The Digital Video Recorder:
Unbundling Advertising and Content

Randal C. Picker†

Next time you turn on your television, actually watch the commercials and you will quickly see how poorly the economic model of TV is working. They put on a commercial for dog food, but you are allergic to dogs, a commercial for diapers, but, mercifully, your kids are old enough that you no longer need to decide whether Pampers are better than Huggies. Many of the commercials are for product categories that you do not purchase; others are for products, such as cars or computers, that you use constantly but purchase only sporadically. Most ads are targeted at no more than the broad side of the barn: Adults 18–49 or Women 25–54 or some other rough demographic segment.

We are at a point where this model can be altered dramatically. The digital video recorder (DVR)—the best-known names are TiVo and ReplayTV—takes home-taping of TV programs to a new level by dropping the tapes used by the VCR and recording instead to a hard disk. The continuing, dramatic drop in the cost of a gigabyte of storage makes it possible to switch from clunky tapes to smooth digital storage. Plus, the DVR comes with software to make it much easier to record your favorite shows: tell it to record Friends forever and it will. The DVR also promises that we never need watch another commercial, and some versions of ReplayTV make it possible to redistribute copied programs to other viewers.

It would be easy to dismiss the DVR as just an updated VCR and to assume that we should apply the same rules to both. But responses to drops in transaction costs can be highly nonlinear. As Napster and its successors have made clear, practices tolerated offline—for music, physical sharing of tapes and CDs—might have dramatically different consequences when moved online at vastly lower transaction costs. The DVR is just one manifestation of the possibilities of adding intel-

† Paul and Theo Leffmann Professor of Commercial Law, The University of Chicago Law School. Senior Fellow, The Computation Institute of the University of Chicago and Argonne National Laboratory. I thank Doug Lichtman, James Spindler, and Lior Strahilevitz for comments, as well as participants in the June 2003 Intellectual Property Colloquium and in the Summer Work-in-Progress Workshop, both at The University of Chicago Law School. I also thank the Paul Leffmann Fund and the John M. Olin Program in Law and Economics at the University of Chicago Law School for their generous research support, and through the Olin Program, Microsoft Corporation, Visa U.S.A., Inc., PhRMA, and Verizon.
ligence and easy storage to a box in your living room. In so doing, we are changing the amount of control that can be exerted over the content on the TV screen. As the tech seers have predicted, television is changing from a synchronous medium—you watch content delivered in real time—to one in which content is captured for viewing at a later time. The VCR hints at all of this, but the DVR, which substantially reduces transaction costs relative to the VCR, may very well realize these changes.

But the DVR—and I will use this as a convenient shorthand for a device with intelligence and storage that intermediates television delivery—is much more than just a souped-up VCR. Smart devices such as the DVR will allow us to unbundle content and advertising. Content that comes from broadcasters bundled in one form—the TV show itself, the station identifications, the ads selling Budweiser, and the promos for a very special Dawson's Creek—can be reshaped and separated before the viewer sees it. The kill-the-commercials feature of some DVRs is just one approach to this, and one that could matter: unbundling could put at risk the basic financing model for ad-supported TV. Jamie Kellner, then head of Turner Broadcasting Systems, infamously described the commercial-skipping feature of the DVR as "theft": "Your contract with the network when you get the show is you're going to watch the spots. Otherwise you couldn't get the show on an ad-supported basis. Any time you skip a commercial . . . you're actually stealing the programming." Kellner did say that it was fine to go to the bathroom during commercials—or more precisely and more begrudgingly, that "I guess there's a certain amount of tolerance for going to the bathroom."

But in truth, you need not adopt Kellner's out-there views to acknowledge that a perfect ad-zapping technology would drastically alter the extent of free TV. We know the place of TV in the United States: other than sleep and work, Americans spend more time watching TV than doing anything else. TV is the main source of news and information, which magnifies its importance in a democracy. TV advertising is also a $54.4 billion-per-year industry, which puts it squarely in the middle of the wheels of commerce. If the DVR really

---

1 See, for example, Nicholas Negroponte, Being Digital 168–69 (Alfred A. Knopf 1995).
2 Interview of Jamie Kellner, VOD's Ad-Skipping Irks Kellner, in Staci D. Kramer, Content's King, Cable World 32 (Apr 29, 2002).
3 Id.
4 Barbara Brock, Life without TV: Filling Those Four Hours with More Satisfying Leisure, Parks & Recreation 68, 69 (Nov 2002) ("On average, Americans watch TV more than four hours a day."). Brock also notes that Americans spend 40 percent of their leisure time watching television. Id.
is the end of the TV commercial, the rapid spread of DVRs will over-
turn the basic structure of broadcast TV.

