

Intermediary Liability and Trade in Follow-on Innovation

Alexander Cuntz and Matthias Sahli

Intermediary Liability and Trade in Follow-on Innovation *

Alexander Cuntz [†] Matthias Sahli [‡]

October 14, 2021

Abstract

Liability rules affect the incentives of intermediaries to disseminate and curate creative works, in particular when works build on the work of predecessors and they are potentially infringing copyright. In an application to the visual arts, we show that appropriation artists borrow images from different sources and incorporate them into new, derivative works of art. By doing so, they risk infringing copyright but also put commercial trade and availability of the work at litigation risk as liability can extend to intermediaries in markets (auction houses) or in public exhibitions (museums). Using a differences-in-differences model and unique data on the level of the individual art work, we empirically investigate the impact of the prominent 2013 *Cariou v. Prince* U.S. court decision on trade and availability in Appropriation Art.

Keywords: copyright; intermediary liability; reuse; appropriation art; auctions

JEL Codes: O31; O34; Z11

*The authors would like to thank Amy Adler, Stefan Bechtold, Carsten Fink, Stefan Heidenreich, Christian Handke, Franziska Kaiser and Guy Pessach, as well as seminar participants at WIPO, at ETH Zürich, at University of Neuchâtel, at University of Lausanne, at University of Southern Denmark (SDU), at Copenhagen Business School (CBS) and conference participants at the 21th international conference on cultural economics (Lille) for their comments on previous versions of the work. Sahli also acknowledges the financial support from the Research Commission FNS. The views expressed are those of the authors, and do not reflect the views of the World Intellectual Property Organization or its member states.

[†]World Intellectual Property Organization, Department for Economics and Data Analytics, 34, chemin des Colombettes, CH-1211 Geneva. email: alexander.cuntz@wipo.int

[‡]World Intellectual Property Organization, Department for Economics and Data Analytics, 34, chemin des Colombettes, CH-1211 Geneva. email: matthias.sahli@wipo.int; University of Neuchâtel, Institute of Economic Research, A.-L. Breguet 2, CH-2000 Neuchâtel. email: matthias.sahli@unine.ch

1 Introduction

While in creative sectors such as music or audiovisual copying at low cost and the quasi-public good character of works pose a threat to their static supply and might cause underprovisioning in the absence of copyright (Landes and Posner, 1989; Posner, 2014, 2005; Depoorter et al., 2019), this is less of a concern in the visual arts (Landes, 2000; Landes and Levine, 2006). However, in general, copyright also balances artistic freedom and commercial interest between different generations of creators, old and new. By granting both parties certain rights and obligations around creative ‘reuse’, copyright defines to which extent new works can be inspired by and build on incumbent ones, and it determines revenue sharing between upstream and downstream activities (Fromer, 2015). This paper adapts a ‘dynamic efficiency’ perspective and aims to account for the longer-term cost to follow-on innovation by ‘users’ of the existing body of works (Handke, 2016), with a particular focus on trade intermediaries.

In recent years, the visual arts have become a central battleground for copyright infringement cases (Adler, 2018). In various court cases around the world, not only the artists themselves, but also intermediaries such as galleries, auction houses and museums alike have been held liable for infringing rights when reusing, selling or exhibiting these works in the visual arts market.¹ In general, intermediary liability has become a growing concern in copyright policies as exemplified by the public debate on Article 17 of the Digital Single Market Directive in the EU. The economic impact of intermediary liability, however, might go well beyond online platforms sharing content. Whether changes in legal frameworks and litigation risks ultimately affect commercial trade around artistic reuses is an empirical question we want to address in this paper. Therefore, the paper builds on previous economic

¹A recent example is the Jeff Koons copyright case heard in the French courts in 2017 where a work by the artist was removed from an exhibition in the Museum Pompidou in Paris, and both, the artist and the Museum Pompidou were found guilty of plagiarism and copyright infringement (Artnet, 2017). The same artist, Jeff Koons, had already been sued in the U.S. in 2015, together with the auction house ‘Phillips’ together for copyright infringement, see e.g. (Artnet, 2015; Adler, 2018)

research studying the effect of copyright regimes on follow-on innovation and (cumulative) creativity ([Giorcelli and Moser, 2020](#); [Heald, 2014](#); [Nagaraj, 2016](#); [Watson, 2017b](#); [Reimers, 2019](#); [MacGarvie et al., 2018](#); [Biasi and Moser, 2016](#)).

Using a differences-in-differences design and large-scale data from online services [Artsy](#) and [Artprice](#), we quantify the impact of the 2013 *Cariou v. Prince* decision and changes in perceived risk around fair use rules on the level of trade and commercial availability in Appropriation Art. Appropriation artists borrow and re-contextualize existing works from popular culture, other artists, advertising or other sources and incorporate them into new work of art ([Evans, 2009](#); [Landes, 2000](#)).² As we will argue in the paper, the controversial US court decision dating back to 2013 has become the defining case of copyright infringement and Appropriation Art of our time, and has the effect of changing the application of fair use rules and perceived risk for intermediaries in the art market. We find that the total number of global auctions declines following the 2013 decision and that, as a response to contributory liability concerns and higher legal uncertainty, some trade in the Appropriation Arts relocates to jurisdictions outside the US. Moreover, while the sales probability of artworks listed in auctions also decreases, hedonic pricing models indicate that auction outcomes do not systematically adjust in due course.

Main contributions of the paper are the following. First, the impact of legal uncertainty in the copyright framework may not only be on copyright owners, but it trickles down on intermediaries such as auction houses and galleries. Accordingly, copyright not only shapes the incentives for creators, but – perhaps more importantly – it shapes the many layers and

²Setting the boundaries of copyright in specific areas of the visual arts might be particularly challenging, and this is why we focus on the Appropriation Art and its relation to art market intermediaries as exemplified in the literature ([Landes, 2000](#); [Landes and Levine, 2006](#); [Schaumann, 2015](#); [Adler, 2016](#)). In many legal frameworks their works are considered ‘derivative’ or ‘transformative’ in nature. In addition, even though this art movement emerged several decades ago, it can be associated with the use of new technologies including digital ones ([Adler, 2016](#)) and also relates to the many new and growing media-based segments in the art market which make cumulative creativity and reuse an area of growing policy concern and interest ([Carroll, 2006](#)).

incentives through which creative works are traded and disseminated. Our economic findings corroborate the basic argument developed in the theoretical literature (Wu, 2004; Landes, 2000). By focusing on intermediaries in the visual art market and their indirect liability for infringement (Landes and Lichtman, 2003), the paper quantifies the shifts of incentives since 2013 and observes behavior for those curating and trading Appropriation Art. Similar to the effect of broader copyrights on reuses (Scotchmer, 1991; Murray and O'Mahony, 2007; Green and Scotchmer, 1995), uncertainty around indirect liability impedes commercial trade and limits curation around follow-on innovation.

Second, because the economic effect of legal uncertainty around fair use defenses is scrutinized in the research, it also contributes to the larger debate about how the (complementary) fair use doctrine under US copyright law compares to a closed lists of copyright exceptions (only), as they exist in many other countries, and whether the fair use doctrine creates legal uncertainty because of its vague, standard-like nature (Beebe, 2008; Sag, 2012). The effect of copyright and indirect liability on the commercial activity around cumulative creativity has received little attention in the economic literature so far and it is a novel contribution for the economic analysis of the art sector and beyond. We provide first-hand quantitative evidence on actual costs and market charges for imposing indirect liability on intermediaries within the fair use doctrine.

Third, empirical studies have documented how differences in national copyright laws can push trade to foreign jurisdictions, and they are part of a larger canon of studies looking at the economic effect of resale rights (Watt et al., 2014; Ginsburgh et al., 2005; Ginsburgh, 2005; Banternghansa and Graddy, 2011). In a similar vein, Landes and Lichtman (2003) argue that indirect liability creates incentives for online music platforms to shift services to jurisdiction that offer them more favorable rules. Notably, our findings provide evidence that legal uncertainty around the fair-use doctrine - as reflected in the U.S. copyright judicial

decisions - can force the relocation of sales to foreign jurisdiction and markets with less uncertainty. To the best of our knowledge, this is the first study that documents such an effect.

The paper structures as follows. Section 2 provides an overview of the economic literature as well as a short legal and art historic background on the reuse of images in the visual arts. Section 3 presents the data and the empirical framework. Section 4 gives results and robustness checks. Sections 5 and 6 discuss policy implications and conclude.

2 Literature Review

While quantitative studies in copyright economics focus on creative and cultural industries such as books, music and movies ([Reimers, 2019](#); [Adermon and Liang, 2010](#); [Aguiar and Waldfogel, 2018](#)), relatively little research has been done on the scope of copyright and on the visual arts sector.³ The role of copyright in the visual arts differs significantly from other sectors. First, there is likely lower demand for copies of visual art works. Even at low prices, copies would be poor substitutes for original works and, traditionally, there is a limited market for print-multiples ([Becker et al., 2000](#); [Buccafusco et al., 2017](#)). Second, there is a high premium value attached to the original artwork and ‘authenticity’ in general ([Watt et al., 2014](#)). In a similar vein, [Landes and Levine \(2006\)](#) argue that the general economic case for copyright protection is weakened for unique works such as paintings, since the artist’s main income source is the first sale of the original work (in the absence of resale rights). Overall, for several reasons being copied seems less of a threat to visual artist’s work and to the appropriation of value than it is for writers, composers or performers in other sectors ([Landes and Levine, 2006](#)).

³For example, [Watt et al. \(2014\)](#) develops economic theory in the visual arts describing how copyright can help artists exploit their works by creating a secondary market for copies and reproductions.

Still, there is an area of the visual arts where copyright laws play a decisive role, namely, in *Appropriation Art*, where, put simple, copying others' work is the modus operandi (see e.g. [Evans \(2009\)](#) and the next section [2.1 'Art Historic Background'](#)). Therefore, rules on the scope of copyright also will need to coordinate between different generations of creators and balance the sharing economic value over time when their work is 'sequential' in nature. There is an argument in the literature that copyright is sometimes overreaching in the scope it provides to original creators compared to their successors ([Buccafusco et al., 2017](#)). National and international laws and legal traditions treat these reuses of works differently, also in the visual arts. For example, in certain jurisdictions, moral rights enshrined in copyright frameworks might require successive artists to credit and have their reuses of (selected) original works 'authorized' ex ante, and also to have follow-on creations reviewed and approved by original creators. Practically, these grant the latter a veto option towards commercialization of the 'derivative' work, which aims to insure the 'integrity' of the original work and its creator. In other jurisdictions, 'fair use' limits copyright protection and allows for unauthorized copying in circumstances which roughly try to adapt to economic efficiencies ([Landes and Posner, 1989](#)). It is worth noting in this context that copyright limitations in other jurisdictions may not be as 'favorable' to Appropriation Art as the U.S. fair use defense can be ([Geiger, 2020](#); [Lucas and Ginsburg, 2016](#)). In particular, the latter doctrine has included in the U.S. the concept of 'transformativeness' which should protect creativity by allowing to some extent new creative art work building on preexisting works (see the section [2.2 'Legal Background'](#) and [Adler \(2016\)](#)), based on the idea that this can safeguard artistic freedom and space to operate.

[Landes and Lichtman \(2003\)](#) were first to discuss the economics of indirect liability for infringement. From the perspective of the law, indirect (or contributory) liability is an alternative mechanism to rights enforcement. Direct infringers often rely on technology, services, and venues provided by other third parties and these parties can be held liable for

'facilitating' infringement even when most of their sales are legitimate. As a consequence to indirect liability, for example, online hosting platforms might be asked to invest in and implement new enforcement and filtering technologies to comply with laws. Whether or not indirect liability of intermediaries can provide a more effective route of enforcement than enforcing rights with direct infringers is not clear *ex ante* and needs assessment.⁴ [Landes and Lichtman \(2003\)](#) argue that the proper scope for indirect liability can be determined by weighing its costs and benefits against those associated with other plausible mechanisms for rewarding creators which replicates their general idea in other papers to fully account for the cost of maintaining the copyright system when defining its boundaries. Our research makes an important contribution to that discussion by providing quantitative evidence on some of the actual costs and market charges for imposing indirect liability on intermediaries. Because they can also be held liable, they might be less willing to curate and offer reuses that are possibly infringing goods to buyers.

