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August 1, 2006

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

Re: *Ex Parte*: **In the Matter of Comcast Corporation's Request for Waiver of 47 C.F.R. § 76.1204(a)(1), CSR-7012-Z, CS Docket No. 97-80.**

Dear Ms. Dortch:

Comcast Corporation ("Comcast") commissioned Dr. Michael Katz, who holds the Sarin Chair in Strategy and Leadership at the University of California, Berkeley, to conduct an economic analysis of Comcast's request for waiver of the integration ban for certain low-cost, limited-capability set-top boxes.

Dr. Katz's analysis, which is attached, concludes that granting the waiver would promote economic efficiency and consumer welfare, while denying the waiver would inefficiently raise costs and harm consumers in various ways. The analysis reaches those conclusions based on the following findings:

- Granting the waiver would not harm competition in the sale of consumer electronics equipment. The forces of common reliance will be strong even if applied only to higher-end set-top boxes, such as those with HD/DVR capabilities. In short, there is no evidence of incremental benefits associated with denying the waiver.
- Granting the waiver would promote competition in multichannel video programming distribution.
- There is clear evidence that refusing to waive the integration ban for low-cost, limited-capability set-top boxes could trigger an estimated $200-300 million of social costs per year. Given the lack of incremental benefits, these costs would be pure waste.
- Proactively including models that are successors to those set-top boxes for which Comcast has sought the initial waiver—subject to limitations on including certain advanced functionality in such boxes—would promote economic efficiency and consumer welfare.

Kindly direct any questions regarding this matter to my attention.

Sincerely,

/s/ Jonathan Friedman
Jonathan Friedman
Counsel for Comcast Corporation

Attachment

cc: Donna Gregg
Rosemary Harold
Andrew Long
Steven Broeckaert
John Wong
Mike Lance
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AN ECONOMIC ANALYSIS OF THE COMCAST SET-TOP BOX WAIVER REQUEST

Michael L. Katz*

August 1, 2006

* This paper was commissioned by Comcast Corporation. The views expressed are those of the author and do not necessarily reflect the views of Comcast Corporation.

CONTENTS

EXECUTIVE SUMMARY

Comcast Corporation has applied to the Federal Communications Commission for a waiver of its rule banning set-top box integration for certain low-cost, limited-capability set-top boxes.

Economic analysis supports the conclusion that granting the waiver would promote economic efficiency and consumer welfare. Conversely, denying the waiver would inefficiently raise costs and harm consumers in various ways. These broad conclusions derive from the following findings:

- Granting the waiver would not harm competition in the sale of consumer electronics equipment. The forces of common reliance will be strong even if applied only to higher-end set-top boxes, such as those with HD/DVR capabilities. In short, there is no evidence of incremental benefits associated with denying the waiver.
- Granting the waiver would promote competition in multichannel video programming distribution.
- There is clear evidence that refusing to waive the integration ban for low-cost, limited-capability set-top boxes could trigger an estimated $200-300 million of social costs per year. Given the lack of incremental benefits, these costs would be pure waste.
- Proactively including models that are successors to those set-top boxes for which Comcast has sought the initial waiver—subject to limitations on including certain advanced functionality in such boxes—would promote economic efficiency and consumer welfare.

For all of these reasons, I conclude that granting the waiver would be in the public interest.

I. INTRODUCTION

1. Comcast Corporation ("Comcast") has filed a request with the Federal Communications Commission ("Commission") for a waiver of the Commission's ban on integrated set-top boxes with respect to certain low-cost, limited-capability set-top boxes.[1] In this note, I examine the economic effects of granting this waiver. I conclude that granting the waiver on a timely basis would promote economic efficiency, enhance competition, and enhance consumer welfare. I also conclude that refusing to waive the integration ban for low-cost, limited-capability set-top boxes could trigger additional social costs (or efficiency losses) of $200-300 million per year, or more. These costs would be borne by cable operators and consumers. Because any benefits derived from denying the waiver would be negligible, these costs would represent pure waste.

II. GRANTING THE WAIVER WILL NOT HARM COMPETITION IN CONSUMER ELECTRONICS.

2. Numerous public policies, including antitrust enforcement and the Telecommunications Act of 1996, promote competition for the benefits it brings to consumers.[2] These benefits typically come in the form of lower prices, greater innovation and variety, and/or higher product and service quality. The Commission's policies are intended to serve the public interest, and the public interest encompasses more than competition and efficiency. Nonetheless, promoting efficiency through competition is widely recognized as the most effective means to promote overall consumer welfare in most markets.