At least as important, the unbundling of ads and content allows
personalization of commercials, and that in turn may change content
itself. Personalization will make commercials much more valuable: we
will stop getting ads for products we will never purchase or are not
ready to purchase soon. We could move from a world in which one of
ten commercials is of interest to a hit rate of nine out of ten. If you
think that is unrealistic, think of advertising in specialty magazines—
computers, cameras, or cars. And in a competitive market, more effec-
tive commercials should mean fewer commercials: they do not need
to make you watch ten ads to get the one meaningful ad in front of
you.

But more importantly, personalization will change the core role
that content plays in intermediating between advertisers and audi-
ences. Advertisers care enormously about their audiences. For adver-
tising-supported content, the content creator is a middleman, an in-
termediary in the two-sided market made up of audiences and adver-
tisers. In a world in which content and ads are bound together, my ads
get only to individuals who are interested in the content to which the
ads are tied. Grab the remote and flip through the specialized cable
networks. The ads on the Food Network are quite different from those
on Fox Sports World. Content is shaped to attract an audience with
particular demographics so that ads can be targeted at them. Content
mediates the union of advertisers and audience.

Intelligent devices that mediate content—smart TVs or stand-
alone boxes such as the DVR—have the capacity to subvert the criti-
cal matching process played by content creators. If instead I can un-
bundle ads from the content—if I can tailor TV commercials to your
personal characteristics—all that matters is that the viewer is there to
watch the ad. For the advertiser, the content is not the point, the ads
are. If TV test patterns emerged to succeed reality-based TV shows,
advertisers would not care at all, so long as viewers watched the
commercials that "interrupted" the test patterns.

We can imagine these choices in the most concrete terms possi-
ble. You pay for TV directly on your cable bill or you pay for it by
having commercials interrupt the shows that you watch. So you turn
on the TV to watch a show. Before you can watch, you are presented
with a choice: pay a set fee to watch the show commercial-free or get
the show for free with commercials. Of course, they cannot make you
watch the commercials—just as they cannot now—but, absent legal

---

6 That obviously oversimplifies: advertisers care about whether their ads are going to be
well received and believe that program context matters for the warmth of the reception. See C.
controls regarding the privacy of information about individuals, they will know exactly who you are and should be able to offer commercials for products that you might actually care about. At the same time, the DVR, acting as a broker, says to potential advertisers, "here are the personal characteristics of this viewer in Chicago, Illinois; how much will you pay to reach him?"

But this model works only if we can easily separate ad-supported viewers from fee-paying viewers (whether those viewers pay per view or through a monthly subscription fee). If we cannot—if viewers can "offer" to watch commercials and then use TiVo to delete them—then we may have to move to a one-size-fits-all model for TV, where all TV is paid for on a subscription basis. How the technology is organized will almost certainly help to determine whether viewers can commit to retaining the ads. Decentralized, free-standing DVRs—the current model—will make commitment difficult. Centralizing the DVR technology in the pipes bringing the content into your home—putting the DVR technology in the cable box—may make the ad commitments more credible. The range of possible, supportable economic models turns directly on how the DVR technology is organized and those models matter directly for the kind of content that will be made available.

In many ways, the central question for advertising-supported content is who controls the bundle of content and ads. Until recently, consumers of content could select only from the bundles offered to them; they had no direct ability to unbundle. Intermediaries—such as cable companies, or more recently, satellite providers—could have unbundled or rebundled content, but were expressly barred from doing so by law.

With the increasing intelligence of display devices, we now face across-the-board the issue of how content and advertising bundles are presented.

And as we turn more directly to law, to situate the DVR, compare it with the VCR and cable. We litigated how copyright law applied to the VCR in *Sony Corp of America v Universal City Studios, Inc.*, and stopped there; we have never passed legislation to control the VCR. The regulation of cable also started as a copyright problem, arising when cable was community access TV (CATV) and did nothing more than grab broadcasts from the skies using large, shared antennae to forward TV broadcasts to subscribers. Like the VCR, we litigated (with the Supreme Court eventually ruling that CATV did

---

7 See 17 USC § 111(c)(3) (2000) (providing that "the secondary transmission to the public by a cable system of a performance ... in a primary transmission made by a broadcast station ... is actionable as an act of infringement ... if the content ... is in any way willfully altered by the cable system"); 17 USC § 501 (providing remedies for infringement under §§ 106–21).

not violate copyright law) but we also regulated TV intermediation, with a mix of copyright, statutory compulsory licenses, must-carry obligations, and retransmission consent rules.