Moreover, this research contributes to the debate on the appropriate balance of copyright in cumulative creativity, suggesting that broad copyrights might impede reuse and follow-on innovation ([Heald, 2014](#); [Nagaraj, 2016](#); [Watson, 2017b](#); [Reimers, 2019](#); [MacGarvie et al., 2018](#)). Several of the underlying economic mechanisms around creative reuse deserve attention here. First, copyright incentivizes original creators to consider the additional value of productive reuses or 'remixes' downstream, without cannibalizing their own returns. In this way, well-balanced rights might help expand total output of original works and remixes ([Gans, 2015](#); [McLeod and DiCola, 2011](#)).

Second, it may take the establishment of fair use rules or pre-set compensation schemes

⁴In a similar vein, according to ([Landes and Lichtman, 2003](#)), adjustments to the scope and duration of copyright protection can provide an alternative approach to imposing indirect liability because that also tailors the incentives to create and disseminate works. In general, there is a vast empirical literature on the effects of different types of interventions and enforcement rules on the levels of infringement online and offline which due to space constraints we will not cover here. For an overview, see [Danaher et al. \(2017\)](#).

to overcome strategic hold-up and transaction costs problems around the efficient licensing of such reuses, in particular for productive rather than reproductive ones (Landes and Posner, 2003; Posner, 2004; Landes and Posner, 2009).⁵ Put differently, the economic efficiency around fair use can include circumstances with high transaction costs in which the benefits to the copier are higher than costs of negotiation with the downstream right holder (Landes and Levine, 2006). For example, Watson (2017b) argues that hip-hop artists reusing preexisting recordings (i.e. digital sampling in music) spend excess information and search costs before they can enter negotiations over licenses with the relevant right holders. Thus, ex post licensing together with sunk cost creates hold-up inefficiencies for potential reuses.

Third, when downstream artists invest in creating a derivative work based on multiple sources, complementarities arise between original works (Watson, 2017b). As a result, right holders might individually charge higher licensing fees above the optimal level, so-called ‘royalty stacking’ increasing the cost of downstream reuses, an issue previously discussed in the context of patents (Farrell et al., 2007). In yet another paper, Watson (2017a) uses a matched-sample difference-in-differences design and reproductive ‘reuse’ instances as a quasi-exogenous shock to the music streaming of the original/underlying song. Using Spotify’s similarity algorithm, he finds that downstream reuses exhibit positive demand effects via advertising on the streaming of original songs, thereby moderating ex post competition from reusing songs. These effects are larger for less prominent artists and first time reuses of original songs. Both papers (Watson, 2017b,a) serve as an inspiration for the research design and methodological approach developed in this paper.

Reuses in Appropriation Art in particular are often productive rather than reproductive in nature. Hence, it is unlikely that, in this particular field of the visual arts, upstream works

⁵That said, e.g. visual artists rights associations and registries offer support for licensing to those who want to reproduce works of visual art, mostly reproductions of their artwork in e.g. books, postcards or merchandise (Posner, 2004).

do much harm to original works and will cannibalize their anticipated licensing revenues as in other sectors (Landes, 2000; Martin, 1985; Watson, 2017a). Rather it seems, based on the literature on cumulative creativity and copyright effects, artistic freedom to operate and reuse practices in the Appropriation Arts could be affected by changes in legal frameworks, including judicial decisions. A similar situation might well apply to market intermediaries that are facing higher litigation and liability risks when trading possibly infringing reuses compared to other types of original artworks. Ultimately, this is the empirical question we want to address in this paper. In the following, we briefly outline the history of Appropriation Art and the legal concept of fair use in the visual arts.

2.1 Art Historic Background: Reuse of Images in the Visual Arts

Appropriation *in art* is nothing new and dates back far. From a historic perspective, artists have always reused, borrowed or repainted from one another's work (Irvin, 2005). In doing so, appropriation of existing imagery for visual art works finds its artistic roots in Modernism (for a historical development of appropriation, see (Ames, 1993), (Welchman, 2013)). However, so-called *Appropriation Art* is somewhat different than what was created before.

The history of appropriation in art and its perception has changed over time. For example, (Schaumann, 2015) briefly discuss the history of appropriation as an artistic technique and (Evans, 2009) provide a more extensive art historic review of artistic practices and theoretical concepts of Appropriation Art. In the early twentieth century, artists began to take objects from others into their works of art, such as Picasso and his collages. With Marcel Duchamp's famous 'ready-made' art works he repositioned and retitled ordinary manufactured objects. Shifting from the use of objects, the 'Pop Art' movement started in the 1960s to reuse preexisting images. Leonardo DaVinci's 'Mona Lisa' is maybe one of the most famous appropriated artworks, to name just a few, e.g. Marcel Duchamp, Banksy or Andy Warhol appropriated this piece of art. The contemporary artists' Sherrie Levine, Louise Lawler,

Richard Prince or Elaine Sturtevant, however, went one step further in terms of appropriation of art. The famous *Cowboy Series* is emblematic for the art work by Prince, where he rephotographed Marlboro's (older) advertisements (see. e.g. (Phillips, 2021)). Sturtevant, besides, mainly practiced the art concept of reproducing artworks by contemporary artists, which were visually indistinguishable from the originals, probably best known for her series called *Warhol Flowers* (Artnet, 2021). In a similar vein, Sherrie Levine photographed reproductions of the male photographer Walker Evans (titled *After Walker Evans*), or replicas of Marcel Duchamp's Urinal (titled *After Marcel Duchamp*), among others, raising questions about originality and authenticity, and to make a point about how female voices were undervalued in the art world (MET, 2021; Tate, 2021).

Copying in art has now become a central subject of contemporary art because of shifts in both the art itself and the available technology (Adler, 2016). Throughout the twentieth century, artists also have used appropriation not only as a means for creating new art but also to express social criticism (Okpaluba, 2002). Appropriation Art strategies include readymade, détournement, pastiche, rephotography, recombination, simulation or parody, see e.g. (Evans, 2009). Overall, by the 1980s the term 'Appropriation Art' came into use and copyright infringement cases against artists who reuse images have increased in the last few decades (Schaumann, 2015) and hence an increasing amount of questions on the role of copyright law in the visual arts.

2.2 Legal Background: Copyright Rules and the Reuse of Images

As argued above, an important affirmative defense in U.S. copyright law is the fair use doctrine (Landes and Levine, 2006). Fair use allows for unauthorized copying in circumstances that are roughly consistent with promoting economic efficiency (Landes, 2000). That said, fair use in these terms is fair when 'the cost of transacting with the copyright owner over

permission to use the copyrighted work would exceed the benefits of transacting’ ((Posner, 1992), p.69, and (Landes and Posner, 1989)). In broad terms, the fair use codified in section 107 of the U.S. Copyright Act allows for fair use and reproduction of a copyrighted work for purposes such as criticism, comment, teaching, research or news reporting and provides the four factors to be used in determining whether a particular use made of a work is a fair use (for an application to the visual arts, see (Schaumann, 2015; Adler, 2016, 2018; Whitaker, 2019)).

Other legal systems also include rules prescribing exceptions and limitations for the scope of copyright protection, such as the British right of ‘parody’, known as ‘fair dealing’, or the French ‘droit de citation’ (Depoorter and Parisi, 2002). Also, Israel and South Korea currently have implemented limited fair use provisions (Watson, 2017a). Generally, scholars on fair use argue that the doctrinal complexity and legal uncertainty can result in higher intellectual property enforcement costs (Depoorter et al., 2019). The adaptation of the open-ended standard of the copyright doctrine to technological advances is discussed in Depoorter (2008) and Menell (2002). Furthermore, Liu (2019) provides an empirical study of transformative fair use jurisprudence for all types of copyrighted works in the U.S.

Certainly, when it comes to copyright law in the visual arts, the fair use doctrine is the subject of a controversial debate based on U.S. copyright jurisprudence. Appropriation Art has been challenged in the U.S. courts many a times as an infringement of copyright of the ‘appropriated’ works (Agarwal, 2017).⁶ As a landmark case (Adler, 2018) in fair use, scholars point out the decision of *Cariou v. Prince* in 2013. The artist Richard Prince *and*

⁶Among early Appropriation Art cases, in 1992 *Rogers v. Koons*, Koons was sued for transforming a photograph into a sculpture. Based on fair use, Koons argued that his sculpture should be privileged as a satirical comment or parody, but the court rejected this (Landes, 2000; Posner, 1992; Ames, 1993). Already at that time, the decision was not well received by artists because of their fear this might cripple Appropriation Art (Landes, 2000). The same artist, Koons, won the next case in 2006 (*Bloom v. Koons*) where the court held that the reusing work differed sufficiently from the original. For a detailed review of copyright fair use cases in the visual arts and the road to *Cariou v. Prince* see e.g. Adler (2016). A more recent case is the *Warhol v. Goldsmith* decision from early 2021, accessible [here](#).

the Gagosian Gallery as the market intermediary were sued for copyright infringement by the photographer Cariou for incorporating altered versions of his photographs into Prince's series of artwork (see e.g. (Francis, 2014)). The lower court ruled in favour of the upstream photographer Cariou and found that the whole artwork series was infringing the copyright in the original content. Interestingly, not only was Prince held liable for copyright infringement, but the Gagosian Gallery was also found to have 'vicarious and contributory' liability (Adler, 2016). In a spectacular turnaround, the Second Circuit found that twenty-five out of thirty artworks in that series were fair use (Sarmiento and Haaften-Schick, 2013).

While a superficial reading of the decision could lead to the conclusion that the decision might even increase legal certainty and trade, others argue that the opposite was true: The decision refined the fair use test in important ways that made it, arguably, more complicated – at least in the short term – to predict whether Appropriation Art is a copyright violation of the original artwork or not. Accordingly, it made the law even less predictable for artists and everyone involved in trade and curation of these works (Adler, 2018). Moreover, the decision undermined the importance of other fair use factors with its unclear boundaries and an increased emphasis on transformation (Agarwal, 2017). The mere possibility of fair use litigation would now threaten away artists and their intermediaries and so 'fair use is broken' (Whitaker, 2019). In Adler (2016), the decision is described as the most urgent art law case and that it has brought a state of 'panic' to the art world. What is more, the court decision also has not been well-received in the art scene, as for instance the New York Times had titled 'one of the most closely watched copyright cases to rattle the world of fine art' and that it 'set off alarm bells [...] in museums showing contemporary art' (NewYorkTimes, 2011).⁷

In any case, this controversial and prominent court decision in 2013, has become the new

⁷Some further voices from the art scene are represented in ArtNews (2014), among others, the Andy Warhol Foundation and Amy Goldrich, which framed the decision as 'one of the most significant art copyright cases of recent decades' [...] and further argued that it was a positive outcome for appropriation artists and 'those whose work may be sources for appropriation will likely be disappointed by this outcome.' We also provide further evidence on the importance of the exogenous shock by analyzing google online searches in section 3.3.

boundary drawing case of copyright infringement and Appropriation Art and it substantially increased legal uncertainty and litigation risks ([Sarmiento and Haaften-Schick, 2013](#)).

We argue that there was a somewhat more complex market response as the decision is said to have increased overall legal uncertainty for downstream artists and derivative works on sale and in exhibitions. Hence, the role of fair use in the visual arts and how it affected behavior on markets, ultimately, is an empirical question we want to address. Although the case was settled upon remand and thus there is no final determination of liability from the District Court, in its initial determination the District Court had found that *'the Gagosian Defendants had the right and ability to ensure that Prince obtained licenses to use the Photos before they made Prince's paintings available for sale'* and therefore ruled that the Gagosian Defendants were liable as vicarious and contributory infringers.⁸ Accordingly, we can motivate the focus on trade intermediaries such as auction houses by the legal uncertainty these decisions induced in the legal framework and the broad publicity they received. As illustrated in the previous section 2.1, the fine arts is currently undergoing a technological shift in creating new art ([NewYorkTimes, 2011](#); [Adler, 2016](#)), while at the same time, as this section showed, 'copyright and fair use have become a central battleground' in the visual arts sector.

3 Data and Empirical Framework

3.1 Data and Matching

The unique dataset is compiled from the 'Art Genome Project' and its hosting service [Artsy \(2019\)](#). The online matchmaker brings together reputable galleries, auction houses and art buyers globally. Next to hosting thousands of art work for sale online, it also presents educational material and, provided its mere scale, also serves as a 'reference' catalogue on

⁸Excerpt from *Cariou v. Prince*, 784 F. Supp. 2d 337, 98 U.S.P.Q.2d 1318 (S.D.N.Y. 2011).

visual arts history to users. Its technology builds on a growing database containing more than 50'000 artists. The 'Art Genome Project' classifies, connects and characterizes each of these artists with currently over 1'000 characteristics, so-called 'genomes' (Artsy, 2019). In this way, the 'Art Genome Project' is a classification system, manually conducted by art historians and data-scientists.

