

FEDERAL TRADE COMMISSION

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FEDERAL TRADE COMMISSION

COMPETITION AND INTELLECTUAL)
PROPERTY LAW AND POLICY IN)
THE KNOWLEDGE-BASED ECONOMY)
)

FEBRUARY 25, 2002

Wells Fargo Room
Haas School of Business
University of California
Berkeley, California

The workshop in the above-entitled matter
commenced at 1:00 p.m.

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P R O C E E D I N G S

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3 COMMISSIONER THOMPSON: Thank you. I am glad
4 you were all able to find your way here. Our Court
5 Reporter did not. And it goes to show that even the best
6 plans -- but thank you very much.

7 On behalf of the Commission and my colleagues
8 at DOJ, it is a pleasure to welcome you here to the West
9 Coast Session of our hearings on Intellectual Property.
10 It is a great honor to be here amongst such distinguished
11 company discussing really important topics. But I hope
12 we will also have some fun in this process trading ideas
13 and learning from each other.

14 I would like to start out by extending special
15 thanks to Susan DeSanti, our Deputy General Counsel for
16 policy studies and her dedicated staff, and our
17 colleagues at the Department of Justice who all have
18 worked so hard to put this ground breaking forum
19 together. Thank you very much.

20 I would also like to thank our administrative
21 host, Bob Barde, and the folks here at Berkeley for
22 extending their hospitality and allowing us to invade
23 their
24 space.

25 Now being here at Berkeley reminds me of a very

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1 important conclusion that was reached by the students
2 that I had in a Graduate Public Policy Workshop at
3 Princeton several years ago. That class was examining
4 the important issues surrounding the next generation
5 Internet that is expected to operate at speeds multiples
6 faster than current Internet speeds.

7 And that class was surprised to conclude that
8 almost all of the important Public Policy decisions that
9 we will confront in looking at NGI and the future of
10 Information Technology will not be decided at some later
11 date, but instead are being decided right now. And I
12 think the same holds true for the many policy issues
13 surrounding Intellectual Property generally -- patent,
14 copyright, and licensing issues that will drive the
15 future in areas such as Communications, Publishing,
16 Music, Entertainment and Biotechnology and I could go on.

17 So it is no exaggeration that, in many senses,
18 the people in this room have the ability to make a
19 tremendous impact on the direction of our economy,
20 whether we call it the "Old Economy," the "New Economy,"
21 or the "New New Economy." I would be thankful to have an
22 economy right now.

23 Most of you here know a little bit about the
24 FTC. It is a small little agency in Washington of about
25 1,000 lawyers and economists and other staff people. We

1 have a dual mandate because we act as the country's
2 primary Consumer Protection Agency. But at the same time
3 we are also charged with promoting competition through

1 pendulum has swung too far the other way and that the
2 recent proliferation of patents and restrictive licensing
3 schemes has created a patent thicket that stifles
4 innovation.

5 Now part of reconciling the topical tension
6 between Antitrust and Intellectual Property may be
7 recognizing that the doctrines are indeed harmonious
8 because they both enhance public welfare by encouraging
9 competition. The challenge, then, is striking the right
10 balance, which in most controversies, as in this one, is
11 probably some place in the middle. So what will be
12 instructive here in striking that middle balance is
13 applying what we have all learned from our experiences at
14 the outer edges of the curve, and how we apply those
15 learnings going forward.

16 In addition, economics has increasingly been
17 recognized as a potential bridge between I.P. and
18 Antitrust and may provide one means to help illuminate
19 the middle road. We are hoping that our esteemed guests
20 here today might share their own light on that subject,
21 as well as identify additional issues for us to explore.

22 So to conclude, I think that we have to
23 recognize that all of us in Antitrust have recently had
24 significant and extensive histories in complex cases
25 involving the competitive use of intellectual property.

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1 I mean, I can think of just looking back at recent times
2 of the things that we looked at in mergers such as
3 AOL/Time Warner, or in investigations like Intel or
4 Dell. So it is not so distant that we considered those
5 issues.

6 So we at the Commission remain alert to
7 Antitrust issues involving intellectual property, but we
8 also have to recognize that in a fast moving marketplace
9 we have much to learn. While we have been generally
10 cautious in our approach to New Economy and Intellectual
11 Property questions, we attempt to apply an appropriate
12 degree of circumspection and balance because I strongly
13 believe that in achieving benefits to consumers and
14 industry alike, we have to have a balanced and
15 transparent and forward-looking approach to policy
16 problems by using interactive forums like this one, as
17 well as working groups, industry self regulation, and
18 from time to time, a little strong law enforcement.