Given the importance of commercials in financing free broadcast TV, the legal responses to both the VCR and cable as broadcast forwarders unsurprisingly paid close attention to what happened to the commercials. As we turn to regulating the DVR, we will move down the same path, first considering how current law applies and then whether new laws are required. How the technology is organized turns out to be quite important. Standard legal instruments such as copyright or contract work only so well with widespread, decentralized use of a technology. Centralized technology is easier to control, either through contract; through common law doctrines such as contributory copyright infringement, the tack tried in *Sony*; or through direct regulation, as we have done with cable. The regulatory path for the DVR probably turns on whether it emerges as a decentralized technology (à la the VCR) or as part of the cable/satellite system. And, if the DVR technology is centralized, as many forecast, we may see a substantial asymmetry between broadcast and cable. The dispute over “must carry” will morph into a fight over “must store” or “must be smart” as over-the-air broadcasters will seek access to the storage and intelligence that will come to reside in the set-top box.

I. REGULATING CONTENT INTERMEDIARIES

To help situate the DVR, consider four related situations, each of which addresses rules for the permissible behavior of a content intermediary: telephone directory covers in the 1920s; less obscurely, the litigation over the VCR in *Sony*; the dispute over ad-swapping on VCR tapes; and finally, the regulation of cable TV. What I find interesting here is how we see recurring conflicts over advertising bundling and yet a wide variety of legal responses to those conflicts.

A. Telephone Directory Covers

In the 1924 case *National Telephone Directory Co v Dawson Manufacturing Co*, Southwestern Bell Telephone distributed a telephone directory in St. Louis. The directory came with paid ads sprinkled throughout, and, most prominently, ads on the front, back, and spine of the directory. The Chase Hotel in St. Louis entered into a
deal with the Dawson Manufacturing Company in which Dawson would produce wrap-around covers for the telephone directories to be placed in the hotel rooms. Dawson would find advertisers for the spots on the covers, thereby covering up Southwestern Bell's ads. The Chase Hotel was the last mover in this situation. Quite literally, it acted as gatekeeper to its hotel rooms—both for guests and the advertisers seeking access to them. It physically placed telephone directories in its rooms and thus was in a position to put a cover on the directories. Chase could insert its own ads and substantially diminish the value of the ads arranged by Southwestern Bell.

This is not a situation in which we need to be concerned about the creation incentives for the work in question. Southwestern Bell was going to create a directory even if it could not control the cover revenues. The telephone directory is a key way of getting people to use the telephone—it complements the phone system. It is also true that protecting Southwestern Bell from entry in the cover market would increase its revenues, but so would allowing it to charge more for phone service. The real focus here is on maximizing the value of the cover: we can have only one cover for the phone book, and the question is who gets to decide which cover is bound to—that is, bundled with—the content on the inside.

In many ways, this is just a case about contracts and prices. Southwestern Bell and Chase were dealing with each other directly. Southwestern Bell could have specified in its contract with Chase that Chase would not add covers to the directories. Of course, as the phone company, Southwestern's contract terms may have been limited by regulations. If the underlying legal rule barred Chase from adding covers to the directories, Chase would need to pay Southwestern Bell for the right to add covers. It might make sense to do that if, by adding covers, Chase could tailor the cover ads to the demographics of the average Chase customer. By contrast, if any last mover could lawfully add covers to the directories, Southwestern Bell would need to cut deals with each last mover regarding covers, an expensive proposition that would probably force Southwestern Bell to foreclose this possibility through contract or the tariffs setting forth the terms under which it provided services.

As I hope that suggests, we probably should assign the "property right" in the cover to Southwestern Bell. I use the term "property right" loosely, as the actual rule might be implemented through contract or regulation. The default assignment is based on the guess—and it is nothing more than that—that we will see relatively few situations in which last movers can profitably tailor ads to their local audience, and that we should therefore impose on these last movers the burden to negotiate around the initial entitlement. The relative cost of nego-
tiating around the property right is a key reason for structuring property rights in the first instance. Southwestern Bell was distributing roughly 140,000 copies of the telephone directory, while Chase was taking a few hundred (and we can expect there to be few last movers in Chase's ad-tailoring position); it seems sensible to vest the property right in Southwestern Bell.

In the case as litigated, the court found that Chase was engaging in unfair competition. This is an old doctrine with uncertain boundaries, but here unfair competition law is being used as a way of assigning property rights. By finding Chase and the directory company to have competed unfairly in adding the directory covers, the court assigned the property right in the covers to Southwestern Bell. That in turn structured the negotiations over the covers. Last movers who wanted to tailor ads would have to buy that right from Southwestern Bell. And also note the way in which the legal doctrine matters: a pure contracts approach would work between Southwestern Bell and Chase, but if the directory cover company is really the moving force here, Southwestern Bell did not already have a contract with Dawson.