As a first step, we identify and attribute artists to the field of Appropriation Art, based on the artist-level 'appropriation' genome recorded in the Artsy data. API queries result in 1'901 unique artists and their biographies, including information on place and year of birth and death, nationality, and current work locations.⁹ As a second step, we survey the complete list of genomes and identify other genomes from the Art Genome Project indicating other types of reuse practices.¹⁰ This provides additional information on other reusing genomes (other than the appropriation genome collected in the first stage) for the initial set of appropriation artists i.e. up to eight different 'genomes' around reuse practices can now be assigned to an individual artist of the first query. In order to create our control group of artists, we retrieve information on similar artists based on Artsy's similarity algorithm and the Art-Genome-Project nearest neighbor graphs (i.e. related artists, however, excluded all artists with one or more appropriation-close genome-information).¹¹ This gives us another 2'362 artists with a similar set of genomes as the one recorded for the initial set of appropriation artists. To sum up, our Artsy dataset contains 4'263 unique artists meeting one or more criteria (i) a tight definition of appropriation based on a single 'appropriation' genome, (ii) the first

⁹After initial registration, artist meta-data from the Artsy website can be accessed via the public application programming interface (API). Python code used in the paper will be provided online.

¹⁰According to (Artsy, 2019) close 'genomes' of 'Appropriation Art' are: contemporary conceptualism, engagement with mass media, layered images, mixed media, neo conceptualism, photographic source, the pictures generation, use of vintage imaginary.

¹¹Artsy's similar artists feature "continuously computes a K-nearest neighbor graph for artists using data from the Art-Genome-Project" (Artsy, 2020). The 1'000+ characteristics of artists include art historical movements, subject matter and formal qualities, a detailed list is provided here (Artsy, 2021). We manually double-checked the 'appropriation' classification by comparing the queries with known and listed artists on e.g. Wikipedia, (Tate, 2021) or (Evans, 2009). Chapter 3.2 furthermore describes differences of appropriation artists and similar artists on the artist-level, and chapter 3.3 compares outcomes (auction results) in both groups to make sure that the groups are sufficiently close based on objective criteria.

criteria plus a wider definition of appropriation based on multiple genomes associated with different reuse practices and (iii) being similar based on a vector calculation across all Artsy genomes, however, not meeting one of the first two criteria (control group).

As a second source we compile trade data on auction outcomes from [Artprice \(2020\)](#). The Artprice database contains auction records on more than 12 m. artworks from around 6'000 houses worldwide and auctions since the 1960s ([Artprice, 2020](#)). First, for unique artists from our initial Artsy list, the Artprice database allows us to combine information on approximate production and the supply of works over time, i.e. we can establish the sales catalogue of works for appropriation artists, the so-called catalogue raisonné. We are able to match auction data for 1'025 appropriation artists (out of the total 1'901 artists) and another 1'162 similar artists (out of the total 2'362 artists). The latter constitutes our control group of artists that are active in very similar art fields based on the Artsy algorithm, but that do not carry the appropriation genome nor another genome closely related to Appropriation Art. We thus can minimize the risk that artists in the control group also affected by the change in law practice are included and, at the same time, that they are not sufficiently similar to those of the potentially treated artists. Moreover, especially for younger and less popular artists, data coverage might be limited as not all artists and their artworks have (yet) entered secondary markets (auctions) at the beginning of the observation period. Still, descriptives for matched and unmatched artists from Artsy samples yield very similar results.¹² Second, we gather additional information from Artprice webpages on the level of the individual artwork (for example, the work's title, size, medium, date of creation, price estimates and 'hammer-prices') and on the level of the auction house (for example, location and auction date). Notably, most auction markets are heavily concentrated around a few

¹²40 per cent of unmatched appropriation artists are born in the U.S., followed by many British, Chinese and French-born artists. However, we observe fewer Chinese-born appropriation artists in matched samples. Roughly 33 (37) per cent of unmatched artists are female, and, on average, artists are 12 (7) years younger compared to matches in the appropriation sample (control group). Arguably, this suggests that some younger artists and recent artworks have not yet entered secondary markets and thus their actual market values might be less well covered in both samples.

superstars which also applies to Appropriation Art. Andy Warhol, Damien Hirst and Roy Lichtenstein alone account for more than a quarter of all auctions recorded for appropriation (-close) artists.¹³

3.2 Descriptive Statistics

Table 1 gives a descriptive overview of the matched sample of appropriation artists compared to similar artists. This dataset contains 171'573 auction results for appropriation artists and 198'073 auction results for artists in the control group, and thus a total of $n = 369'646$ outcomes from art auctions recorded over a forty-year period since 1980.

On the one hand, appropriation artists were, on average, born in 1962 (figure 1) and female artists account for roughly one-fifth of the total sample. The average artwork was created in 1984 (figure 2). And, the data shows interesting cyclical and, if anything, weakly increasing trends in the production and supply of new works as recorded in the auctions data. This is in line with our expectations as Appropriation Art is a relatively recent art movement. Furthermore, in three quarters of total auctions by appropriation artists lots were sold and traded at a mean (median) hammer price of 125'590 (5'000) USD (table 1, figure 3). Figure 2 shows that most of these artworks (medium) were multiple-prints (46 per cent) or paintings (22 per cent).

On the other hand, similar artists in the control group were born, on average, in 1956 and female artists account for roughly one-fourth of the total (figure 1). Figure 4 compares total auctions of artworks by appropriation artists with those recorded for similar artists

¹³The economic literature on art auctions also discusses the so-called 'master-piece effect' (Ashenfelter and Graddy, 2003) which relates returns from investment in paintings of well-known artists to those garnered from investment in less-known, second-tier artwork. The empirical evidence is ambiguous so far, ranging from a positive effect (De la Barre et al., 1994) to no or a negative effect of more investment in masterpieces (Ginsburgh and Jeanfils, 1995; Pesando, 1993; Ashenfelter and Graddy, 2003; Mei and Moses, 2001).

Table 1: Descriptive Statistics

	MEAN	SD	MIN	MAX	OBS
Appropriation Artists					
Artists-Level					
Birthday	1962.35	17.21	1879	2010	840
Deathday	1998.34	18.56	1927	2020	79
Female	0.22	0.42	0	1	876
G Mixed Media	0.35	0.48	0	1	1025
G Contemp. Conceptualism	0.24	0.42	0	1	1025
G Eng. with Mass Media	0.20	0.40	0	1	1025
G Layered Images	0.08	0.28	0	1	1025
G Neo Conceptualism	0.01	0.11	0	1	1025
G Photographic Source	0.13	0.33	0	1	1025
G Pict. Generation	0.01	0.12	0	1	1025
G Use of Vintage Img.	0.05	0.22	0	1	1025
Auction-Level					
Artwork Creationyear	1984.71	19.51	1854	2019	141527
Artwork Size m2	0.71	1.13	0	53.3	145476
Artwork Size m3	0.45	2.88	0	174.96	13416
Auction Year	2011.1	6.94	1983	2020	171573
Auction Estimate (low) USD	86745.83	1068082	0	1.27e+08	170248
Auction Estimate (up) USD	115903.5	1028728	0	7.00e+07	145924
Auction Hammerprice USD	125590.3	1369431	-3	1.27e+08	121471
Lot Not Sold	0.26	0.44	0	1	171573
Number of Auctions	434.48	632.279	1	2230	171573
log(Number of Auctions)	4.53	1.86	0	7.43	171573
% of U.S. Auctions	0.289	0.261	0	1	171573
Control Artists					
Artists-Level					
Birthday	1956.22	23.63	1875	1990	895
Deathday	1992.27	32.64	1771	2019	130
Female	0.27	0.44	0	1	960
Auction-Level					
Artwork Creationyear	1966.9	25.08	1869	2020	143256
Artwork Size m2	0.47	1.23	0	309.68	161619
Artwork Size m3	0.35	1.56	0	78.40	10316
Auction Year	2010.63	7.61	1983	2020	198071
Auction Estimate (low) USD	37328.79	713345.5	0	1.40e+08	196086
Auction Estimate (up) USD	56311.14	692166.7	0	5.91e+07	160171
Auction Hammerprice USD	52204.96	911577.4	4	1.60e+08	141670
Lot Not Sold	0.255	0.44	0	1	198073
Number of Auctions	893.34	1512.5	1	4406	198073
log(Number of Auctions)	4.88	2.21	0	8.39	198073
% of U.S. Auctions	0.248	0.268	0	1	198073

throughout the observation period. There is an increasing trend in the total number of auctions for each group. This seems to be due to a higher fraction of younger artists entering auction markets as time progresses as well as, eventually, more complete data coverage of

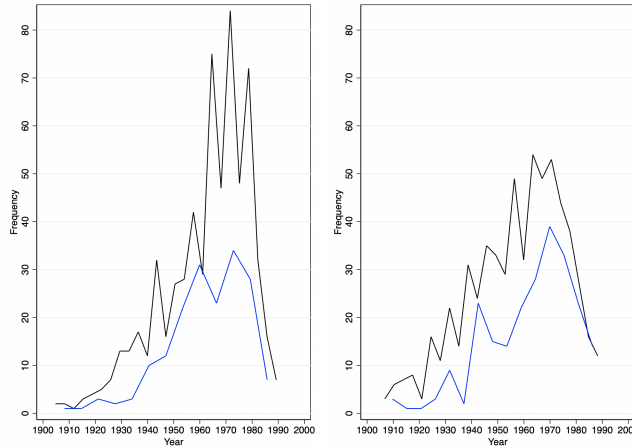


Figure 1: Panel Distribution of Artists' Year of Birth

Note: This figure shows the birth year of appropriation artists (left) and similar artists (right) by their gender. The blue lines indicate female artists and black lines represent male artists' birth year. The two figures are restricted to artists born in 1900 or later, 26 artists are excluded, ($n=2'159$).

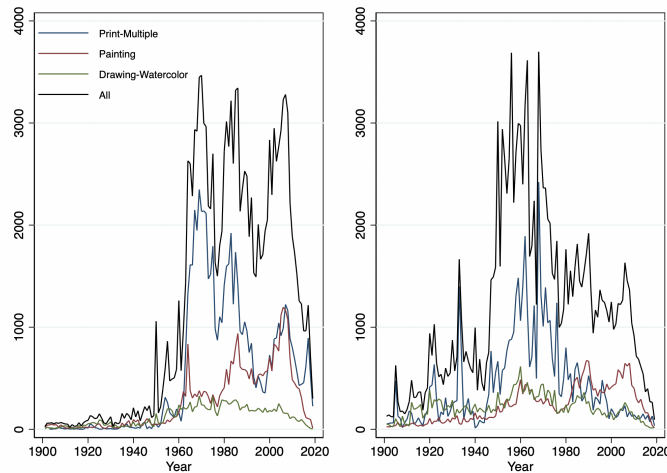


Figure 2: Panel Distribution of Artworks' Year of Creation and Selected Artwork Medium

Note: This figure shows the total number of artworks (black line) and corresponding years of creation. The colored lines represent the distribution for selected artwork-mediums. The left (right) panel presents appropriation artists (control artists). Samples are restricted to unique artworks (based on titles) and those created after 1900, ($n= 221'892$).¹⁴

auctions over time in the underlying Artprice database. Average (median) hammerprices for similar artists stood at 52'204 (3'030) USD (table 1 and figure 3). The difference in average auction prices when compared to appropriation artists is driven by a few outliers and superstars which achieve higher auction results on a constant basis. We therefore log-

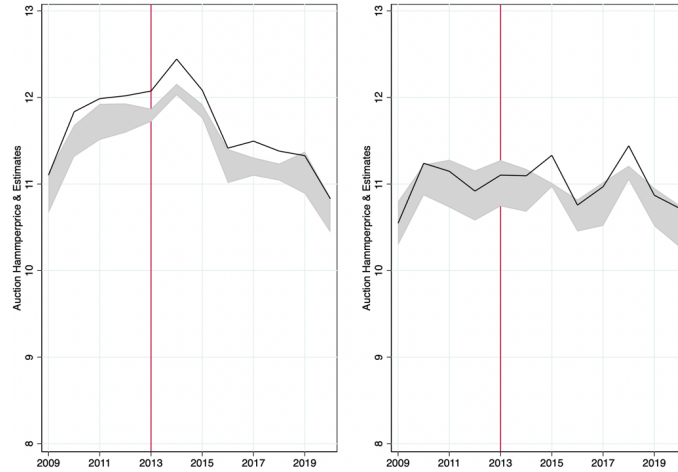


Figure 3: Panel Distribution of Auctions' Hammer-prices and Price Estimates Ranges

Note: This shows the yearly log-transformed mean of the price-estimates ranges (grey-shaded area) and realized auction hammer-prices (black line). The left (right) panel shows auction outcomes for appropriation (control group) artists.

transform the dependent variable 'hammerprice' in our estimates (for more details, also see section 3.3). Similar to the treatment group, in one out of four auctions for similar artists, lots were not sold.