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[1] *See In the Matter of Comcast Corporation's Request for Waiver of 47 C.F.R. § 76.1204(a)(1),* Comcast Request for Waiver, CSR-7012-Z, CS Dkt. No. 97-90 (Apr. 19, 2006) (hereinafter *Comcast Waiver Reque*st).

[2] *See* Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1996). The 1996 Act amends the Communications Act of 1934, 47 U.S.C. §§ 151 et. seq.

3. The present section examines the effects that granting Comcast's waiver request would have on competition in the provision of consumer electronics equipment. It is important to recognize, however, that competition in the video entertainment sector occurs at both the system and component levels.[3] At the component level, there are, for example, competing manufacturers of the equipment necessary to connect a television receiver to a cable system. There is also significant competition at the system level, particularly between direct broadcast satellite ("DBS") offerings and cable television. Moreover, large telephone companies have begun to offer competing services and have plans to become major competitors.[4] DBS, cable television, and telephone-network-based video each comprises a bundle of content, equipment, and customer service. A rational consumer choosing between DBS service, cable service, and telephone-company video service will consider all of these components in making his or her choice. It is therefore important to consider competition at both the component and systems levels when examining the economic effects of granting Comcast's requested waiver. Thus, after considering the effects of the waiver on component (equipment) competition in this section, the following section will examine the effects of the waiver on systems competition.

A. There is an Important Distinction between Harm to Competition and Harm to Competitors.

4. There is a critical and widely recognized distinction between preventing harm to competition and preventing harm to competitors. Consider a hypothetical example in which

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[3] Here, I am using "system" in the economic sense of two or more complementary components that are used together to generate consumer value.

[4] For information regarding AT&T's video offering, U-verse Television, *see* http://www.sbc.com/gen/u-verse?pid=7871&cdvn=custom, site visited July 27, 2006. For information regarding Verizon's video offering, FiOS TV, *see* http://www22.verizon.com/content/fiostv, site visited July 27, 2006. *See also Verizon's Petition for Waiver of the Set-Top Box Integration Ban, 47 C.F.R. § 76.1204(a)(1)* (July 10, 2006) (hereinafter *Verizon Waiver Request*), at 6 (describing Verizon's FiOS TV deployment plans).

several service providers formed a cartel and agreed to charge subscribers prices elevated well above costs. If one of the firms breached the agreement and charged a price closer to the competitive level, that action would very likely harm its competitors. But that action would be economically efficient and benefit consumers—there would be an increase in competition. Public policy properly condemns price fixing and seeks increased competition. Similarly, if a firm brings a lower cost or higher quality product to market, that action typically will harm competitors but strengthens competition and benefits consumers. Public policy should not seek to block such behavior.

5. This broad principle has an important application in the present matter. Suppose a cable operator, or some other company, offers an integrated set-top box that has lower costs than alternative models. Introduction of that box very likely harms sellers of competing equipment but—in both the everyday and economic senses of the word—it increases competition.[5]

B. Consumer Electronics Equipment Manufacturers Do Not Want to Serve this Segment of the Marketplace.

6. It is my understanding that consumer electronics equipment manufacturers do not want to serve the low-cost, limited-capability segment of the marketplace, whether or not cable companies offer low-cost, limited-capability integrated boxes.[6] Hence, granting Comcast's

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[5] This situation can be contrasted with one in which the least-cost way to manufacture set-top boxes was to have separable security and cable companies adopted integrated boxes solely to freeze out rivals. Observe that this hypothetical would require both that integrated set-top boxes not be lower cost and that only cable operators could offer integrated set-top boxes to subscribers. This hypothetical would be a very different situation than the one we see in the cable industry today.