19 For these reasons, I look forward to hearing
20 what all of our generous and distinguished panels have to
21 tell us. And I am also interested in hearing your
22 questions. So let the games begin.

23 MS. DeSANTI: Thank you very much, Commissioner
24 Thompson. I am Susan DeSanti and I also want to thank
25 the Competition Policy Center and the Berkeley Center for

1 Law and Technology, very gracious and helpful hosts, and
2 generous hosts. Many people have made this possible and
3 we appreciate it.

4 Basically we thought that we should not be
5 doing hearings on intellectual property and competition
6 policy without coming to what has been a center for much
7 of the innovation that has gone on, as well as a lot of
8 the thinking about innovation and how best to understand
9 it.

10 This week, we hope to get two important
11 perspectives, perspectives from economists, perspectives
12 from business. The basic questions for today's panel
13 involve does competition spur innovation? And if so,
14 how? What are the policy implications? You all know
15 this is not a simple question. In addition, it leads to
16 questions about the role of patents in encouraging or
17 hindering competition that may foster innovation.

18 So from the very start, we meet ourselves
19 coming and going as we start to look into these issues.
20 We are here to listen and learn, and you will see that we
21 are asking questions rather than making definitive
22 statements. We are hoping we will learn a lot from these
23 hearings. In structuring today's panel, I had two
24 problems, 1) everybody here is a headliner. These are
25 all people who should be the centerpiece of any panel

1 that you have. So that was my first problem.

2 And, in addition, each one of their
3 presentations, I believe, compliments and builds on the
4 other. So we are going to have a somewhat arbitrary
5 order. We will have four presentations and then we will
6 have a discussion for 45 minutes, and we will then have a
7 break for 15 minutes, probably around 3:00 to 3:15, and
8 then we will have another three presentations and finish
9 up with a discussion through to 4:30.

10 Before I go any farther, I do want to introduce
11 the other people who are on this panel from the
12 Government. There is Hillary Greene from the FTC Staff,
13 Sue Majewski from DOJ, Ray Chen from the Patent and
14 Trademark Office, and I also want to give the opportunity
15 to Frances Marshall to speak. Frances is the person at
16 the DOJ Antitrust Division who is leading up their
17 effort. Frances?

18 MS. MARSHALL: Thanks, Susan. I just want to
19 take a couple minutes to say good afternoon to everyone.
20 We also thank the Competition and Policy Center and
21 Berkeley Center for Law and Technology for making these
22 sessions possible and for providing this beautiful venue.
23 It is really wonderful to be here. I am delighted to be
24 here and do look forward to the series of interesting
25 presentations and discussions through Thursday. In the

1 afternoon as we continue to examine the effects of how
2 tradition in patent law and policy on innovations and
3 other aspects of continued welfare. But thank you,
4 Susan.

5 MS. DeSANTI: Thank you, Frances. All right,
6 and now let the games begin. Our first presenter will be
7 Professor Richard Gilbert. Rich is Professor of
8 Economics at the University of California at Berkeley.
9 From 1993 until May of '95, he was the Deputy Assistant
10 Attorney General for Economics in the Antitrust Division
11 of the U.S. Department of Justice, where he basically
12 became the father of the Intellectual Property Guidelines
13 that were jointly adopted by DOJ and FTC. He has
14 extensive research in this area, far too numerous to
15 mention all of his articles, but it basically focuses
16 among other things on Antitrust Economics, Intellectual
17 Property, and Research and Development.

18 Rich?

19 MR. GILBERT: Thank you, Susan. First, I am
20 delighted to welcome our friends and colleagues from
21 Washington to our little town of Berkeley. Here you can
22 be both inside and outside the beltway because we do not
23 have a beltway, but we are very delighted that we can
24 have an opportunity to debate these very important issues
25 here on Berkeley soil. I would like to discuss a

1 question that we have heard a great deal, particularly as
2 intellectual policy and R&D policy developed in the
3 former administration and that is whether innovation
4 should continue to have a role in merger policy.

5 And that is a question that we are all likely
6 to ask with the new Administration. And arguments for
7 the importance of innovation from market performance,
8 there are many analyses that relate economic growth to
9 investments in Research and Development and human
10 capital. This is all about the analysis of the residual
11 and total factor productivity measurements.