B. The VCR

In Sony, Universal Studios and Disney sued Sony for contributory copyright infringement caused by consumer copying of TV programs using a VCR. Third-party liability for copyright infringement turns first on finding the primary party liable for copyright infringement, and second on finding a basis for extending that liability to the third party. Here, of course, that would mean liability for a consumer using a VCR to tape programs.

The Court in Sony announced its now famous (infamous?) test for evaluating third-party liability—namely, that the sale of copying equipment does not constitute contributory infringement so long as the product is "merely [ ] capable of substantial noninfringing uses." I have criticized this test elsewhere and will not pursue that here. The Court also found that private noncommercial time-shifting—recording a TV show for later home use—is a fair use and hence does not constitute copyright infringement. Under the statute, a fair use finding turns on an analysis of a number of subsidiary factors, includ-

13 Id at 442.
ing the “effect of the use upon the potential market for or value of the copyrighted work.”

The content creators argued that home-taping would reduce the market value of their works by making commercials less effective. Like the dispute between Southwestern Bell and the Chase Hotel, content creators were concerned that the last mover—here the home viewer—would avoid the commercials bundled with the content. Careful tapers might not record commercials at all, while other viewers might fast-forward over ads when replaying a program. But these arguments did not carry the day. On the evidence presented in the district court, 92 percent of the shows were recorded with commercials. That number seems surprisingly low when you consider the mechanics of “avoiding” the commercials: watch the show live, pause recording when the commercials start, and resume recording when the commercials end. As to pure playback, 25 percent of watchers fast-forwarded through the ads. And, of course, these numbers do not capture the marginal effect of the VCR on ad watching: did these committed ad avoiders watch ads before the VCR?

The result in *Sony* meant that VCR manufacturers were free to continue without making any payments to content creators. Money, of course, is exactly what the content creators wanted: as the majority opinion notes, the copyright holders would have been willing to accept a compulsory license of their works for copying in exchange for a royalty on VCR sales. Unlike the telephone directory example where Southwestern Bell and the Chase Hotel could negotiate directly, it would have been impossible to undertake individualized negotiations with end users regarding commercial deletion. A practical compensation mechanism would need to be tied to VCR sales or to sales of blank tapes. In Europe, many countries introduced a combination of equipment and blank medium levies to create funds to compensate copyright holders. In fact, Germany introduced such a program as early as 1965.

**C. VCR Tapes**

Paramount broke new ground in March 1987 when it released the video for *Top Gun*: the video included a Diet Pepsi commercial that played before the movie. It did not take long for a new entrant

---

15 17 USC § 107(4).
16 *Sony*, 464 US at 453 n 36.
17 Id.
18 Id at 441 n 21.
20 See Bruce Horovitz, *Marketing: Pepsi Earns Wings in Home Video*, LA Times § 4 at 9
to emerge: commercial add-on companies. These companies, bridging
the divide between advertisers and video rental retailers, would take a
video tape distributed by Paramount and add commercials at the be-
ginning of the tapes. In some cases, the added commercials were writ-
ten on blank lead-in tape; in other cases, the new commercial over-
wrote the copyright notice or even the Pepsi commercials that Para-
mount included with the tapes.  

This situation created a mess for Paramount. Obviously, if the
add-on company overwrote the original ad, Paramount could not sell
that tape space to Pepsi. It would be as if I tried to sell you a billboard
and you knew full well that someone else could plaster their ad over it
immediately. Even without the direct overwrite, Paramount had a
problem, as the add-on companies were adding commercials for
products that competed with Pepsi; Paramount’s contract with Pepsi
specified that Paramount would not include ads on the tapes for such
products, a form of exclusivity common in advertising.

The add-on company is another example of a last mover. It acted
as a gatekeeper and sat in the middle between the advertiser and the
video rental store. Paramount sued one of the add-on firms, Video
Broadcasting Systems (VBS), alleging, among other things, two theo-
ries of copyright liability: first, that VBS had mutilated its work; and
second, that VBS had created a derivative work, something that only
the copyright holder, Paramount, would be allowed to do. 2 The mu-
tilation claim has its roots in the continental concept of droit moral, the
“moral right . . . of the artist to have his work attributed to him in the
form in which he created it.” 21 It should come as no surprise that the
court in Paramount found it difficult to take seriously how that lofty
notion might apply to swapping an ad for a local pizza joint with a
Diet Pepsi commercial on the Top Gun video tape.  