[6] *See* Steve Donohue, "The Incredible Disappearing Magic Box," *Multichannel News*, January 9, 2006, (reporting that most television receivers marketed as "digital cable-ready" are high-definition receivers); *see also* CableLabs, *Certified, Verified and Self-Verified Cable Products 07/13/06*, *available at* http://www.cablelabs.com/udcp/downloads/OC_PNP.pdf (site visited July 27, 2006) (listing only three set-top boxes, two of which are TiVo DVRs and the third of which is Mitsubishi's HD-6000, which Mitsubishi's web site describes as a high-definition DVR (*see* http://www.mitsubishi-tv.com/j/i/18386/OtherDetails.html?cid=41, site visited July 27, 2006)).

requested waiver cannot harm component competition in this segment because there is little or no "competition" in this segment to harm.[7]

7. One might argue that, if cable operators were not allowed to offer low-cost, limited-capability set-top boxes, then consumers would be forced to buy the high-end equipment that consumer electronics manufacturers wish to sell. To the extent that it had this effect, such a policy could raise the profits of some consumer electronics manufacturers and retailers.[8] But even if this policy did raise manufacturer and retailer profits, it would be a costly and inefficient means of doing so. And it would harm consumers. Endorsing this practice would clearly be making the mistake of failing to distinguish "harm to competition" from "harm to competitors." From a consumer welfare perspective, artificially handicapping one set of suppliers does not promote competition.

8. If there is any sense to the theory that limiting cable companies' abilities to offer efficient, low-cost, limited-capability, integrated set-top boxes promotes efficiency or consumer welfare, that theory must be based on the notion that "common reliance"—the idea that both navigation devices deployed by cable operators and those built by consumer electronics manufacturers for sale at retail should rely on the same security technology and conditional access interface—is critical. However, as I now discuss, economic analysis indicates that granting the waiver would not meaningfully weaken common reliance.

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7 This statement is a simplification because it ignores the systems-level competition discussed below.

8 It should be noted, however, that some consumers would likely lease more-expensive-but-still-limited-capability boxes, and others would forgo digital services. Because of this last effect, blocking the waiver might *reduce* the profits of some consumer electronics manufacturers and retailers. As discussed in Section V below, denial of the waiver would very likely slow the adoption of digital services, which—in turn—might reduce consumers' incentives to purchase new television receivers that would otherwise allow consumers to take better advantage of these services.

C. Cable System Operators Will Have Incentives to Support CableCARD Technology because It Will Be Used in Millions of Higher-End Boxes, Deployment of which is Critical to Operators' Ability to Generate Revenues.

9. Whether the waiver is granted or not, the forces of common reliance will be strong. The new higher-end set-top boxes that Comcast and other cable operators will deploy after the integration ban goes into effect, such as set-top boxes with high-definition and digital video recording (DVR) capabilities, will include CableCARDs. Comcast anticipates that its deployment of these higher-end boxes will number in the millions.[9]

10. Comcast and other cable operators have strong incentives to support these CableCARD-enabled boxes because they otherwise will not be able to roll out advanced new services that are vital to their revenue growth. The requested waiver applies to boxes that cannot support advanced functions and services, such as DVR and high definition television. These advanced functions and services are a critical part of Comcast's financial future.[10] The number of cable subscribers has been flat or falling in the last few years.[11] Hence, cable industry growth is highly dependent on the operators' being able to offer new services to existing subscribers, both to

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[9] *See In the Matter of Comcast Corporation's Request for Waiver of 47 C.F.R. § 76.1204(a)(1)*, Reply of Comcast Corporation, CSR-7012-Z, CS Dkt. No. 97-80 (June 30, 2006) (hereinafter *Comcast Waiver Reply*), at 14 n.56.

[10] *See* Comcast Press Release, *Comcast Reports Second Quarter 2006 Results*, (July. 27, 2006), *available at* http://media.corporate-ir.net/media_files/irol/11/118591/Earnings_2Q06/2q06release.pdf, at 2 (noting that as of June 30, 2006, 30 percent of Comcast's digital customers subscribed to DVR and/or HDTV services, as compared to 19 percent a year earlier).

[11] *See* Federal Communications Commission, *In the Matter of Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, Twelfth Annual Report, 21 FCC Rcd. 2503 (rel. March 3, 2006) (hereinafter *Twelfth Annual Report*), Table B-1.

increase revenues per subscriber and to retain subscribers in the face of competition from DBS and, going forward, telephone company video offerings.[12]

11. In the light of the importance of these high-end CableCARD-enabled set-top boxes, Comcast and other cable operators will have to ensure the successful deployment of CableCARD technology in these boxes, the successful installation and support of CableCARDs in these devices and retail CableCARD-enabled devices, and the successful management of their networks to deliver services in a manner that is compatible with CableCARDs. In short, Comcast and other cable operators will have powerful economic incentives to support CableCARD technology in their networks, operations, and customer care services, whether or not the waiver is granted. Indeed, Comcast has placed orders with suppliers such as Panasonic for set-top boxes that use CableCARDs.