12 For example, showing that once you subtract out
13 that contributions of capital labor and ordinary inputs,
14 a whole lot is leftover, much of which appears to
15 correlate with the research and development and human
16 capital. There is also a great deal of anecdotal
17 evidence that competition promotes innovation. You can
18 find it in almost any industry from the software
19 industry. There is the competition that occurred between
20 digital researches, DR Dos and Microsoft's MS-DOS, and
21 new upgrades while DR DOS was a potent competitor
13 Explorers.

1 in the microprocessor area, and other semiconductor
2 components races. Looking at how foreign competition
3 affected labor productivity and other measures of
4 productivity in the automobile industry, also some
5 evidence in Telecom as well. These sorts of stories can
6 be interpreted different ways, of course.

7 There has generally been a shift towards more
8 development and less basic research in response to
9 competition, but nonetheless a delivery of more product
10 to the consumer.

11 Now some arguments against that we have heard,
12 I would just like to review them for this session. There
13 is the historical Shumpeterian -- Joseph Shumpeter's
14 argument that monopoly promotes innovation, arguing based
15 on appropriation, scale economies, cash flow, all factors
16 that could at least theoretically contribute to more
17 innovation.

18 But, of course, looking at the other side of
19 that, the incremental benefit from innovation can be low,
20 a point that Kenneth Arrow made, I think, in 1962 it was,
21 a very perceptive article. And then the difficulty of
22 identifying sources of innovation -- R&D is typically
23 secret, so it is very hard to see who is doing it and
24 therefore very hard to assess the state of competition.
25 And innovations can come from unexpected sources.

1 Another argument against innovation having a
2 role in merger policy is that the link between Research
3 and Development expenditures and innovation can be weak.
4 And what we tend to focus on in merger analysis is
5 accounting the inputs, the research and development, but
6 what we would really like to know is what happens to the
7 outputs, innovation, and they are not the same thing.
8 There is little empirical evidence supporting a link
9 between competition and innovation.

10 Most of the statistical analysis in this area
11 tends to fall apart, as we look across industries and
12 account for industry characteristics. But on the other
13 hand, there are also really few natural experiments that
14 can be used to assess this relationship between
15 competition and innovation. And it is not at all clear
16 that the kind of cross-sectional statistical analysis
17 that we have looked at can really shed much light on this
18 subject. And therefore, I am not sure it is proper to
19 include it as an argument against.

20 Now just to review merger enforcement in the
21 first half of the 90's, innovation challenges were few
22 and far between. Of all the merger challenges out of a
23 total of 135, four of those challenges were based on
24 innovation effects, a total of 3 percent lost in the
25 noise.

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1 Then, in the second half of the 90's, that
2 number changed dramatically. The number of merger cases
3 challenges about doubled. That was in line with the pace
4 of merger activity over this period. And the total
5 number of challenges went up to about 18 percent of the
6 total, that is an increase of six times. A total number
7 of challenges that were baseline innovation effects --
8 alleged innovation effects.

9 So there was a dramatic shift in the role that
10 innovation played in this latter half of the 90's, but I
11 would argue that much of this was more rhetoric than it
12 was an actual decisive role played by innovation in these
13 cases. And if you take apart the cases and look at them
14 closely, of the 49 challenges, alleging innovation
15 effects in the latter half of the 90's, 35 of them
16 were really add-on effects in industries that almost
17 certainly would have been challenged based on effects
18 in markets for existing goods and services. That is,
19 these were fairly traditional merger cases in which
20 innovation effects were included as another concern from
21 the merger.

22 Another five of these could have been
23 challenged based on a theory of one-sided potential
24 competition, that is, a market in which one firm is a
25 potential competitor into a market in which the other

1 firm is a significant player. And by our count, about
2 six to eight cases that we would call real innovation
3 cases, which I would also say you can look at as two-
4 sided potential competition cases; that is, Firm A is a
5 potential competitor into a market where Firm B may also
6 be a potential competitor.

7 So the market does not yet exist and the two of
8 them are potential entrants into that market. One way to

1 is need for further study in this area and maybe some
2 follow-up study on the effects of divestitures and
3 remedies in these cases. I have got ten minutes and I
4 think I came under.

5 MS. DeSANTI: Our next speaker is Professor Dan
6 Rubinfeld. Dan teaches both Law and Economics at the
7 University of California at Berkeley. He also served in
8 June of 1997 through December 1998 as Deputy Assistant
9 Attorney General for Economics in the U.S. Department of

1 the Department of Justice. And what we have done is to
2 first highlight all the areas of the various guidelines
3 that the agencies have promulgated that talk about
4 innovation. And I will skip almost all of that because
5 you all know about it.