The derivative work claim was no more successful. Copyright law
assigns exclusive control over “derivative” works to the owner of the
original copyright. 22 So, for example, J.K. Rowling has exclusive con-
trol over sequels to the first Harry Potter book. But should we think
of the revised tape—the new commercial plus Top Gun—as a new

---

22 Id.
23 Gilliam v American Broadcasting Cos, Inc, 538 F2d 14, 24 (2d Cir 1976) (stating that
while American copyright law does not recognize “moral rights or provide a cause of action for
their violation,” the economic policy underlying copyright depends on granting artists relief “for
mutilation or misrepresentation of their work to the public,” and thus courts have long found
room for such claims “outside the statutory law of copyright, such as [in] contract law, or the tort
of unfair competition”).
24 Paramount, 724 F Supp at 819.
25 17 USC § 106(2).
work that is derivative of *Top Gun*? Probably not. Adding a com-mercial at the beginning should not be seen as sufficiently original as to make the commercial-plus-movie a new copyrighted work. If no new copyrightable work has been created, then Paramount's exclusive derivative work right was not violated. After VBS worked with the tape, *Top Gun* emerged unchanged: Tom Cruise still flew airplanes and chased Kelly McGillis. Note that the focus on originality as simply a doctrinal matter slips over the more troublesome questions of precisely what *should* determine the scope of the derivative work right and what guidance we should give to judges in implementing that principle.

Like Southwestern Bell, Paramount also asserted an unfair competition claim, but that idea lacks traction when detailed contracts are possible. VBS had obviously entered into a deal with the local retailers to add the local commercials. With Paramount just selling the tapes without further provisions, copyright's first-sale doctrine\(^\text{26}\) offered comfort to VBS and the retailers. As technology changed, however, the studios and the retailers entered into new contractual arrangements. Originally, studios simply sold tapes to the retailers, with retailers assuming the risk of uncertain demand. As technology made it possible for studios to collect information about actual tape rentals by video stores, the business deal between studios and retail stores shifted from a sales model to an access model.\(^\text{27}\) A studio now can put a bunch of copies of a new movie into the video store and collect a per-rental fee. The retailer's inventory problem shrinks considerably. And this new contract between the studio and the retailer means that the question of local ad insertion could easily be addressed as just another term of the larger contract.

D. Cable

What we now know as cable TV started as CATV. Think of these as shared antenna systems with local distribution over a network of landlines. You and I live in the middle of nowhere and thus get lousy free broadcast TV reception or none at all. We could each build a very large antenna to get better reception, but such an antenna could easily be shared by a number of users. CATV faced many legal uncertainties, but two were critical. First, did the antenna owner owe anything to the broadcast stations for the use of their signal? Second, did the antenna

\(^{26}\) See 17 USC § 109(a) (granting the owners of individual copies of protected works the right to sell or dispose of those copies without the copyright owner's permission).

owner owe anything to the copyright owners for the use of their content?

These are basic property right and communications law questions. Answers in favor of broadcasters or copyright owners obviously would have made entry substantially more difficult, as, at a minimum, CATV entrants would have needed to negotiate for rights with many broadcasters and content owners. Early case law favored the copyright owners, but two key Supreme Court decisions established that cable operators were more like viewers than broadcasters and therefore did not "perform" the works that they carried. That regime lasted less than two years, as the Copyright Act of 1976 reset the rules for so-called secondary transmissions, treating some unauthorized transmissions as a copyright infringement but coupling that with a statutory mandatory licensing scheme.

Under the license, cable firms pay a statutory fee for the use of some broadcasts; use without paying the fee is a copyright violation. The statutory license comes subject to the requirement that the cable company must preserve the content of the original transmission, including the advertising during, before, and after the program. The hearings leading to the 1976 Copyright Act make clear that there was a substantial dispute about the extent to which cable could add value to advertising in forwarding the over-the-air broadcast programs. Congress ultimately came down on the side of broadcasters in requiring the cable companies to pass through the advertising intact.

But nothing in the statutory license affirmatively required the cable companies to distribute broadcast content. A separate set of rules, known as the must-carry rules, addressed this issue. The FCC first imposed must-carry obligations in the 1960s through regulations, but those regulations were eventually overturned by the D.C. Circuit in 1985 and again in 1987 as unconstitutional under the First Amendment. Congress reimposed must-carry in the 1992 Cable Act, and


29 See 17 USC § 111 (establishing what actions constitute copyright infringement by a cable system and creating a mandatory licensing scheme for cable retransmission of television broadcasts); 17 USC § 501 (providing a private cause of action for copyright infringement and giving television stations and other licensees standing to sue cable companies for infringement).