12. It is also worth noting that Comcast and other cable operators *already* have strong incentives to support CableCARD-enabled devices to avoid the costs of handling customer complaints, as well as the adverse effects on company reputation. Regardless of where they obtained the equipment, subscribers tend to call their cable operator when a CableCARD device does not function properly. These service calls and visits are expensive, and a dissatisfied customer is also expensive.[13] Comcast will continue to have these economic incentives to make its cable systems function well with CableCARD-enabled consumer electronics devices after the

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12 *See also Twelfth Annual Report,* Table 3, which shows that the number of households subscribing to premium cable service fell in recent years but the number of pay units per pay household increased.

13 *See* NCTA Report on CableCARDs, filed in CS Dkt. No. 97-80, at 3 (June 29, 2006) ("[I]f there is a problem in receiving services in the manner expected [with a CableCARD product], the cable company will receive the first call. As a result, it likely will dispatch a technician to determine the problem -- an expensive proposition for the operator and an annoyance for the cable customer."); *see also id.* at Ex. A (describing Comcast's experiences with CableCARD-enabled devices).

integration ban goes into effect—whether those CableCARD-enabled devices are purchased at retail or leased from Comcast.

13. There are other, independent reasons why Comcast and other cable operators already have strong incentives to support CableCARD technology. Comcast is in the business of providing services, not equipment, and there are significant costs associated with acquiring and maintaining set-top boxes. CableCARD technology provides a way for Comcast and other cable operators to reduce those equipment-related costs. Cable-ready television receivers and DVRs allow Comcast to offer its services to subscribers at lower cost because there is no need to provide a stand-alone set-top box.[14] In short, every cable customer who purchases a CableCARD-enabled television receiver or DVR at retail means one less customer for which Comcast must provide a set-top box.

14. Lastly, competition from DBS, telcos, and other MVPDs further increases the incentives of cable companies to promote advanced set-top boxes that will allow them to offer attractive new services and, thus, compete more effectively with those MVPDs. For example, in the last several years, competition with DBS providers has helped spur cable operators to roll out DVR-capable set-top boxes to many of their subscribers.[15] And a Motorola executive recently indicated that the company expects that preparations by Verizon, DirecTV, and others to roll out

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[14] In the future, CableCARD technology may not be the most efficient means of enabling cable-ready television receivers. In particular, downloadable security potentially offers a number of benefits.

[15] DBS providers added 10 million subscribers between June 2001 and June 2005, while cable operators lost subscribers over that period. *See Twelfth Annual Report* at App. B, Table B-1 (comparing subscribers for cable, DBS, and other MVPDs between 2001 and 2005).

multi-room DVRs will create pressures for cable companies to push their roll-outs of similar products.[16]

15. In summary, granting the waiver will not undermine the Commission's goal of effective common reliance. And denying the waiver will not generate any appreciable benefits through increased common reliance.

III. GRANTING THE WAIVER WILL PROMOTE COMPETITION IN MULTICHANNEL VIDEO PROGRAMMING DISTRIBUTION.

16. Competition occurs at both system and component levels. There is competition between DBS and other MVPD systems (content, customer care, and equipment) and cable systems (content, customer care, and equipment). Granting the waiver will allow for more efficient production of one component—set-top boxes—and thus allow and incent cable companies to compete more vigorously with DBS and other service providers.

17. An important fact is that the major non-cable competitors in the multichannel video distribution industry offer integrated boxes.[17] This fact is significant for at least two reasons. First, it suggests that integrated set-top boxes are an efficient approach that offers consumer benefits. This conclusion follows from the fact that these competitors adopted this technology at a time when they did not possess significant market power in multichannel video distribution. Second, if cable companies and their customers are forced to incur the added costs and inconvenience of CableCARD-enabled boxes, while other MVPDs and their customers can avoid such costs and inconvenience, the resulting differential will create an artificial source of

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[16] Statement of John Burke, vice president and general manager of digital video solutions, as reported by Steve Donohue, "The Incredible Disappearing Magic Box," *Multichannel News,* January 9, 2006.