6 But I do want to point out that if we look,
7 say, at the horizontal merger guidelines and look at the
8 discussion of anti-competitive effects, it will tell you
9 something about the issue I want to follow-up on, which
10 is the relationship between competition and innovation.
11 If you are going to try to look for the empirical work
12 that supports whether there is such relationship or not,
13 you obviously have to figure out what the theory is you
14 are trying to support.

15 And the guidelines suggest, at least to me,
16 that with respect to innovation, coordinated effects are
17 probably less likely to be important than unilateral
18 effects because, really, for some of the reasons Rich
19 Gilbert pointed out, with R&D being so secret and
20 monitoring being difficult, it is not likely that you are
21 going to have a coordination in most situations unless it
22 is through an explicit joint venture, and that is treated
23 separately by the guidelines. But I think there are
24 significant unilateral effects that are of two
25 characters.

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1 One is perhaps a traditional argument that says
2 that when emerging firms compete more directly with each
3 other than with other firms with respect to innovation,
4 it can be then shown using standard unilateral effects
5 theory that innovation could be reduced by a loss of
6 competition. There is a second effects theory that
7 builds on the idea that innovation is more likely to be
8 random due to unusual unpredictable events. And it just
9 says that if you have fewer innovators, if you have less
10 diversity, you are likely to have less innovation or
11 higher prices or lower quality products.

12 Now if you go back and sort of ask yourself
13 what is the empirical basis to support building a
14 unilateral effects theory, as I think Rick suggested,
15 most of the evidence is anecdotal, there is not really
16 solid econometric evidence, but there are a lot of
17 interesting case studies that I think are enlightening,
18 and I will just highlight a few of the issues.

19 First of all, there is the usual tension that
20 Rich described, that says perhaps monopoly makes sense
21 for innovation because monopolists will recoup all the
22 rewards from innovation; on the other hand, there is a
23 concern that with monopoly, either explicit monopoly or a
24 vertical relationship that results from vertical
25 integration, that there might be the possibility of what

1 amounts to vertical foreclosure, that is, the vertically
2 integrated company may have an incentive to keep its
3 innovative research in-house and not to support
4 competitors external to the firm that might actually be
5 innovating in competition with part of the vertical
6 operation. And that is what I am going to call in-house
7 bias.

8 When you look at the empirical data on rewards
9 from innovation, I think you may get a misleading view
10 because we all know that there is a very skewed
11 distribution of rewards from innovation. The really
12 successful companies are very profitable and most R&D is
13 not terribly successful. You do not want to make either
14 of two mistakes. You do not want to necessarily assume
15 that the successful firm has earned its monopoly rents
16 inappropriately, but you also do not want to necessarily

1 typically arise in capital intensive industries, or as
2 you would expect, industries where innovation costs are
3 relatively low. And in those industries that are high
4 tech or highly innovative, we tend to see smaller firms
5 playing a big role in innovating.

6 And finally, there is a study I find compelling
7 that suggests that in the computer and semi-conductor
8 industries, innovations interestingly typically occur
9 both from the large established firms and the small
10 start-up's, but not so much by the smaller firms that are
11 already well on their way. So there is kind of an
12 extreme conclusion either way.

13 There is evidence, both theoretical and
14 empirical, that suggests that the nature of innovation
15 will depend on whether you are in an industry where the
16 innovation is cumulative, or whether it is likely to be
17 discrete and independent, and with cumulative innovation,
18 there are a lot of issues that will come up here and in
19 the hearings because you typically need some form of
20 collaboration in the form of standard setting or cross
21 licensing agreements, and that may raise coordination
22 issues.

23 And similarly, if you are looking empirically
24 in innovation in network markets and comparing it to non-
25 network markets, there may be some important differences.

1 Network markets, the concern I have, which I think is
2 supported by some of the literature, is that incumbents
3 are likely to innovate, but innovate in ways that
4 reinforce their position as incumbents, whereas new
5 smaller players are likely not to be affected by that
6 incentive.

7 And I find myself in agreement with the view of
8 Scherer and Ross (phonetic) who say that technological
9 progress thrives best in an environment that nurtures
10 diversity of sizes and perhaps especially that keeps
11 barriers to entry by technologically innovative newcomers
12 low.