30 See, for example, Letter of Jim Terrell, Chairman, Independent Television Stations, Inc, to Representative Robert W. Kastenmeier (June 17, 1975), in G. Grossman, ed, 16 Omnibus Copyright Revision Legislative History: U.S. Congress House Committee on the Judiciary Subcommittee on the Courts, Civil Liberties and the Administration of Justice Hearings 1975 (Part 3) 2032 (Hein 2001).

31 Quincy Cable TV, Inc v FCC, 768 F2d 1434 (DC Cir 1985); Century Communications Corp v FCC, 835 F2d 292 (DC Cir 1987), clarified in 837 F2d 517 (DC Cir 1988).

the new version was again challenged as a violation of the First Amendment. Those rules went to the Supreme Court twice before the court ultimately approved them. Under the current must-carry rules, the cable operator must broadcast the entire schedule of the local over-the-air station, including all of the commercials. The rules thus prevent the cable company from acting as a typical last mover—such as the Chase Hotel, you and I using our VCRs, or the commercial add-on firms—who otherwise would seek to delete the commercials.

The 1992 Cable Act actually put in place a more complex regime, as it supplemented the must-carry rules with a new process for "retransmission consent." Every three years, local broadcasters must choose between exercising their must-carry rights—under which they get carriage by the cable operator but no money—and negotiating access with the cable operator and possibly seeking payment for the retransmission. This retransmission consent rule created a stronger property right in the broadcast signal than existed under the 1976 Copyright Act, which had embraced a more circumscribed set of rights in broadcast signals by allowing mandatory licensing of those signals. By conferring a property right in the signal, the 1992 Cable Act pushed toward using contracts to regulate how cable companies would intermediate local broadcast signals.

II. EVALUATING THE DIGITAL VIDEO RECORDER

We have just seen five ways in which law may apply to content intermediaries: (1) unfair competition law can set property rights in how content can be used; (2) copyright law can be directed at the intermediation device itself, as we saw in Sony; (3) copyright can also be directed at the result of the intermediation, as we saw with the Top Gun video tape; (4) contracts can control the use of content, as they currently do for VHS rentals; or (5) Congress can legislate and its agents can regulate, as we have seen with cable but did not see, contrary to much of the rest of the world, for the VCR. What will happen to the DVR?

We should start with some quick statistics. The FCC puts the number of TV-owning households in the U.S. as of June 2002 at 105.4 million. Roughly 85 percent of those subscribe to a program service such as cable or satellite. About 90 percent of TV households have a

---

34 47 USC § 534(b)(3); 47 CFR § 76.62 (2003).
37 Id at 26903.
Unbundling Advertising and Content

VCR. Figures on DVR penetration are less precise. The FCC estimates the number at 1 million. Media reports put the number at 2.4 million, with TiVo itself reporting roughly seven hundred thousand customers. Satellite suppliers have been especially active in moving to integrate DVR technology into their products, and cable companies are moving to add DVRs to the cable set-top box. Industry analysts forecast robust growth in the DVR market, with roughly 28.6 million households in the United States, or 25 percent of all households, having a DVR by 2008. The vast majority of these are expected to be units in set-top boxes rather than stand-alone units.

But with a current adoption rate of barely 2 percent, we are at the early stages of this technology (or maybe it just is not going anywhere). And purchase of a DVR does not equal use. It is hard to be certain about the facts, but some reports suggest that TiVo households do 40 percent of their prime-time viewing through TiVo, and that TiVo watchers skip 70 percent of the commercials. You can probably multiply with the best of them, so we are currently at a figure for "lost" commercials of 2 percent x 40 percent x 70 percent, which translates into slightly more than 0.5 percent of all commercials. But if we moved quickly to 90 percent penetration (the current figure for VCRs) or 85 percent penetration (the figure for TV delivery other than over-the-air) we have a much more significant issue.