[17] *See Comcast Waiver Request* at 13. n.39 (noting that DIRECTV and EchoStar offer integrated set-top boxes to customers). Verizon has recently filed an application for waiver of the integration ban for *all* of its set-top boxes, not just a narrow category of boxes. *See Verizon Waiver Request*.

competitive advantage for DBS and other providers. This artificial advantage will distort competition and, consequently, harm economic efficiency and consumer welfare. A full assessment of whether it is in the public interest to require particular set-top boxes to comply with the Commission's ban on integrated set-top boxes must weigh these adverse effects against any benefits that compliance might have.

18. Current and future cable subscribers will benefit from the increase in competition that granting the waiver will enable. So, too, will DBS and other MVPD subscribers. For example, even if they do not switch service providers, DBS subscribers can expect to be offered more favorable terms as their contracts come up for renewal. In summary, granting the waiver to allow cable companies to offer more efficient set-top boxes will promote competition and consumer welfare.

IV. DENYING THE WAIVER WOULD INEFFICIENTLY RAISE CONSUMER EQUIPMENT COSTS.

19. Denying the waiver would significantly raise costs through several mechanisms:

- *Use of CableCARD technology will require a significant change in the design of current low-cost, limited-capability boxes.* If the waiver is denied, equipment manufacturers will have to make substantial changes in the designs and form factors of the boxes for which the waiver is sought. It is my understanding that, at present, low-cost, limited-capability set-top boxes lack the power supply and space needed to support a CableCARD. These necessary design changes would increase costs and—by making the set-top boxes bulkier—decrease consumer convenience.
- *A CableCARD-enabled set-top box has higher manufacturing costs.* In comparison with an integrated set-top box, a CableCARD-enabled box requires additional materials and manufacturing steps.

- *The CableCARD itself is costly.* The CableCARD itself requires materials, labor, and distribution. An important fact is that many of these costs are not incurred when constructing a set-top box with integrated security features.
- *CableCARD systems are more complex than integrated set-top boxes and thus more likely to trigger customer calls to the cable operator or require service visits by the operator.* Service calls and truck rolls are costly. Truck rolls, in particular, involve significant labor and, in some locations, fuel. In contrast to electronics costs, labor and fuel costs are generally rising.

20. Several sources have provided quantitative estimates of these additional costs. According to Comcast, imposing a CableCARD requirement on low-cost, limited-capability set-top boxes would increase the cost of such devices to Comcast by 50 percent or more.[18] In 2002, the National Cable & Telecommunications Association ("NCTA") filed a report based on consultations with Motorola and Scientific Atlanta indicating that the added cost of the CableCARD-host combination was between $72 and $93 per device.[19] More recently, Verizon submitted projections that inclusion of CableCARD technology would raise the wholesale price of a set-top box cost as much as $25 per unit, and that the CableCARDs themselves would cost an additional $50 to $70 per card.[20] These projections do not include increased service costs associated with the added complexity of CableCARD technology.

21. Sony disputes these cost projections in several regards and argues that the cost increases would not be significant. First, Sony suggests that the CableCARD technology is relatively

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18 *See Comcast Waiver Request* at 17.

19 *See In the Matter of Implementation of Section 304 of the Telecommunications Ac of 1996; Commercial Availability of Navigation Devices*, Report of the National Cable & Telecommunications Association Regarding the Significant Costs to Consumers Arising from the 2005 Ban on Integrated Set-Top Boxes, CS Docket No. 97-80 (Aug. 2, 2002). *See also* NCTA, "Ex Parte Presentation in Commercial Availability of Navigation Devices CS Docket No. 97-80" (Jan. 7, 2003).

20 *See Verizon Waiver Request*, Declaration of Brian H. Whitton (hereinafter *Whitton Declaration*), ¶11.

mature and thus should not trigger significant research and development costs or product redesign.[21] With respect to design, this argument ignores the fact that current boxes have been optimized to minimize their size and cost, both of which are features that benefit consumers.

22. Second, Sony asserts that making a set-top box CableCARD ready increases costs by less than $25 per set-top box.[22] Even assuming the validity of that cost figure, however, the added $25 would have a dramatic impact on the commercial economics of a set-top box, which at volume typically costs between $70 and $100 per device.[23]

23. Third, although Sony acknowledges that the cost of a CableCARD is approximately $80, Sony asserts that almost all of these costs have to be incurred to manufacture an integrated set-top box.[24] As noted above, however, Comcast states that an entire low-functionality, integrated set-top box can be manufactured in volume for as little as $70. Using Sony's figure, a CableCARD *alone* costs 14 percent more than an *entire* integrated set-top box at the low end of the Comcast range. This fact indicates that—contrary to Sony's claim—those components in an integrated box that overlap with CableCARD functionality must be significantly cheaper than a CableCARD.