13 Now I was looking around just based on my
14 experience during the second half of Rich's experiment
15 where there were a lot of innovation cases, and it may
16 surprise you to find that it is not the Microsoft case
17 wh nrmeversitnnovvolvon inhich I tb no dio ev case

1 me is that the Division staff actually developed some of
2 these theories of innovation and actually got some
3 interesting empirical support for those theories. I will
4 not go through the details. It would probably take more
5 than the two or three minutes I have left, but in
6 Lockheed Northrop, there are horizontal issues because
7 there was the proposed merger which did not go through
8 eventually, it was blocked.

9 The merger would be a merger to monopoly in
10 Airborne early warning radar, electro-optical missile
11 warnings, fibre-optic toe decoys, and directed infrared
12 counter measures. I am sure you all wanted to get all
13 that down. And then it would be three to two in high
14 fixed wing military airplanes and stealth technology and
15 a few other areas. But interestingly, there are also

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1 path breaking innovations in the defense area, at least,
 2 are made by niche players and not by the leading
 3 incumbents.

4 And in developing the vertical case, they were
 5 very concerned that Northrop Lockheed would have an
 6 incentive to deny rivals' access to key technologies and
 7 that it would not be willing appropriately to share know-
 8 how and trade secrets when in fact certain cooperation
 9 with outsiders would be pro-innovation. And the division
 10 was concerned that this anticompetitive effects with
 11 respect to in-house bias would hurt competition and
 12 innovation in air frames and radar.

13 And in the end, interesting ,ling appr
 14 interesting would be by TD drgtols in effel 3 incumbents.
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1 Antitrust Law and Regulation at the University of
2 California at Berkeley. In 1999 through 2000, Professor
3 Shelanski served as Chief Economist of the Federal
4 Communications Commission. In 1998 through '99, he was
5 Senior Economist to the President's Council of Economic
6 Advisors. And prior to his appointment at Berkeley and
7 his government service, Professor Shelanski practiced law
8 in Washington, D.C. and also served as a law clerk to
9 Justice Scalia of the Supreme Court.

10 Howard?

11 MR. SHELANSKI: Thanks, Susan. Well, if Rich
12 gave nine minutes of Dan's talk, Rich and Dan together
13 have given all of my talk, but I would like to go back
14 and talk in a little bit more detail about why the
15 question of how and to what extent to bring innovation
16 into antitrust policy is such a difficult question.

17 We have seen starting probably about 15 years
18 ago, a body of scholarship that loudly made the point
19 that innovation was extremely relevant to antitrust
20 policy, and even more strongly making the point that it
21 was relevant to a retreat in antitrust policy. And yet
22 some of the very people who gave us that scholarship now
23 look at what has happened as antitrust listened to them
24 to the extent of embracing innovation, but then in the
25 view of some, took it in precisely the wrong direction,

1 in the direction of more enforcement.

2 Now, I think as Rich has made very clear,
3 innovation has come in so far in the cases as an
4 additional set of arguments to be made to enforce or to
5 not enforce. Innovation has not become a completely
6 freestanding and independent objective of antitrust
7 policy; rather, in the course of merger analyses, what
8 the agencies seem to have done is to be on the look-out
9 for protecting innovation, just as they protect
10 competition where a transaction might give rise to harm.
11 Going forward, there is a question of whether that has
12 been a wise policy course, whether it should be
13 continued, or whether the original arguments for retreat
14 in antitrust policy because of its possible negative
15 consequences on innovation should again come to the fore
16 and reverse the course that we have been on.

17 There is some economic learning that I think is
18 relevant to this and it tells us why it is so hard to, as
19 a general policy prescription, come out with general
20 rules for enforcement with regard to innovation, just
21 like we have some general rules or guidelines for
22 enforcement with regard to market performance along more
23 convention variables like price and output. And I want
24 to talk a little bit about some of this data.

25 The idea that innovation and static

1 efficiencies -- static economic efficiency -- might
2 differ in their respective responses to market
3 concentration was suggested long ago by Shumpeter
4 (phonetic), among others, as Dan mentioned. Shumpeter
5 wrote in 1942 that perfect competition is not only
6 impossible, but inferior, and has no title to being set
7 up as a model of ideal efficiency when the goal is
8 economic welfare over time, rather than static economic
9 performance. Fairly strong statement that goes right to
10 the heart of much of the policy premise of modern
11 antitrust law.

12 And Shumpeter really had the view that large
13 firms, and presumably firms of market power, would be
14 superior innovators. There was of course countervailing
15 theoretical arguments, early work by John Kenneth
16 Galbraith, important work by Kenneth Arrow, but some of
17 the most interesting work that flowed from this were
18 efforts empirically to test -- what is called the
19 Shumpeterian hypothesis, and more broadly to test the
20 relationship between market structure and innovation.