The switch from tape to hard disk entails several innovations: superior programmability, the ability to pause live TV shows and then continue watching them without missing a beat, and the ability to skip commercials entirely. Updates to the DVR make it possible to distribute a recorded show to friends, assuming, of course, that they also have the same DVR, though ReplayTV has dropped this feature going forward. Commercial skipping and sending shows to friends attracted the attention of content producers, and in November 2001, a bunch of the content biggies—including Paramount, Disney, NBC, Showtime, ABC, CBS, and Viacom—sued SONICblue, the producer of ReplayTV, alleging copyright violations. On June 6, 2002, the Elec-

36 Id at 26907.
39 Id at 26945.
40 See Seth Schiesel, Cable or Satellite? Please Stay Tuned, NY Times G1 (July 31, 2003).
42 See Steve McClellan, TiVo's Ad-Friendly Claim Doesn't Sway Top Researchers, Broadcasting & Cable 12 (July 7, 2003).
44 See Amended Complaint, Paramount Pictures Corp v ReplayTV, Inc, Civ No 01-09358-FMC (Ex) (CD Cal filed Nov 21, 2001), online at http://www.eff.org/IP/Video/Paramount_v_ReplayTV/20011121_paramount_amd_complaint.pdf (visited Jan 10, 2004) (alleging (1) direct copyright infringement, (2) contributory copyright infringement, (3) vicarious
tronic Frontier Foundation countersued, bringing a declaratory judgment action on behalf of ReplayTV owners. Given Sony, the plaintiffs will need to distinguish the analog VCR or litigate to the Supreme Court with the hopes of overturning the Court's original 5-4 decision. Again, I am quite skeptical about Sony, but will not address that here.

A. Redistribution Incentives and the Organization of Technology

The mere existence of the lawsuit over redistribution of content gives some sense of how uncertain copyright doctrines burden entry into new markets, and the interaction of those doctrines with design decisions. SONICblue made an interesting choice in adding the "Send Show" feature to the ReplayTV 4000. The company undoubtedly was trying to create a network of ReplayTV owners with the hope that the possibility of sharing shows with others would induce users to prefer ReplayTV to TiVo. But adding this feature enmeshed this DVR in the Napster controversy and seemed likely to attract unwanted attention, as indeed it did, when the lawsuit was filed. (No lawsuit has been filed against the competing TiVo system, which allows sharing between TiVos owned by the same person, but not with others' TiVos.) And it turned out this effort was wasted: SONICblue eventually filed for bankruptcy and sold its DVR technology, and the new owner has dropped the redistribution feature.

It was unlikely anyway that the redistribution feature would survive as DVR technology rolled out in large numbers, largely because the DVR will likely be distributed mostly through cable set-top boxes. Cable operators will be very sensitive to the revenue consequences of allowing customers to redistribute content. Redistribution might have direct consequences for revenues generated by pay-per-view programming or video on demand, but very well might similarly affect subscriptions for pay channels. The desirability of redistribution plays out quite differently when the DVR is a stand-alone device. For better or worse, the cable operators will take account of, in a way that a free-standing DVR maker would not, the potential lost cable revenues from allowing end-users to redistribute shows. As the fight over redistribution of content makes clear, the identity of the owner or controller of a technology has important consequences for the technology's development.

Copyright infringement, (4) violation of § 553 of the Communications Act, (5) violation of § 605 of the Communications Act, and (6) unfair business practices).


B. Commercial Deletion and the Commercial Dilemma

If my analysis is right, the DVR dispute will revolve around advertising. We see here another example of the way in which the move from analog to digital technology reduces transaction costs and puts pressure on the old business model. The DVR lowers the cost of deleting commercials relative to a standard VCR or even relative to an analog dual-head VCR. The plaintiffs in the ReplayTV suit are quite plausibly right in thinking that if we all had free-standing DVRs, the current financing model for free broadcast TV would be toast. That model is one that lives and dies on commercials, and absent making us want to watch commercials—as many advertisers clearly do—no watching of commercials means no free TV.

Maybe there is a shared interest in making it difficult to skip commercials. Indeed, deleting-versus-watching commercials may very well be a classic prisoners’ dilemma: I want you to watch commercials rather than having to watch them myself, but I cannot influence your behavior—and armed with DVRs, neither of us watches commercials, and free TV vanishes. If we measure the copyright fair use right against the prior baseline established by Sony—under which home-recording was allowed and fast-forwarding through commercials went uncontrolled—SONICblue should prevail on the copyright claims tied to commercial skipping; DVR commercial skipping is just a handier way of exercising these Sony “rights.” That said, if we really take fair use analysis as open-ended economic analysis, the prisoners’ dilemma problem of commercials and free TV suggests that we will not necessarily reach the best joint outcome if we allow individuals to make choices on their own. Only something more collective (or more centralized) would get us to preserving the commercials.

Thus there might be a collective interest in limiting individuals’ ability to eliminate commercials. Eliminating commercials is an attempt to escape the tax that those commercials represent. In a world of ubiquitous removal technology, we move television commercial viewing from opt out to opt in. With decentralized TiVo, the technology threatens a mandatory shift from an advertising-based medium to a fee-based medium. Moving the intelligence away from the edges of the network to the center preserves the possibility that users can commit to not deleting the commercials. With DVR services provided centrally, each TV watcher could choose whether to pay one fee for ad-free content or a different fee for content with ads.