24. Lastly, Sony appears to imply that the costs of deploying and servicing CableCARDs (*e.g.*, the costs of service technician visits to subscribers' premises to resolve problems) somehow don't count in the calculation of the costs of CableCARD technology because the

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21 *See In the Matter of Implementation of Section 304 of the Telecommunications Act; Commercial Availability of Navigation Devices; and Comcast Corporation's Request for Waiver of 47 C.F.R. § 76.1204(a)(1)*, Comments of Sony Electronics Inc., CSR-7012-Z, CS Dkt. No. 97-90 (Jun. 15, 2006) (hereinafter *Sony Comments*), at 8.

22 *See id.*

23 *See Comcast Waiver Reply* at 17.

24 *See Sony Comments* at 8 and 9.

"necessity, frequency, and therefore cost of sending a technician for CableCARD installation are solely within the control of the cable operators."[25] The fact that cable operators could "control" costs by having no subscribers and thus having no need to install CableCARD-enabled boxes is irrelevant. If one were to adopt this view, then virtually any manufactured good would be costless because the manufacturer would "control" the need for materials, labor, plant, and equipment. Hence, the implicit argument made by Sony in this regard is without merit.

25. Given the large number of set-top boxes that would be affected, the per-unit cost increases correspond to large additional costs. Comcast has indicated that it plans to deploy between one and 1.5 million low-cost, limited-capability set-top boxes this year and in subsequent years.[26] Comcast accounts for approximately one third of all subscribers to the six largest cable operators.[27] Assuming that the other large cable operators behave similarly, and ignoring any deployment by other cable operators, between 3 million and 4.5 million low-cost, limited-capability boxes will be deployed each year. As discussed above, the low end of the NCTA's estimated increase in the industry average cost of a set-top box and CableCARD combination is $72. Hence, using this figure to be conservative, the estimated social cost of refusing to waive the integration ban for low-cost, limited-capability set-top boxes would be between $216 million and $324 million per year.[28] The bottom line for policy analysis is this:

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[25] *See Sony Comments* at 7 n.14.

[26] *See Comcast Waiver Request* at 10.

[27] Comcast subscribers make up 34 percent of the total subscribers to Comcast, Time Warner, Cox, Charter, Adelphia, and Cablevision. *See Twelfth Annual Report,* Table B-3.

[28] The dollar figures in the text have been calculated under the assumption that Comcast and other cable operators would deploy these boxes at the same rate currently planned. In practice, one would expect cable operators to deploy fewer limited-capability, digital set-top boxes in response to the substantial price increases that denying the waiver would trigger. Consequently, actual total expenditures on the affected set-top boxes would rise by less than the amount stated in the text. However, as discussed in Section V below, the reduced deployment of these boxes would lead to: losses in consumer surplus as fewer consumers would enjoy the benefits of digital services; increased costs associated with the dual distribution

these costs would represent efficiency losses of hundreds of millions of dollars per year because, for the reasons discussed above, the policy would generate no significant offsetting benefits.

26. In closing this discussion of costs, it is important to observe that there is a characteristic of equipment costs that can be a source of potential confusion. Namely, the manufacture of consumer electronics equipment is subject to economies of scale and experience effects. Some might point to the falling costs of CableCARD and CableCARD-enabled set-top boxes and assert that the increased costs associated with the use of CableCARDs are falling. However, the costs of integrated set-top boxes, as well as those of CableCARD/set-top box combinations, can be expected to fall with production volumes. It does not follow that the difference, which represents the inefficiency of denying the waiver, will fall. Moreover, according to one submission to the Commission, there are unlikely to be significant volume-related reductions in the additional manufacturing costs incurred to make a set-top box CableCARD ready.[29]

27. Claims that high-end CableCARD-enabled devices will have much higher unit costs as a consequence of granting the waiver have not been supported with evidence, and there is reason to be skeptical about the magnitudes of any such effects. Specifically, unit cost curves generally flatten out at high levels of production, and—even if the waiver is granted—there will be demand for millions of CableCARD-enabled devices.