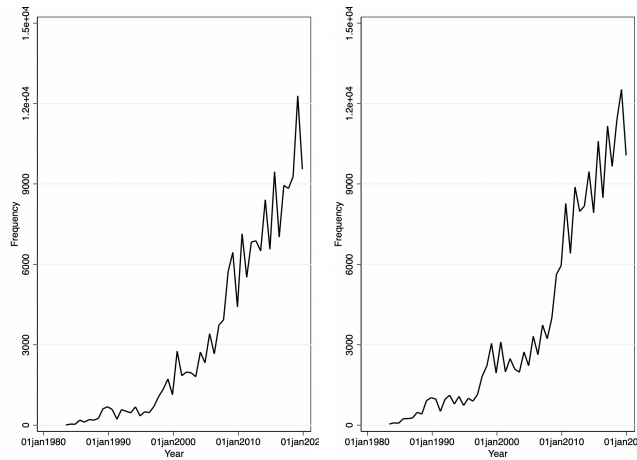


Figure 4: Panel Distribution of Auction Dates

Note: This figure shows the distribution of the total numbers of auctions for appropriation artists (left) and for control artists (right), (n=369'646).

Moreover, the highest percentage of appropriation artists' originate from the U.S. (31 per cent), followed by British (10 per cent), French (5 per cent) and German (5 per cent)

artists. In terms of their work location, artists frequently reside in New York (U.S.) (9 per cent), London (U.K.) (6 per cent), L.A. (U.S.) (6 per cent), Berlin (Germany) (4 per cent) or Brooklyn (U.S.) (4 per cent). Geographic origins and locations are comparable for control and appropriation artists and only few data caveats apply.¹⁵

Once again, figure 4 shows an increasing trend of auction records over time. Most of the auctions take place in auction houses in the U.S. (29 per cent), followed by houses in the U.K., Germany and France. Moreover, the most prominent auction houses in our sample in terms of the total number of auctions are Christie’s, Sotheby’s and Phillips (all UK origin but with satellite houses around the world). The top ten auction houses for similar and appropriation artists are listed in table 2, accounting for roughly 40 per cent of all records.

Table 2: Top 10 Auction Houses

Appropriation Artists		Control Artists	
Auction House	Observations	Auction House	Observations
Christie’s	25,510	Christie’s	26,054
Sotheby’s	22,302	Sotheby’s	20,953
Phillips	10,559	Bonhams	7,317
Bonhams	4,304	Phillips	5,016
Artcurial S.V.V.	3,676	Swann Galleries	3,877
Van Ham Kunstauktionen	2,471	Artcurial (S.V.V.)	2,934
Cornette De Saint CYR M.	2,309	Grisebach	2,110
Dorotheum	2,005	Lempertz 1,792	1,789
Lempertz	1,962	Mainichi Auction Inc.	1,757
Swann Galleries	1,962	Dorotheum	1,755
1,471 other houses	94,489	1,864 other houses	124,511

Note: This table shows the distribution of the top 10 auction houses (any country) by appropriation (left) and similar artists (right). The last line gives total auctions/observations by all other houses.

By exploring museum collection- and exhibition-data around Appropriation Art and appropriation-close artworks, we provide further descriptive evidence on the public inter-

¹⁵The highest percentage of artists in the control group mostly originate from the U.S. (26 per cent), Great Britain (7 per cent), Germany (6 per cent) and France (4 per cent). In addition, similar artists are most frequently located and working in New York (roughly 8 per cent), London (5 per cent), L.A. (5 per cent), Paris (4 per cent) and Berlin (3 per cent). Notably, figures warrant careful interpretation as some artists record more than one work location/residence and because location names are not fully harmonized across the data.

est and continued market relevance of the Appropriation Arts following the 2013 decision. For this purpose, we create a subsample of the top-500 appropriation artists (in terms of Artsy-ranking) and manually link them to the Metropolitan Museum of Modern Art New York (MET) collection database.¹⁶ On the left-hand side, figure 5 shows the total yearly number of exhibitions of appropriation artworks in the MET Museum or artworks on loan to other museums. Overall, it shows an overall increasing trend. On the right-hand side, when taking a look at the total number of days these artworks were exhibited, trends are as well increasing but they seem slightly less pronounced for more recent years. In general, appropriation artworks are exhibited more often, but also for longer periods. In addition, based on the vast MET collection as one of the most important contemporary art collection in the U.S. (if not the world), we find further support for the importance and continued interest in the Appropriation Arts in recent years as more than 10% of our Appropriation Art subsample of artists were found in the MET collection. Based on this descriptive evidence, the indirect liability of intermediaries such as museums¹⁷ and arguably greater legal uncertainty in the copyright system does not seem to have systematically limited the availability and dissemination of possibly infringing artworks in these (public) spaces. Whether this result would continue to hold for museums in a multivariate setting or in a more detailed, artwork-level analysis is an interesting endeavor we leave for future research.

3.3 Empirical Framework

The empirical strategy exploits the 2013 court decision as an exogenous institutional shock using a differences-in-differences design (see also section 2.2 on 'Legal Background'). The court did reverse a lower court decision, which took many observers by surprise and was

¹⁶The New York MET-collection database is the largest art museum in the U.S. with a focus on contemporary art. Based on this step, we are able to identify 53 artists with a total of 178 artworks collected by the MET museum, and, web-crawling their recent artworks' exhibition history, results in a total of 702 exhibitions for them (exhibited in the MET or on loan to other museums).

¹⁷Please refer, for instance, to the recent Appropriation Art copyright lawsuit where a work by the artist Jeff Koons has been removed from an exhibition in the Museum Pompidou in Paris ([Artnet, 2017](#)).

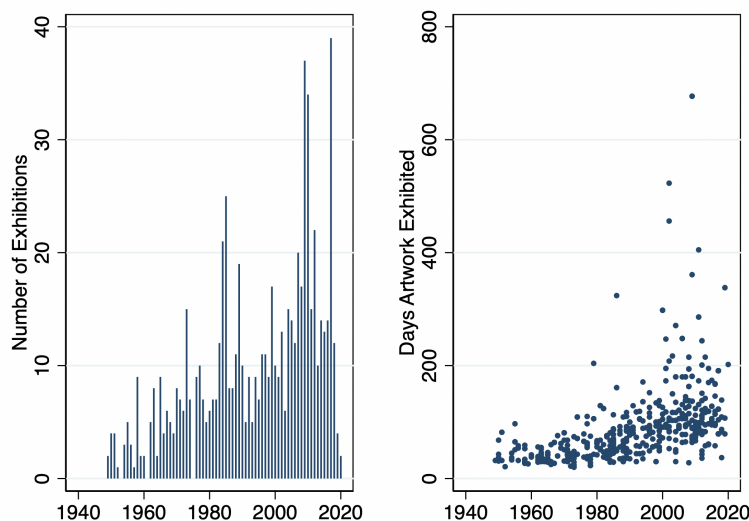


Figure 5: MET Appropriation Artwork Exhibitions

Note: This figure shows the total number of exhibitions (left) and total number of days an artwork was exhibited (right) of Appropriation Art artworks (based on a top-100 subsample of artists) in the Metropolitan Museum of Modern Art (MET) New York, (n= 521).

hard to anticipate at the time. Based on Google trends data, figure 6 shows online searches for alternative sets of keywords, 'cariou v prince' and 'cariou v. prince' (i.e. common ways to search for legal cases in the U.S.). This gives rise to three interesting takeaways. First, initial noise in searches already starts from 2009 onwards, when Cariou filed his copyright infringement case. Second, in line with our empirical strategy, around the 2nd Circuit decision cutoff date in April 2013 we see a systematic increase (top panel) and a peak in searches on Google (bottom panel). And third, we are unable to observe any searches (or searches are below the limit threshold of Google trends) outside the U.S., although we inspect search traffic worldwide.

The identification strategy exploits two alternative differences-in-differences approaches to estimate the effect of the prominent *2013 Cariou v. Prince* court decision, a change in copyright jurisprudence, so to speak Adler (2016). Differences-in-differences analysis is a common research design to estimate causal effects of such a change in law practice or policy

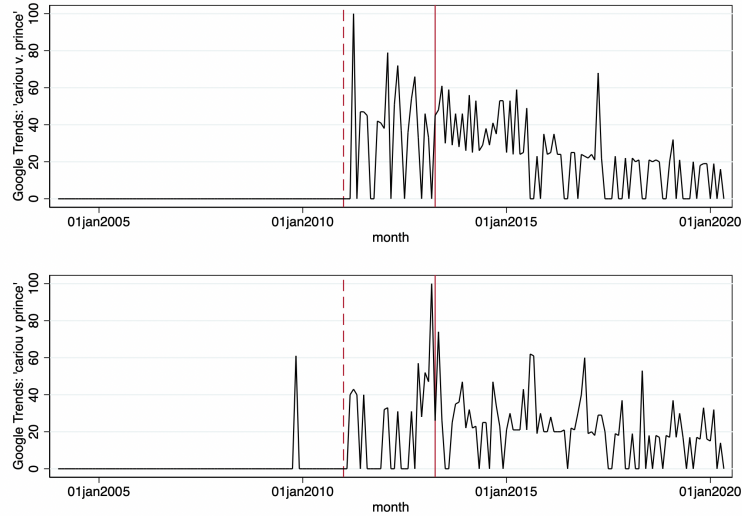


Figure 6: Google Trends: Cariou v. Prince

Note: This figure shows online searches worldwide between 2005 and 2020 for two sets of keywords: 'cariou v. prince' (top panel) and 'cariou v prince' (bottom panel) around the 2013 court decision (red vertical line). Searching users are located in New York (NY) and search data is normalized.

change (for an application to changes in copyright laws see, for example, [Kretschmer and Peukert \(2014\)](#); [Watson \(2017b\)](#)). A first strategy considers the global auction market for Appropriation Art as potentially treated¹⁸ in the post-2013 period, and thus we control for auctions and artworks by similar artists that we can identify based on the Artsy genome information. A second strategy compares only auctions for appropriation artworks in the U.S. (treated group) to auctions of the same art movement outside the U.S. (control group). We assume that artists themselves do not directly respond to a particular court decision in a copyright case by shifting 'appropriation (art) practices', for example, by increasingly reusing non-infringing materials from the public domain in new artworks. This can be explained by the fact that, for most Appropriation Art artists, knowingly appropriating (copyrighted)

¹⁸For the set of treated artists we have information on both a tighter' definition of *Appropriation Art* artists and a 'wider' definition of contemporary artists associated with or categorized as artists applying 'appropriation' practices (including the appropriation-genome). Again, it is important to note that not all artworks in the group of treated artists will infringe copyright. But since not all rights around potentially copyright-infringing artworks are cleared, *potentially* infringing artists and artworks are equally important levels of the analysis to consider as the perceived risk of copyright litigation will still shift incentives to trade these artworks.

objects and image is at the very center of their artistic strategy and practices, and we expect them to be faithful to the original 'conception' of the Appropriation Art (movement). Given the various copyright litigation cases against artists *and* the claims on contributory liability of galleries and auction houses, we expect strong responses to a change in the (visual art) fair use jurisprudence on secondary market trade of appropriation artworks.