C. Ad Personalization and Changes to Content

But we should expect more than just successful pass-through of some commercials to viewers. That does no more than continue the
current state of ad-supported television. The possible attractiveness of inserting an intelligent intermediary between the over-the-air broadcaster and the television viewer should be apparent. Such an intermediary could deliver to viewers commercials that are tailored for those viewers. In the current regime, commercials are matched with viewers in a relatively clunky fashion. As an advertiser, I know that a particular kind of viewer watches *Friends*. I deliver commercials based upon those aggregate views, but if it turns out that the odd grandmother watches the show to better relate to her grandchildren, we have probably delivered the wrong ads to her. Far better—far more valuable—to have the intermediary know that Grandma is watching and match commercials to her. This is not to say, of course, that Grandma or any other viewer actually welcomes the advertising but that a viewer finds the interruption less costly when useful information is presented.

As I noted in the Introduction, ad personalization should make commercials much more effective and might be expected to reduce the number of commercials broadcast. The extent to which that will occur depends on precisely how much information the DVR sees and uses, and there is little doubt that concerns over the privacy of information will be a key issue for ad personalization and a natural action point for lawmakers.

But successful ad personalization will also change content itself. To see this, consider a simple example. One show can be broadcast: a hockey game or a game show. Viewer *A* will watch only hockey, while viewers *B* and *C* will watch only the game show. Only one commercial can be broadcast on the show (viewers do not care about one commercial, but find any more infinitely painful). Three advertisers compete for the single slot. The beer company would pay $5 to reach *A* and nothing to reach *B* or *C*. The coffee seller would pay $3 to reach *B* and nothing to reach *A* or *C*. The tea maker would pay $3 to reach *C* and nothing to reach *A* or *B*.

In an ad-supported environment, which show will be broadcast with what commercial? Hockey with the beer commercial. We can run only one commercial, and the most valuable commercial is the beer commercial. Now suppose that we can tailor commercials: how will this alter the outcome? The TV station will now broadcast the game show and will show the coffee commercial to *B* and the tea commercial to *C*. Total ad revenue will increase from $5 to $6.

Ad personalization has the capacity to change TV content, as the simple example should make clear. I have said nothing about whether this is good or bad, just that it is possible. Also note that we can now support more TV programs. If the cost of producing the game show or
the hockey game was $5.50, without ad personalization we would get neither show; with ad personalization, we can pay for the game show.

CONCLUSION

We are now positioned to guess at how we will regulate DVR technology. The emergence of the DVR as a free-standing device has put us on the wrong track. As a free-standing device, we will replay the Sony litigation and have another fight over copyright. As a 5–4 pre-digital era decision early in the days of ubiquitous copy technology, it makes sense to rethink Sony and see whether we want to end up in the same spot. I doubt it, but that is not my issue here. Instead, as the DVR technology is incorporated into the devices we already use to deliver intermediated TV—cable and satellite set-top boxes—we will regulate DVR technology incrementally as part of the larger regulation of cable and satellite broadcasting.

In that framework, the key idea has been pass-through: in varying degrees, the TV intermediary is required to pass through the content of the over-the-air broadcaster with the commercials intact. The copyright statutory licensing scheme implemented one version of pass-through, the must-carry rules a slightly different version, and a third version can be required as a matter of contract under retransmission consent. The key doctrinal question will be whether these pass-through rules limit the ability of TV intermediaries to incorporate DVR technologies. Is the cable company complying with its must-carry obligation to broadcast the full content of the local station, including the commercials, if viewers can use the set-top box to delete those commercials?

I have not attempted to answer that doctrinal question here. The answer to that question will establish the property right to the delivery of the commercials and the baseline against which negotiations will take place for broadcasters who elect the retransmission consent process. But to some extent, I think that the answer to the doctrinal question is of limited importance, as it applies only to ad-supported broadcast channels. Competition from ad-supported cable channels will matter. For ad-supported cable, the cable operators will rely on contract to move toward ad personalization. The cable company contracts upward with content creators and downward with customers and, through this nexus of contracts and control over technology, can establish terms of use directly, making copyright largely irrelevant. If this model turns out to be a much better way of delivering ads, we will see a substantial advantage for ad-supported cable over broadcast TV. For broadcasters, the issue will not be about fighting to get their ads to viewers intact but rather one of getting access, possibly through the retransmission consent process, to the ad personalization technology
made possible by the insertion of intelligence and storage into the set-top box.