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of cable programming in both analog and digital formats; increased expenditures on off-air, digital-to-analog converters; and, to the extent that economies of scale were not fully realized, higher unit costs for those limited-capability, digital set-top boxes that were deployed. As a matter of economic theory, these harms to efficiency could be larger or smaller than the change in expenditures on set-top boxes due to the quantity decrease. The present analysis treats them as offsetting and thus uses the projected increase in expenditures holding the number of set-top boxes constant as a measure of the social costs of denying the waiver.

[29] *Whitton Declaration* ¶12.

V. DENYING THE WAIVER WOULD HARM CONSUMERS.

28. Denying the waiver would harm consumers through several mechanisms. The harm to competition described in Section III above is one of them. The present section discusses two more.

A. Higher Costs Would Lead to Higher Prices.

29. As discussed in the previous section, denying the waiver would raise the costs of low-cost, limited-capability set-top boxes. It is well established in economics that, when costs rise, suppliers respond by raising quality-adjusted prices. That is, when costs rise, suppliers pass some or all of those costs on to their customers. The price increases triggered by denial of the waiver would harm consumers.

30. Those consumers who continued to purchase limited-capability set-top boxes would end up paying more for set-top boxes than they otherwise would. It is important to note that these more expensive boxes would not offer any compensating benefits to these consumers and, indeed, would be bulkier and thus less convenient.

31. Other consumers would respond to the higher prices by choosing not to purchase digital cable services that they otherwise would buy. Some of these consumers have a good sense of what digital services are worth to them, and the price increase would represent an upper bound on the welfare losses suffered by these consumers. For other consumers, the welfare losses might be much larger. Specifically, the higher cost of digital set-top boxes would make it more expensive for a consumer to try digital services. Some consumers who would otherwise highly value digital services might never learn that fact and, consequently, might not subscribe to digital services even though they would benefit from doing so. As a result, the harm to a given consumer from the increase in the price of a set-top box could exceed the price increase.

B. There Would Be Negative Externalities from Insufficient Adoption.

32. Denying the waiver can be expected to slow the transition to all-digital distribution of cable programming. Slowing this transition would harm consumers and economic efficiency through two mechanisms. First, there are significant opportunity costs associated with using spectrum for analog signals that duplicate digital signals. It is my understanding that the transition to all-digital distribution of cable programming would free up as much as two-thirds of the cable spectrum for other uses, which would benefit consumers. Second, there are costs that must be incurred to run the analog part of a distribution system. Migration to fully digital distribution would avoid the extra costs associated with dual transmission in both analog and digital formats.

33. It might appear that Comcast would have incentives to internalize these effects. To some extent they would. But freeing up the cable spectrum to roll out new services would almost certainly generate large amounts of incremental consumer surplus for households and producer surplus for the providers of complementary services (*e.g.,* programming producers). Hence, the internalization would be incomplete. Consequently, denying the waiver would—by raising the costs of set-top boxes—very likely slow the transition to more efficient use of cable spectrum.

34. It should also be observed that facilitating the transition to all-digital services ultimately will likely promote greater consumer interest in, and more sales of, higher-end devices that rely on CableCARD technology. Hence, there may well be an increase in the strength of common reliance as a result of the Commission's granting the waiver.

35. Lastly, Sony appears to claim that granting the waiver in order to promote adoption of digital technology would be tantamount to the Commission's granting a subsidy to Comcast.[30] From the perspective of economics, this claim is baseless. There is no accepted definition of the term within economics that would label the avoidance of unnecessary costs as a subsidy.

36. Sony's claim is ironic because granting the waiver would, in fact, reduce the need for the federal government to provide subsidies. The affected subsidies are those associated with the provision of digital-to-analog converters to facilitate the cessation of analog television broadcasting in 2009. Congress has mandated that a subsidy for low-cost converters be made available to consumers.[31] The greater the extent to which consumers obtain access to digital broadcast signals using low-cost digital cable boxes, the less demand there will be for government-subsidized off-air converter boxes.

VI. THERE ARE SIGNIFICANT EFFICIENCY BENEFITS FROM GRANTING A WAIVER TO A CLASS OF SET-TOP BOXES BASED ON FUNCTIONALITY.

37. By stating clearly now that the waiver will apply to replacement or successor set-top boxes (subject to limitations on advanced functionality discussed below), the Commission can promote efficient investment and innovation. Conversely, failure to define future approvals can create unneeded uncertainty that distorts investment and innovation. If the Commission is vague about the treatment of such replacement or successor boxes, equipment manufacturers and cable operators will not be certain that innovative boxes will be approved. This uncertainty reduces the incentives to invest in quality improvements and cost reductions, even if it later turns out that such innovations are acceptable to the Commission.