In the first empirical setting we make use of the fact that not all auctions result in a sales success, and hence, the auction houses will either report the hammer price or that the artwork has not been sold, i.e. 'lot not sold'. This is the case for roughly 30 per cent of all auction records, in both our treatment and control samples. We thus run logit models for the probability that an appropriation artwork is a sales success when compared to similar artists and their auction successes before and after the event in April 2013. Arguably, a focus on immediate sales success captures the short- to mid-term effect of the policy change. If auction schedules only can be adjusted slowly to the changes in the legal environment and the supply of artworks is to a certain degree 'sticky'¹⁹, we might well observe immediate demand-side responses via the observed changes in sales probabilities. In the longer-term, however, auction houses and galleries will adjust their supply to the changes in potential litigation risks of hosting and selling appropriation artists, and these artworks might no longer (or less often) appear on the secondary market. In turn, a second set of regressions focuses on the total number of auctions. Arguably, this captures the longer-term effects on total trade of appropriating artworks which potentially include copyright-infringing materials before and after the decision. A third set of regressions takes a closer look at the U.S. market outcomes. Here, we focus on the percentage of artworks by an appropriation artist that are hosted in U.S. auctions (relative to non-U.S. auctions) compared to the percentage for a similar artist and her works in the pre and post-2013 periods. This effect might well capture whether or

¹⁹For example, it is common practice to publish a pre-sale catalogue with information on the auction items up for sale and auction houses are typically commissioning the work for sellers entering a contractual relation with them (consignment agreement) that cannot be immediately canceled. For standard practices at art auctions see [Ashenfelter and Graddy \(2003\)](#).

not appropriation artworks increasingly shifted to auction houses outside the U.S. and other jurisdictions, and whether the changes in perceived litigation risks among secondary market intermediaries in the U.S. led to a 'relocation' of global trade in due course. To set up our baseline model more formally, let

$$Y_{itc}^k = \alpha + \beta_1 Post_t + \beta_2 Appropriation_i + \delta(Appropriation_i \times Post_t) + \mathbf{X} + \mu_i + \phi_t + \gamma_c + \epsilon_{itc}, \quad (1)$$

where Y_{it}^k are the outcome variables (k) for auction results of artist i at date t . $Appropriation_i$ identifies the group of treated artists and $Post_t$ all auctions scheduled after April 2013. The differences-in-differences coefficient of interest is captured by δ . We include year fixed effects ϕ_t , country fixed-effects γ_c , artist fixed effects μ_i , and a vector of controls X to the baseline model.

A second, alternative identification strategy limits the data to appropriation artists only and compares their U.S. (treated) to non-U.S. auctions (control group) before and after the prominent court decision. In this way, the strategy also addresses potential boundary and composition issues for treatment and control groups. Arguably, not all artists in the treatment group are incorporating copyright-protected material in each of their artworks, and the potential infringement of the derivative or the resulting work can only be considered an approximation. In a similar vein, some artworks and art practices by similar artists might involve reuse of already existing, original works created by other artists. This will make it harder to establish clear-cut boundaries between treatment and control groups.

Baseline models include artists- and year-fixed effects (FE) and, where feasible, clustered standard errors at the artist level or bootstrapped standard errors, taking into account the plausible auto-correlation in the data as discussed in [Bertrand et al. \(2004\)](#) for differences-in-differences estimations. Clustering standard errors may not always be required as [Abadie et al. \(2017\)](#) argues. If fixed effects are included and there is no heterogeneity in the treatment

effect, adjusting for standard errors is not necessary. The FE panel regressions allow us to observe the coefficient of interest, $appropriation * post$, and we control for unobserved artist-specific and time-invariant heterogeneity as well as time trends in the auctions data with year FE. However, as being an appropriation artist (or not) is not a time-variant characteristic the way our initial data is structured, we cannot separately report effects for our treated group coefficient $appropriation$. Furthermore, next to the baseline models, we include artwork-level specific controls (artwork size, artwork medium and artwork age at auction date) or auction-specific controls (top auction houses²⁰ and sales country), or both in alternative model specifications. Furthermore, fixed-effects and differences-in-differences estimators are based on the idea of time- or group-invariant omitted variables ([Angrist and Pischke, 2008](#)), and potential endogeneity could lead to incorrect inferences. Thus, unobserved time-variant heterogeneity in the group of treated artists might still be correlated with the error-term. Given the quasi-experimental framework, our large-scale auction-dataset and various control variables, we assume that the potential omitted variable bias is less of a concern, and careful causal inference is appropriate.

An important task is to construct and validate a control group that does not violate the pre-2013 common trend assumption in the differences-in-differences framework. This assumption requires a parallel trend before a policy change and assumes that the treatment and control group would have had a similar trend in the outcome variables (i.e. the so-called 'counterfactual trend' in the treatment group). We address this issue in two steps suggested in the standard literature ([Angrist and Pischke, 2008](#)). First, we plot the mean of the dependent variables for the treatment and control group before and after the event. The results suggest that baseline models include pre-period trends of 2000 up to a minimum of 2010, i.e. a lag maximum of 13 years before the court decision, and a lag minimum of 3

²⁰We control for the four biggest auction houses, as this effect captures most of the variation of auction house differences we found, and furthermore, reporting practices across auction houses can vary ([Ashenfelter and Graddy, 2003](#)).

years before. And second, for a more formal inspection of the common pre-trend assumption we estimate further regressions as, for example, described in Autor (2003). To further check the robustness of our results we apply placebo tests in timing and treatment groups and we generate sub-samples to test for the influence of outliers (for example, superstars with a large number of auctions) on wider results. Moreover, we can largely rule out alternative events in 2013 that would account for the changes we observe in Appropriation Art sales.²¹

3.4 Limitations

The overall data and empirical approach is not without limits. First, it is a difficult task to identify the group of treated artists. On the one hand, appropriation artists are not a heterogeneous group to identify, we are only able to approximate this group via genome records on artist level publicly available in the Artsy data. I.e., unfortunately, we cannot explore the ‘appropriation level’ of individual artworks. On the other hand, artists and market intermediaries such as auction houses could perceive and deal with the potential litigation risks differently. Some agents have different risk attitudes at the outset and will respond more than others to changes in copyright frameworks. Accordingly, changes in their supply of these artworks might be more pronounced too.

Furthermore, based on the data, we are not able to identify the underlying original work that has been appropriated and fully establish the associated copyright status (and, accordingly, whether or not rights have been cleared). Such a strategy would require artwork-level metadata and licensing records which are, unfortunately, not available to us. Here, once again, artists might self-select into reusing materials that they perceive as being out of copyright/in the public domain. Moreover, technological (digital) change may also affect reuse practices over time as it potentially impacts access and production costs when artists

²¹Candidate events in the visual arts world taking place that same year are, for example, the top-selling of Francis Bacon’s triptych of Lucian Freud (1969) at Christie’s New York auction house, but these do not seem to meaningfully relate to Appropriation Art sales.

are appropriating existing materials. We seek to address some of these issues in the analysis.

Finally, monitoring of trade in secondary markets is limited to auctions data as we do not have access to private sales data or sales on primary markets such as galleries, some of which is confidential or not collected on a systematic basis. Still, we trust that the auction data provides us with a representative, multi-year view of global markets for the Appropriation Art and artworks on sale by similar artists.

4 Results

4.1 Secondary Market Effects

Table 3 presents baseline estimates for the dependent variable 'number of auctions'. For sake of clarity, the table only reports the coefficient of interest, the interaction of the treatment group with the post 2013 period dummy, i.e. the estimate of the average treatment effect on the treated (ATT). All models include individual-artist fixed effects and the panel/observation period is restricted to years 2010-2020 (incl.) in order to rule out potential impact of the 2008 global financial and economic crisis (which saw auction hammerprices peak in 2007 and fewer unsold items). Estimates from the baseline model with no controls (1) show a negative average effect of minus 63 auctions for appropriation artists and their artworks when compared to similar artists and their auctions in the period after the court decision (2013 and onwards). This negative effect accentuates when controlling for artwork-specific characteristic in model (3), i.e. the artwork-size, artwork-medium, artwork-age at the auction date, and for auction-specific characteristics (4), i.e. dummy variables for the most prominent auction houses, and when including (auction) year- and country-fixed effects capturing time and location trends.²² These potentially important time trends seem to

²²Auction-specific controls include dummy variables for auctions at Phillips, Sothebys, Christies and Bonhams. The specific shares of auction houses in total auctions are reported in table 2. Alternative models (not reported in the table, available upon request) yield similar results when adding more or different controls

have relatively little effects on the ATT, however, together with artwork- and auction-level controls, they significantly increase the explanatory power of our models. In an alternative model specification (6) we use the log-transformed number of auctions as the dependent variable and again insert all available controls as in model (5). The weak positive sign of the ATT indicates that some outliers, i.e. a few artists with many auctions in a specific (exceptional) year, might drive some of the negative baseline results in models (1) to (5). However, this seems very unlikely to be the case, beyond the time-invariant artist- and the auction year-fixed effects we can control for, and given that the number of auctions in the data is not heavily skewed. Overall, even in the presence of superstars with a few exceptional years of sales, global auctions related to the average appropriation artist decreased by around 66 auctions per year after the legal framework changes in the U.S. and compared to auctions by similar artists in the control group (the overall panel mean (2010-2020) of appropriation (control) artists is 535 (1274) auctions per year, with a standard deviation of 711 (1732) auctions, and a within standard deviation of 201 (134) auctions, also cf. table 1 and figure 7).

Table 4 reports logit regression results for the dependent variable 'lot not sold', i.e. a dummy variable for items listed but not sold at auctions (1 if no sales success, 0 otherwise). Models (2) through (6) are constructed with the same controls as in previous table 3. However, as we cannot add artists-fixed effects to models due to the large number of groups and observations within a group, we include clustered standard errors at the artists-level. All models report average marginal effects. As outlined in the empirical framework, the dependent variable might reflect short-term responses on the demand side, and we therefore restrict the observation period to +/- 2 years around the court intervention (i.e. 2011-2015). In this way, we can rule out again possible bias in the estimates from the financial crisis. However, a comparison of models (1) and (2) shows that the shorter time-frame does not

for auction-specific characteristics, i.e. controls for i) more auction houses, ii) country-specific auction houses or iii) combinations thereof.

Table 3: Baseline Results: Number of Auctions

	(1)	(2)	(3)	(4)	(5)	(6)
Number of Auctions						log(.)
<i>Appropriation</i> × <i>Post_{it}</i>	-62.65*** (-24.30)	-66.54*** (-29.36)	-66.62*** (-29.39)	-66.55*** (-29.35)	-66.58*** (-29.37)	0.0327*** (8.55)
Year FE	No	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes	Yes	Yes
N	168870	168870	168870	168870	168870	168870
R ²	0.0524	0.268	0.2693	0.2691	0.2695	0.322
N Groups	1949	1949	1949	1949	1949	1949

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This table shows the regression results for the dependent variable 'number of auctions' (yearly average). All results are calculated with artists fixed-effects, model (3) onward with auction-country fixed-effects. Samples are restricted to years 2010-2020 (including). Model (1) and (2) include no control variables, model (3) includes artwork-specific controls (age at auction, size, medium), model (4) includes auction-house-specific controls (Phillips, Sothebys, Christies, Bonhams) and model (5) combines model (3) and (4). Model (6) is calculated as model (5) but the dependent variable is log-transformed (i.e. number of auctions).

change the baseline result. In most models, the coefficient of interest is statistically significant at the 5%-level and can be interpreted as follows: Treated appropriation artists face a roughly two percentage point higher probability that their artwork is not sold in an auction after 2013 when compared to similar artists and their artworks in the same period. Further conditioning models on price estimates does not affect results (not shown). Given that for treated and control groups on average one fourth of the listed auctions do not result in a sale success, the economic significance of the percentage point change seems relatively small.

At large, however, smaller changes in sales success as well as the number of auctions might still make a difference in terms of their total art market value, assuming that works did not find alternative sales channels. A simple back-of-the-envelope calculation based on the ATTs can exemplify this. Given that the median (appropriation) artwork after 2010 was sold for 4'500 US-Dollars and the treated group includes 1'025 unique artists, plausible (annual) market value forgone due to artworks not auctioned in this art field is roughly 304 m. US-Dollars on a global level (some of which was likely invested in alternative artworks and auctions). To put these numbers into context, based on our data, total auction sales

Table 4: Baseline Results: Lot Not Sold

	(1)	(2)	(3)	(4)	(5)	(6)
Lot Not Sold						
<i>Appropriation</i> × <i>Post_{it}</i>	0.023* (2.30)	0.023* (2.30)	0.019* (2.05)	0.023* (2.17)	0.019* (2.21)	0.0175 (1.62)
Year FE	No	No	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	No	No	No
Cluster SE	Yes	Yes	Yes	Yes	Yes	Yes
Timeframe	2010-2020	2011-2015	2011-2015	2011-2015	2011-2015	2011-2015
N	75166	75166	75166	75166	75166	75244
N Groups	1448	1448	1448	1448	1448	1451

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This table shows the regression results for the dependent variable 'lot not sold'. All models report marginal effects. SE clustered at the artist-level in model (1) to (5), model (6) bootstrapped SE. Model (3) includes no control variables, model (4) includes artwork-specific controls (age at auction, size, medium), model (5) includes auction-house-specific controls (phillips, sothebys, christies, bonhams) and model (6) combines model (4) and (5).

amounted to 2.36 b. US-Dollars in 2014. Beyond auction sales for appropriation and control artists, however, the total sales volume from public fine art auctions in the same year reached 24.2 b. US-Dollars globally, according to the Art Market Report 2020 (McAndrew, 2019).

4.2 Relocation of trade

Table 5 presents baseline estimates taking a closer look at a potential U.S. auction market shift to other-than-U.S. jurisdictions due to the prominent court decision in the U.S. More specifically, we deploy the relative share of U.S. located auctions (in total auctions by the same artists) as the alternative outcome variable and standard errors clustered on the level of the artist in addition to artist fixed effects. We observe negative and significant effects in any model specification. When further adding year-fixed effects (2), country-fixed effects, artwork- (3), auction-house specific controls (4), or all four (5), these help grow explanatory power of models and the effects stay robust and consistent. It thus appears that trade shifted towards non-U.S. auction houses in periods after 2013 for our treatment group, the appropriation artists, when compared to similar artists and location of their artwork trade. While we cannot fully rule out the possibility that we observe a different set of artists

in pre- and post-periods (for example, a selection bias from new similar artists in Europe entering the panel post 2013) the results reveal that we calculate our differences-in-differences estimator based on the exact same sample of artists as before (i.e. 1'949 appropriation and control artist in total). We thus interpret estimates as a significant reduction and substantial relocation of around 3 percent in the share of U.S. in total auctions among treated artists after the Second Circuit decision. Again, a simple calculation reveals that this relocation shift equals an approximate annual auction market value of 29.4 m. US-Dollars. Again, to put estimates into context, our data suggests that total auction sales range between 1.46 b. and 2.36 b. US-Dollars from 2014 to 2019.

Table 5: Baseline Results: Percentage of U.S. Auctions

	(1)	(2)	(3)	(4)	(5)
% of U.S. Auctions					
<i>Appropriation</i> × <i>Post_{it}</i>	-0.0353** (-2.96)	-0.0354** (-2.95)	-0.0335** (-2.85)	-0.0335** (-2.85)	-0.0335** (-2.85)
Year FE	No	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes	Yes
N	168870	168870	168870	168870	168870
R ²	0.00761	0.0169	0.0778	0.0780	0.0784
N Groups	1949	1949	1949	1949	1949

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This table shows the regression results for the dependent variable 'percentage of U.S. auctions' (yearly average). All results are calculated with artists fixed-effects, model (2) onward with auction-country fixed-effects. SE are clustered at the artist-level. Samples are restricted to years 2010-2020 (including). Model (1) includes no control variables, model (2) includes artwork-specific controls (age at auction, size, medium), model (3) includes auction-house-specific controls (Phillips, Sothebys, Christies, Bonhams) and model (4) combines model (2) and (3).

4.3 Effect Heterogeneity

So far, we have treated appropriation artists as a homogeneous group. However, as the Artsy data also allows us to further consider other genomes closely related to Appropriation Art practices (but different to the appropriation genome) for each of the artists in the treated group, we next address plausible heterogeneity in the treatment effect. The distribution of genomes among the appropriation artists is presented in table 1. Based on (Artsy, 2019), we

consider a set of eight related genres for appropriation artists and interact these with the post 2013 period dummy in order to obtain ATTs for the different subgroups of appropriation artists in the treated group.

Table 6: Baseline Results: Heterogeneity in the Treatment Effect

	(1) Number of Auctions	(2) % U.S. Auctions	(3) Lot Not Sold
<i>MixedMedia</i> × <i>Post_{it}</i>	-2.096 (-0.56)	-0.0272 (-1.72)	-0.011 (-0.25)
<i>ContemporaryConceptualism</i> × <i>Post_{it}</i>	-92.15*** (-14.17)	-0.0269 (-1.58)	-0.003 (-0.14)
<i>EngagementWithMassMedia</i> × <i>Post_{it}</i>	-29.40*** (-9.48)	-0.0114 (-1.24)	-0.006 (-0.28)
<i>LayeredImages</i> × <i>Post_{it}</i>	-82.61*** (-10.22)	-0.0238 (-1.82)	0.028 (0.96)
<i>NeoConceptualism</i> × <i>Post_{it}</i>	-52.79* (-2.40)	-0.0646** (-2.72)	0.042 (0.18)
<i>PhotographicSource</i> × <i>Post_{it}</i>	58.37*** (16.15)	-0.0349*** (-4.75)	0.008 (0.33)
<i>ThePicturesGeneration</i> × <i>Post_{it}</i>	-76.94*** (-7.01)	-0.0565** (-2.65)	0.071 (0.14)
<i>UseOfVintageImagery</i> × <i>Post_{it}</i>	-12.90 (-0.96)	-0.0417 (-1.96)	-0.001 (-0.01)
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Artist FE	Yes	Yes	No
Cluster SE	No	Yes	Yes
Timeframe	2010-2020	2010-2020	2011-2015
N	168870	168870	75244
R ²	0.269	0.0824	N/a
N Groups	1949	1949	1451

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This table shows the regression results for the heterogeneity in the treatment effect for the three dependent variables of the baseline results. Model (1) and (2) with artists-fixed effects, model (3) is a logit model. SE are clustered at the artist-level. All models are calculated with artwork-specific controls (age at auction, size, medium) and auction-house-specific controls (Phillips, Sothebys, Christies, Bonhams).

Table 6 reports model estimates for heterogenous treatments. All models (1) to (3) replicate baseline specifications from previous sections. Again, model (1) accounts for the

number of auctions and shows that all but one subgroup with related genomes are negatively affected by the court decision in 2013. The negative effect is strongest for those artists that, next to the appropriation genome, are also categorized as/record the *Contemporary – Conceptualism* genome in the Artsy data. They see a loss of up to an average 92 auctions in the post 2013 period. Artists also associated with the group of *Photographic – Source* are the clear exception as they are positively affected by holding this genome (i.e. plus 58 auctions with a statistical significance at the 0.1%-level). The heterogeneity of effects among treated appropriation artists is less pronounced when taking a look at the percentage of auctions in the U.S. (model 2). Notably, effects in each of these subgroups stay robust and negative. Estimates for heterogenous treatments in model (3) using 'lot not sold' as an outcome render insignificant and not always show the expected positive sign. We thus can highlight that there is certain heterogeneity in effects across models, but that our main results continue to hold for the different groups of appropriation-artists.

4.4 Hedonic Price Model

We now turn to hedonic price estimations in table 7 where the dependent variable is the log price of an artwork realized at an auction (i.e. 'hammer-price'). In contrast to previous tables, we report all controls/coefficients. As figure 3 illustrates, art prices are highly cyclical and we thus again restrict the panel to post-crisis years and log-transform the dependent variable. The differences-in-differences coefficient *Appropriation * Post* reveals an overall negative effect in models (1), (2) and (4) which changes to positive in models (3) and (5). However, effects are not statistically significant, even though models (4) and (5) explain much of the variation in our dependent variable.

While models appear to be adequately specified and most controls yield estimates very much in line with the existing literature,²³ our regression coefficient of interest (*appropriation**

²³For example, the *artwork – size* and the *artwork – age* (at the auction) both yield a significant positive

post) is unstable in direction and size of effects. Indeed, this is not unexpected, as the literature on auction prices (for an overview, see for example [Ashenfelter and Graddy \(2003\)](#)) suggests that the heterogeneity of the auction price indices are best addressed by hedonic price models on the level of the individual artwork.²⁴ That is to say, the price composition of artworks are somewhat complex to analyze, and so we can expect to observe no direct price responses for traded artworks after the policy change as the effects cannot be studied on the basis of a repeat sales panel for the very same artwork. In this way, data structures, ultimately, constrain our ability to further inspect price effects.

4.5 Assumption and Robustness Checks

We run a set of assumption and robustness checks hereafter. An important assumption for a differences-in-differences regression is the common pre-trend of the treatment and control group. To test whether we observe a parallel trend before the 2013 *Cariou v. Prince* decision, we plot average residuals for both groups. Time windows correspond to those used to calculate baseline results. Figure 7 reveals that, indeed, we observe very similar trends for both groups (i.e. overlapping 90% confidence bands prior to 2013) and hence this supports our differences-in-differences approach. The graphs provide strong visual evidence that the overall percentage of lots not sold and the auction hammer-price follow a common underlying trend prior to the court decision. Both trends also strongly respond to the global financial

effect on the auction hammer-price, in line with ([Beggs and Graddy, 2009](#)). The same goes for different kinds of mediums. On the one hand, classical artwork-mediums such as *paintings* (at the 0.001%-level) and *Audiovisual – Multimedia* are positively correlated with log-transformed prices. On the other hand, if several copies of an artwork exist, i.e. *print – multiple*, prices are negatively correlated. Finally, auction outcomes for artworks traded at major auctioneers, for example, Sothebys, Christies, Phillips and Bonhams, are all highly positive and significant correlated with the resulted hammer-price, again in line with recent work on hedonic pricing ([Ashenfelter and Graddy, 2003](#); [Beggs and Graddy, 2009](#)).

²⁴In particular, the same artwork can be traded in different countries and auction-houses. For example, given an artwork is titled differently or several multiple-prints of the 'same' artwork exist, as well as reporting standards vary between auction houses, in our large auction sample, it seems impossible to identify and manually verify the same artworks over time in our sample. Data samples used in hedonic price models are, moreover, typically hand-collected and often focus on listings of a single auction house or country, well-known artists and their catalogue raisonneés, or they are restricted to a single medium (e.g. paintings).

Table 7: Hedonic Price Model

	(1)	(2)	(3)	(4)	(5)
log(price)					
<i>Appropriation</i> × <i>Post_{it}</i>	-0.0776 (-1.59)	-0.0821 (-1.74)	0.0135 (0.32)	-0.0279 (-0.55)	0.0125 (0.27)
Artwork Size			0.316*** (8.32)		0.283*** (8.45)
Artwork Age			0.00747 (1.84)		0.00720* (2.16)
<i>ArtworkMedium</i>					
Audiovisual-Multimedia			1.674* (2.34)		1.565** (2.63)
Ceramic			-0.658 (-1.35)		-0.412 (-1.01)
Drawing-Watercolor			0.745 (1.54)		0.682 (1.76)
Furniture			0.623 (1.07)		0.606 (1.27)
Lightings			0.110 (0.20)		0.135 (0.28)
Objects			-0.407 (-0.78)		-0.276 (-0.67)
Painting			2.022*** (4.09)		1.877*** (4.70)
Photography			-0.146 (-0.33)		-0.135 (-0.39)
Print-Multiple			-1.063* (-2.12)		-0.841* (-2.00)
Sculpture-Volume			1.068* (2.44)		1.003** (2.90)
Tapestry			-1.795*** (-3.67)		-1.589*** (-3.76)
<i>AuctionHouse</i>					
Phillips				1.735*** (27.94)	1.239*** (19.14)
Sothebys				2.320*** (35.26)	1.543*** (22.66)
Christies				2.040*** (27.21)	1.328*** (20.54)
Bonhams				0.595*** (7.32)	0.474*** (7.50)
Year FE	No	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes	Yes
N	116856	116856	116856	116856	116856
R ²	0.00172	0.00710	0.441	0.260	0.505
N Groups	1735	1735	1735	1735	1735

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This table shows the regression results for the dependent variable 'log(price)'. All results are calculated with artists- fixed effects, model (3) onward with auction-country-fixed effects. SE are clustered at the artist-level. Samples are restricted to years 2010-2020.

and economic crisis with looming bubbles before and massive demand shocks after the crisis (years before 2010 not reported).²⁵ The panel on the bottom left (share of U.S. located in total auctions) in figure 7 seems to reflect a slightly less valid common trends before 2013, but it shows a sharp response right after the decision. The top panel for the total number of auctions clearly shows a parallel trend for all years before 2013. Overall, we conclude that the parallel trend assumption does hold for our models based upon visual inspection of the average residuals and 90% confidence intervals of the outcome variables.