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[30] *See Sony Comments* at 7-8.

[31] *See* Deficit Reduction Act of 2005, Pub. L. No. 109-171, § 3005, 120 Stat. 4, 21 (2006).

38. In contrast, forward-looking approval based on well-defined bright lines would provide full incentives for firms to continue innovating and developing higher quality and lower cost products. Bright lines could be established by specifying a set of advanced functions that any set-top box covered by the waiver must *not* have.

39. It should also be noted that the benefits of a bright-line approach will be lost if the bright-line is drawn in the wrong place. For the reasons indicated above, drawing a bright line based on DVR capability, high-definition output, multiple tuning, and broadband Internet access functionality would protect common reliance while allowing efficient integration. In contrast, limiting the waiver to one-way set-top boxes would not generate significant incremental benefits through common reliance, but would limit consumer access to several features that they value. It is my understanding that Comcast does not have the capability to offer video on demand, electronic programming guides, and extensive parental controls through one-way boxes.

VII. CONCLUSION

40. Economic analysis supports the conclusion that granting the waiver would promote economic efficiency and consumer welfare. Conversely, denying the waiver would inefficiently raise costs and harm consumers in various ways. These broad conclusions derive from the following findings:

- Granting the waiver would not harm competition in the sale of consumer electronics equipment. The forces of common reliance will be strong even if applied only to higher-end set-top boxes, such as those with HD/DVR capabilities. In short, there is no evidence that denying the waiver would create significant incremental benefits.

- Granting the waiver would promote competition in multichannel video programming distribution.

- There is clear evidence that refusing to waive the integration ban for low-cost, limited-capability set-top boxes could trigger an estimated $200-300 million of social costs per year. Given the lack of incremental benefits, these costs would be pure waste.
- Including replacement or successor boxes in the waiver—subject to limitations on including certain advanced functionality in such boxes—would promote economic efficiency and consumer welfare.

For all of these reasons, I conclude that granting the waiver would be in the public interest.

VIII. ABOUT THE AUTHOR

41. Michael L. Katz holds the Sarin Chair in Strategy and Leadership at the University of California, Berkeley. He holds a joint appointment in the Haas School of Business Administration and the Department of Economics. He has also served on the faculty of the Department of Economics at Princeton University. He received his A.B. from Harvard University *summa cum laude* and his doctorate from Oxford University. Both degrees are in Economics.

42. He specializes in the economics of industrial organization, which includes the study of antitrust and regulatory policies. He regularly teaches courses on microeconomics and business strategy. He is the co-author of a microeconomics textbook, and he has published numerous articles in academic journals and books. He has written academic articles on issues regarding the economics of network industries, systems markets, telecommunications policy, and antitrust enforcement. He is recognized as one of the pioneers in extending the theory of network effects to competitive settings. He is a co-editor of the *Journal of Economics and Management Strategy* and serves on the editorial boards of *The California Management Review* and *Information Economics and Policy*. He is also a member of the Computer Science and Telecommunications Board of the National Academies.

43. In addition to his academic experience, he has consulted on the application of economic analysis to issues of antitrust and regulatory policy. He has served as a consultant to both the U.S. Department of Justice and the Federal Communications Commission on issues of antitrust and regulatory policy. He has served as an expert witness before state and federal courts. He has also provided expert testimony before a state regulatory commission and the U.S. Congress.

44. From January 1994 through January 1996, he served as the Chief Economist of the Commission. He participated in the formulation and analysis of policies toward all industries under Commission jurisdiction. As Chief Economist, he oversaw both qualitative and quantitative policy analyses.

45. From September 2001 through January 2003, he served as the Deputy Assistant Attorney General for Economic Analysis at the U.S. Department of Justice. He directed a staff of approximately fifty economists conducting analyses of economic issues arising in both merger and non-merger enforcement. Their principal professional focus was on understanding and projecting the impacts of various business practices and public policy decisions on consumers' economic welfare. His title as Deputy Assistant Attorney General notwithstanding, he is not an attorney.