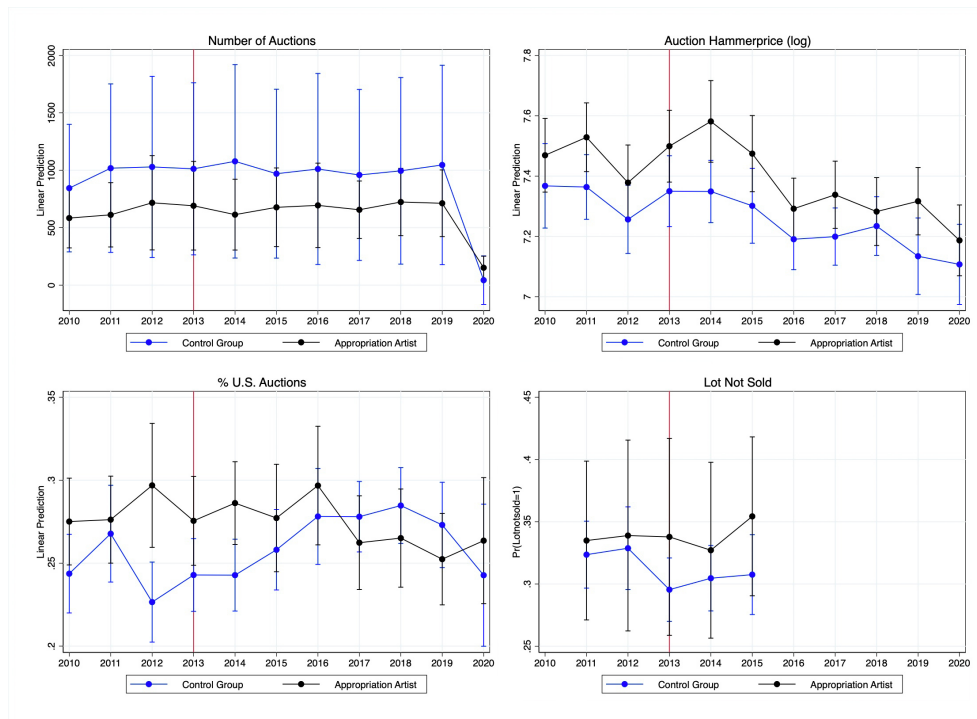


Figure 7: Trends of Appropriation and Control Artists before and after 2013

Note: This figure shows the average annual residuals for each of the dependent variables (Y_{it}^k) for appropriation artists (treatment group, black line), and similar artists (control group, blue line), derived from the equation: $Y_{it}^k = \alpha + \sum_t \beta_0^t year_t + \sum_t \beta_1^t (year_t * Appropriation_i) + X_{it} + \epsilon_{it}$. Bars indicate 90% confidence intervals. The top panel on the left shows the total number of auctions, the log-transformed hammer price (top right), the percentage of U.S. auctions an artist had compared to all auctions (bottom left) and the probability of not sold lots (bottom right). Panels are restricted to years as calculated in the baseline results. Vertical red line indicates the court decisions in 2013.

²⁵On the issue of cyclicity in visual art markets, see, for example, (David et al., 2013; Kräussl et al., 2016).

A second, more formal way to test the parallel trend assumption is presented in table 8. Building on differences-in-differences approaches in the previous literature (Autor, 2003), we test whether there is a significant difference in outcome variables in periods before to the court decision. In models (2) and (3), in 5 out of 6 periods the null hypothesis cannot be rejected (i.e. that the differences in treatment and control group and dependent variables is equal to zero). This again confirms the validity of our trends assumption. For model 1 (number of auctions), the coefficient is significant at the 1%-level three years before but only weakly significant (at the 5%-level) two years before the 2013 court decision.

Table 8: Common Trend Test: Differences in Pre-Periods

	(1)	(2)	(3)
	Number of Auctions	% U.S. Auctions	Lot Not Sold
$Y_{t-3} \times Appropriation$	188.0*** (-0.80)	-0.0172 (-1.02)	0.116 (1.37)
$Y_{t-2} \times Appropriation$	13.87* (2.52)	-0.0400* (-2.22)	-0.136 (-1.50)
$Y_{t-1} \times Appropriation$	12.97* (2.37)	0.0338 (1.13)	-0.146 (-1.49)
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Artist FE	Yes	Yes	No
Cluster SE	No	Yes	Yes
N	68276	68276	50307
R ²	0.318	0.101	N/a
N Groups	1280	1280	1223

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This table shows the interaction of the pre-2013 periods (2007 to 2012 in model (1) and (2), 2010-2012 in model (3), three years prior to 2013 reported in this table) with the treatment group for the three depend variables (1)-(3) as defined in the baseline models. Model (1) and (2) with artists-fixed effects, model (3) is a logit model. All models are calculated with artwork-specific controls (age at auction, size, medium) and auction-house-specific controls (Phillips, Sothebys,Christies, Bonhams).

Finally, table 9 reports a robustness check based on a placebo timing test. We thus rerun the same set of control and dependent variables in models (1) to (3), however, with a placebo timing one year prior to the 2013 court decision and an observation period from 2011 to 2013 to again rule out bias in the aftermath of the financial crisis. If our treatment and control groups followed similar trends in dependent variables before the 2013 changes,

we should observe effects that are close to zero. Model (1) shows indeed a small mean effect size of 18 additional auctions (albeit statistically significant) that an appropriation artist received post 2012 when compared to the control group (compared to the minus 66 in baseline estimates from previous sections). This indicates that we do not have a general trend driving our baseline results. The same holds true for the percentage of U.S. auctions compared to non-U.S. ones and auction success probabilities, where, for the former, the coefficient $appropriation * placebo_{timing2012}$ is positive and only significant at the 5%-level (compared to the negative effect in baseline estimates), for the latter, it is positive and statistically insignificant (compared to the positive effect in baseline estimates).

Table 9: Robustness Check: Placebo Timing

	(1) Number of Auctions	(2) % U.S. Auctions	(3) Lot Not Sold
$Appropriation \times Post_{2012_{it}}$	18.50*** (13.29)	0.0467* (2.32)	0.015 (1.28)
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Artist FE	Yes	Yes	No
Cluster SE	No	Yes	No
Timeframe	2011-2013	2011-2013	2011-2013
N	152895	212940	215240
R ²	0.283	0.0289	N/a
N Groups	1723	1744	1930

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This table shows the placebo-timing regression results for the three dependent variables as defined in the baseline models. Model (1) and (2) include artists-fixed effects, model (3) is a logit model. All models are calculated with artwork-specific controls (age at auction, size, medium) and auction-house-specific controls (Phillips, Sothebys,Christies, Bonhams).

In an alternative, second identification strategy, we modify treatment and control groups and limit to appropriation artists and their auctions. Arguably, auctions by appropriation artists in different jurisdictions might have been affected differently by the legal framework changes. We thus consider the auctions of appropriation artists in the U.S. as treated compared to those auctions of the same group of artists auctioned in non-U.S. houses. Although the prominent appellate decision in the visual arts case has attracted broad attention in the

Appropriation Art-scene, in this second strategy we hypothesize that the trade response is limited to auction houses in the U.S.

Accordingly, table 10 shows regression results for the two dependent variables 'log(hammer-price)' and 'lot not sold' (as we consider 'auctions' as treated, the model using the % of U.S. auctions of an artist becomes obsolete). Both models are calculated with artwork- and auction-house-specific controls as in previous estimation models, and we include year- and country-fixed effects. Similar to the baseline results, we are not able to observe statistically significant price differences of U.S. auction results compared to non-U.S. auction results of appropriation artists. The differences-in-differences coefficient of interest is positive, suggesting that, on average, U.S. auctions resulted post 2013 in higher hammer-prices compared to non-U.S. auctions. The results for the dependent variable 'lot not sold', however, reveal that U.S. appropriation-art auctions (compared to non-U.S. ones) faced an around 5 percentage points lower probability of sales success post 2013. This effect is statistically significant at the 1%-level. This could well reflect the short-term demand-shock and changes in buyers/sellers' perceived litigation risks after the appellate decision in 2013, which might have affected U.S. auctions somewhat differently than those in other countries.

As large auction houses with U.S. headquarters operate on multiple sites across jurisdictions and so, in some instances, subsidiaries outside the U.S. might also be exposed to legal changes and increased uncertainty. Anecdotal evidence suggests that Sotheby's sales rooms in London, Hong Kong and Dubai do not seem to engage in regulatory arbitrage and are also governed by the laws of the state of New York as choosing the toughest law to govern transactions can enhance the companies' international reputations (Shortland and Shortland, 2020). For this reason, we rerun alternative specifications inserting a dummy variable that identifies auctions located abroad but governed under the auspices of an U.S. headquarter (results not shown). Still, our main findings continue to hold.

Table 10: Alternative Empirical Strategy: Appropriation Market Shift

	(1) log(Price)	(2) Lot Not Sold
<i>U.S.Auction</i> × <i>Post_{it}</i>	0.097 (1.55)	0.053*** (4.33)
Year FE	Yes	Yes
Country FE	Yes	Yes
Artist FE	Yes	No
Timeframe	2010-2020	2011-2015
N	59719	38434
R ²	0.509	N/a
N Groups	809	690

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This table shows regression results for the two dependent variables as defined in the baseline models. Samples are restricted to appropriation artists. Model (1) includes artists-fixed effects, model (2) is a logit model and reports marginal effects. SE are clustered at the artist-level. All models are calculated with artwork-specific controls (age at auction, size, medium) and auction-house-specific controls (Phillips, Sothebys, Christies, Bonhams).

5 Policy Discussion

The research indicates that doctrinal complexity and legal uncertainty around U.S. fair use in the visual arts increased following the 2013 court decision. In this particular case, changes might not have helped to promote economic efficiency around licensing in the U.S. (as intended by the fair use doctrine) because criteria to apply fair use in the first place seemed less clear and laws seemed less predictable after the decision (Landes (2000), Adler (2016)). In this way, perceived litigation risks for artists and trade intermediaries have increased in due course.

We provide quantitative evidence on the costs and market charges for imposing indirect liability for infringement on intermediaries in the visual arts. Once their perceived litigation risk increases, this will affect the curation of works and selection into sales. Arguably, however, this research does not provide a comparative assessment of the effectiveness of indirect liability vis-à-vis other types of direct rights enforcement or changes in copyright's scope or length that would also modify incentives to reuse and disseminate artworks. And,

it is not clear how much results generalize to other sectors of the creative economy. There is likely a distinction to be made between the criteria set up by automated filtering of millions of titles as in online music (for example, YouTube's content id system) and manual selection and expert curation of a limited number of works for sale as in the visual arts. Even when copyright decisions, as we assume, do not cause creative practices by (appropriation) artists themselves to change, based on our findings, contributory liability and changes in perceived litigation risks temporarily limit the marketplace and auction showrooms made available to these artists because the relative sales value of their artwork (as compared to other non-infringing artwork) changes in due course. In longer term, we would expect investment and growth of art market segments that involve follow-on innovation and that bear higher infringement risk to be restricted, if the nature of fair use is not evolving with new jurisprudence and risk perceptions are again changing.

Results also corroborate the idea that countries are competing over national legal frameworks and that firms and services are responding to the overall legal climate set up by national jurisprudence. Where laws and legal practices are not harmonized on an international level, intermediaries on global visual art markets such as auction houses will tend to migrate mobile 'factors of production/services' to those jurisdictions that offer the most favorable conditions to them. This need not always be the case in visual art markets as evidence from previous research on resale rights suggests [Banterghansa and Graddy \(2009\)](#). Still, for the Appropriation Art case under scrutiny here, some sales value has shifted to places outside the U.S., with seemingly lower perceived litigation risks for auction houses and different sets of copyright rules in force.

In general, copyright protection not only ring-fences creators from unauthorized copying of others. Beyond the cases of authorized reuse and licensing, as we have shown with the data and extensive analysis, temporary uncertainty around fair use rules also restricts

artists' unauthorized follow-on innovation in the visual arts context, i.e. 'transformative' and 'productive' reuses of original artworks. While unauthorized (reproductive) copying seems much less of an issue in the visual arts, follow-on innovation is a growing policy concern with the changes and assemblage using new digital technologies, and reuses of original artworks that are (also) protected by copyright (cf. table 6). In this way, copyright rules also strike a delicate balance between new and older generations of artists and give them more or less freedom to operate and room to develop new reusing art practices in due course. The latter topic was not part of this investigation, but is an open issue and left to future research.

6 Conclusion

We claim that there is a role for copyright in the visual arts, in particular in cases of follow-on innovation and in the appropriating arts, beyond the control over copying and reproduction of works. We investigate how the prominent 2013 *Cariou v. Prince* U.S. court decision affected trade and availability in this sector. This decision arguably called into question prior assumptions about the application of fair use with respect to some types of visual artworks and may have increased legal uncertainty with respect to those works for market intermediaries.

Our quantitative findings suggest that global auction trade in Appropriation Art, at least temporarily, decreases and partially relocates to other, non-U.S. jurisdictions following the fair use decision. Moreover, for artworks listed in auctions, the sales probability of potentially infringing (appropriating) artworks decreases in this period. Back-of-the-envelope calculations reveal an estimated global market value of around 304 m. U.S. Dollars forgone due to artworks not auctioned after the decision (the total yearly auction sales volume, based on our data, ranges between 1.46 b. and 2.36 b. US-Dollars from 2014 to 2019). However, we cannot detect any significant changes in the pricing of these artworks.

We interpret and relate our findings to a temporary increase in the perceived litigation risks in the visual art environment, in particular in terms of the contributory liability of intermediaries and the charges on global artwork trade by auction houses. Findings are robust against several alternative specifications and placebo testing.

References

- Abadie, A., Athey, S., Imbens, G. W., and Wooldridge, J. (2017). When should you adjust standard errors for clustering? Working Paper 24003, National Bureau of Economic Research.
- Adermon, A. and Liang, C.-Y. (2010). Piracy, music, and movies: A natural experiment. Technical report, Working paper.
- Adler, A. (2016). Fair use and the future of art. *NYUL Rev.*, 91:559.
- Adler, A. (2018). Why art does not need copyright. *Geo. Wash. L. Rev.*, 86:313.
- Agarwal, P. (2017). Appropriation art: Copyright infringement or fair use? *Indian Journal of Intellectual Property Law*, 8:61–90.
- Aguiar, L. and Waldfogel, J. (2018). Netflix: global hegemon or facilitator of frictionless digital trade? *Journal of Cultural Economics*, 42(3):419–445.
- Ames, E. K. (1993). Beyond rogers v. koons: A fair use standard for appropriation. *Columbia Law Review*, 93(6):1473–1526.
- Angrist, J. D. and Pischke, J.-S. (2008). *Mostly harmless econometrics: An empiricist’s companion*. Princeton university press.
- Artnet (2015). Artnet news. url: <https://news.artnet.com/art-world/jeff-koons-sued-copyright-infringement-392667>. retrieved 16.11.20.
- Artnet (2017). Artnet news. url: <https://news.artnet.com/art-world/jeff-koons-pompidou-lose-copyright-infringement-case-887324>. retrieved 16.11.20.
- Artnet (2021). Artnet. url: <http://www.artnet.com/artists/sturtevant/>. retrieved 05.01.21.
- ArtNews (2014). Artnews url: <https://www.artnews.com/art-in-america/features/landmark-copyright-lawsuit-cariou-v-prince-is-settled-59702/>. last visited 12.01.21.
- Artprice (2020). Artprice database. url: <https://artprice.com>. retrieved 20. march 2020.
- Artsy (2019). The art genome project. url: <https://www.artsy.net/about/the/art-genome-project>. retrieved 21.10.19.
- Artsy (2020). The art genome project. url: <https://developers.artsy.net/v2/docs/artists>. retrieved 20. march 2020.
- Artsy (2021). The art genome project. url: <https://www.artsy.net/categories>. last visited 05.01.2021.

- Ashenfelter, O. and Graddy, K. (2003). Auctions and the price of art. *Journal of Economic Literature*, 41(3):763–787.
- Autor, D. H. (2003). Outsourcing at will: The contribution of unjust dismissal doctrine to the growth of employment outsourcing. *Journal of labor economics*, 21(1):1–42.
- Banternghansa, C. and Graddy, K. (2009). The impact of the droit de suite in the uk: An empirical analysis. *C.E.P.R. Discussion Papers, CEPR Discussion Papers*, 35.
- Banternghansa, C. and Graddy, K. (2011). The impact of the droit de suite in the uk: an empirical analysis. *Journal of cultural economics*, 35(2):81–100.
- Becker, G. S., Landes, W. M., and Murphy, K. (2000). The social market for the great masters and other collectibles. *Social Economics: Market Behavior in a Social Environment*.
- Beebe, B. (2008). An empirical study of u.s. copyright fair use opinions, 1978-2005. *University of Pennsylvania Law Review*, 156:549–624.
- Beggs, A. and Graddy, K. (2009). Anchoring effects: Evidence from art auctions. *American Economic Review*, 99(3):1027–39.
- Bertrand, M., Dufflo, E., and Mullainathan, S. (2004). How Much Should We Trust Differences-In-Differences Estimates?*. *The Quarterly Journal of Economics*, 119(1):249–275.
- Biasi, B. and Moser, P. (2016). Effects of copyrights on science: Evidence from the wii book republication program. *American Economic Journal: Microeconomics*.
- Buccafusco, C., Bechtold, S., and Sprigman, C. J. (2017). The nature of sequential innovation. *Wm. & Mary L. Rev.*, 59:1.
- Carroll, M. W. (2006). Fixing fair use. *NCL Rev.*, 85:1087.
- Danaher, B., Smith, M. D., and Telang, R. (2017). Copyright enforcement in the digital age: Empirical evidence and policy implications. *Commun. ACM*, 60(2):68–75.
- David, G., Oosterlinck, K., and Szafarz, A. (2013). Art market inefficiency. *Economics Letters*, 121(1):23–25.
- De la Barre, M., Docclo, S., and Ginsburgh, V. (1994). Returns of impressionist, modern and contemporary european paintings 1962-1991. *Annales d’Economie et de Statistique*, pages 143–181.
- Depoorter, B. (2008). Technology and uncertainty: the shaping effect on copyright law. *U. Pa. L. Rev.*, 157:1831.
- Depoorter, B., Menell, P., and Schwartz, D. (2019). *Research Handbook on the Economics of Intellectual Property Law: Vol 1: Theory Vol 2: Analytical Methods*, volume 1. Edward Elgar Publishing.

- Depoorter, B. and Parisi, F. (2002). Fair use and copyright protection: a price theory explanation. *International Review of Law and Economics*, 21(4):453–473.
- Evans, D. (2009). *Appropriation*. Mit Press.
- Farrell, J., Hayes, J., Shapiro, C., Sullivan, T., Ganglmair, B., Froeb, L., Werden, G., Lemley, M., Shapiro, C., and Elhauge, E. (2007). Do patent holdup and royalty stacking lead to systematically excessive royalties? *supra*, 74(47):603.
- Francis, J. (2014). On appropriation: Cariou v. prince and measuring contextual transformation in fair use. *Berkeley Tech. LJ*, 29:681.
- Fromer, J. C. (2015). Market effects bearing on fair use. *Wash. L. Rev.*, 90:615.
- Gans, J. S. (2015). Remix rights and negotiations over the use of copy-protected works. *International Journal of Industrial Organization*, 41:76–83.
- Geiger, C. (2020). Geiger, fair use through fundamental rights in europe, the cambridge handbook of copyright limitations and exceptions.
- Ginsburgh, V. (2005). The economic consequences of droit de suite in the european union.
- Ginsburgh, V. et al. (2005). Droit de suite. an economic viewpoint. *The modern and contemporary art market*, pages 45–53.
- Ginsburgh, V. and Jeanfils, P. (1995). Long-term comovements in international markets for paintings. *European Economic Review*, 39(3-4):538–548.
- Giorcelli, M. and Moser, P. (2020). Copyright and creativity: Evidence from italian operas. *Journal of Political Economy*.
- Green, J. R. and Scotchmer, S. (1995). On the division of profit in sequential innovation. *The RAND Journal of Economics*, 26(1):20–33.
- Handke, C. (2016). Intellectual property in creative industries: The economic perspective. *SSRN Electronic Journal*.
- Heald, P. J. (2014). How copyright keeps works disappeared. *Journal of Empirical Legal Studies*, 11(4):829–866.
- Irvin, S. (2005). Appropriation and authorship in contemporary art. *The British Journal of Aesthetics*, 45(2):123–137.
- Kräussl, R., Lehnert, T., and Martelin, N. (2016). Is there a bubble in the art market? *Journal of Empirical Finance*, 35:99–109.
- Kretschmer, T. and Peukert, C. (2014). Video killed the radio star? online music videos and digital music sales. *CEP Discussion Papers*, (1265).

- Landes, W. and Lichtman, D. (2003). Indirect Liability for Copyright Infringement: Napster and Beyond. *Journal of Economic Perspectives*, 17(2):113–124.
- Landes, W. M. (2000). Copyright, borrowed images, and appropriation art: An economic approach. *Geo. Mason L. Rev.*, 9:1.
- Landes, W. M. and Levine, D. B. (2006). The economic analysis of art law. *Handbook of the economics of art and culture*, 1:211–251.
- Landes, W. M. and Posner, R. A. (1989). An economic analysis of copyright law. *The Journal of Legal Studies*, 18(2):325–363.
- Landes, W. M. and Posner, R. A. (2003). Indefinitely renewable copyright. *U. Chi. l. Rev.*, 70:471.
- Landes, W. M. and Posner, R. A. (2009). *The economic structure of intellectual property law*. Harvard University Press.
- Liu, J. (2019). An empirical study of transformative use in copyright law. *Stan. Tech. L. Rev.*, 22:163.
- Lucas, A. and Ginsburg, J. (2016). Copyright, freedom of expression and free access to information (comparative study of american and european law). *RIDA*, 249.
- MacGarvie, M., McKeon, N. J., Edgeworth Economics, L., and Watson, J. (2018). It was fifty years ago today: Recording copyright term and the supply of music.
- Martin, S. M. (1985). Museum copyright licensing agreements and visual artists. *Colum.-VLA J.L. & Arts*, 10:421.
- McAndrew, C. (2019). Global art market report, art basel and ubs, basel.
- McLeod, K. and DiCola, P. (2011). *Creative license: The law and culture of digital sampling*. Duke University Press.
- Mei, J. and Moses, M. (2001). Art as an investment and the underperformance of masterpieces: Evidence from 1875-2000. *American Economic Review*, pages 1–37.
- Menell, P. S. (2002). Envisioning copyright law’s digital future. *NYL Sch. L. Rev.*, 46:63.
- MET (2021). Met url: <https://www.metmuseum.org/art/collection/search/267214>. last visited 06.01.21.
- Murray, F. and O’Mahony, S. (2007). Exploring the foundations of cumulative innovation: Implications for organization science. *Organization Science*, 18(6):1006–1021.
- Nagaraj, A. (2016). Does copyright affect reuse? evidence from the google books digitization project. *Evidence from the Google Books Digitization Project (May 8, 2016)*.

- NewYorkTimes (2011). <https://www.nytimes.com/2012/01/01/arts/design/richard-prince-lawsuit-focuses-on-limits-of-appropriation.html?pagewanted=all>.
- Okpaluba, J. (2002). Appropriation art: Fair use or foul? *Cutting Across Media: Appropriation Art, Interventionist Collage, and Copyright Law*.
- Pesando, J. (1993). Art as an investment: The market for modern prints. *American Economic Review*, 83(5):1075–89.
- Phillips (2021). Phillips. url: <https://www.phillips.com/article/13963582/re-contextualizing-commercialism-richard-prince-s-cowboy-series>. retrieved 05.01.21.
- Posner, R. A. (1992). When is parody fair use? *The Journal of Legal Studies*, 21(1):67–78.
- Posner, R. A. (2004). Transaction costs and antitrust concerns in the licensing of intellectual property. *J. Marshall Rev. Intell. Prop. L.*, 4:i.
- Posner, R. A. (2005). Intellectual property: The law and economics approach. *Journal of Economic Perspectives*, 19(2):57–73.
- Posner, R. A. (2014). *Economic analysis of law*. Wolters kluwer law & business.
- Reimers, I. (2019). Copyright and generic entry in book publishing. *American Economic Journal: Microeconomics*, 11(3):257–84.
- Sag, M. (2012). Predicting fair use. *SSRN Electronic Journal*.
- Sarmiento, S. M. and Haaften-Schick, L. v. (2013). Cariou v. prince: Toward a theory of aesthetic-judicial judgments. *Tex. A&M L. Rev.*, 1:941.
- Schaumann, N. (2015). Fair use and appropriation art. *Cybaris Intell. Prop. L. Rev.*, 6:112.
- Scotchmer, S. (1991). Standing on the shoulders of giants: Cumulative research and the patent law. *Journal of Economic Perspectives*, 5(1):29–41.
- Shortland, A. and Shortland, A. (2020). Governance under the shadow of the law: trading high value fine art. *Public Choice*, 184.
- Tate (2021). Tate url: <https://www.tate.org.uk/art/art-terms/a/appropriation>. last visited 06.01.21.
- Watson, J. (2017a). Copyright and the production of hip-hop music. Technical report, Working Paper.
- Watson, J. (2017b). What is the value of re-use? complementarities in popular music. *Complementarities in Popular Music (September 1, 2017) .NET Institute Working Paper*, (17-15).
- Watt, R. et al. (2014). The basic economic theory of copyright. *WATT, Richard. Handbook on the Economics of Copyright*. Cheltenham, UK: Edward Elgar, pages 9–24.

Welchman, J. C. (2013). *Art after Appropriation: Essays on Art in the 1990s*. Routledge.

Whitaker, A. (2019). Shared value over fair use: Technology, added value, and the reinvention of copyright. *Cardozo Arts & Ent. LJ*, 37:635.

Wu, T. (2004). Copyright's communications policy. *Michigan Law Review*, 103(2):278–366.