21 I am not going to go deep into the econometrics
22 of these tests in the time that I have here. They are
23 subject to a lot of methodological critique, and I will
24 just refer you to the work of Wesley Cohen at Carnegie
25 Mellon for excellent discussions of those methodological

1 issues.

2 One thing that is interesting about the
3 background of empirical information is that with regard
4 to innovation, there has long been a view that not just
5 market share, the conventional focus of antitrust, but
6 firm size, is relevant to innovation. And that is
7 something that comes in in merger policy. When firms
8 merge, an entity that is larger than either of the
9 previous two individual entities generally results --
10 generally.

11 Usually in antitrust policy, we do not think
12 about firm size, but because there has been a large body
13 of literature arguing or suggesting that firm size in
14 innovation is relevant, it would seem that the firm size
15 literature at least has some relevance to antitrust
16 policy for mergers.

17 Following Shumpeter, large enterprises have
18 been praised for their superior ability to attract
19 financial and human capital, bear risks, recoup
20 investment required to sustain R&D activities, etc.,
21 small firms, on the other hand, have been touted as being
22 more creative and more nimble in adapting to changes and
23 opportunities than their larger more bureaucratic
24 counterparts. So what do we want for sustained R&D?

25 Numerous early studies found that investment in

1 R&D did increase steadily with firm size, and whether the
2 data was compared across industries or within a
3 particular industry, the evidence generally was accepted
4 to show that R&D investment measured in dollars --
5 inputs, input dollars into R&D -- were higher
6 proportionally in large enterprises.

7 Other studies found that very small firms were
8 in fact more innovation intensive than middle size firms
9 and that the steady link between a firm size and
10 innovation actually occurred over a very limited range.
11 And so the data really did not give us any clear sense of
12 whether it was true the larger firms invested more in
13 innovation.

14 General consensus nonetheless did emerge on two
15 basic points, that large enterprises were more likely
16 than small ones to have ongoing R&D programs, and that
17 among firms that do undertake R&D, bigger firms, tend to
18 make larger R&D investments proportionally. But neither
19 of these conclusions imply that merger policy should
20 begin to attach positive weight to firm size on
21 innovation grounds.

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1 firm size.

2 Moreover, empirical studies relying on formal
3 data such as reported R&D expenditures or patent output
4 do not capture informal or sporadic innovation, which may
5 be quite characteristic of small firms. And the
6 presumption that a large enterprise is more likely to
7 undertake some technological development than a small one
8 is supported only weakly. So the presumed benefit of
9 firm size is questionable.

10 Second, although R&D expenditure is higher in
11 large firms, beyond a threshold level of size, there is
12 little evidence that larger firms' R&D investments are
13 proportionately greater than those made by smaller firms.
14 So there is some proportional increase up to a point, but
15 with very large firms the data is quite unclear. And
16 moreover, these patterns, these consensus patterns vary
17 enormously across industries. I do not have time to go
18 through the various industry specific studies, but the
19 results vary substantially depending on the kind of
20 industry.

21 A third reason we do not want to take the firm
22 size evidence as a reason not to enforce on R&D grounds
23 or innovation grounds is it is very unclear when you pull
24 apart the econometrics of the studies whether the weight
25 that is being put on firm size when you control for other

1 variables really is statistically significant. There has
2 been a lot of debate over the significance.

3 And finally, when the focus is shifted away
4 from innovation inputs such as R&D expenditures to
5 outputs such as patents, large firms show no advantage at
6 all. Small firms actually tend to have slightly higher
7 patent rates. Of course, one can wonder how valuable
8 that measure is given that many patents are indeed not
9 worth terribly much.

10 Okay, switching to the main focus of antitrust,
11 if the firm size literatures were ambiguous and does not
12 give us a reason to retreat from merger enforcement
13 because large firms are good for innovation, what about
14 the market concentration and innovation link?

15 For the most part, economic theory and
16 antitrust policy favor more competition over less for the
17 purpose of lowering prices, expanding out puts, but the
18 presumption that increased benefits come from increased
19 competition may become less universal when one focuses on
20 innovation activity over time. The presumption at least
21 that competition is good is a less strong one.

22 Early theoretical explorations of Shumpeter's
23 claim found that when the polar cases of monopoly and
24 perfect competition were compared, it was in fact perfect
25 competition that provided stronger incentive for cost

1 keeping output high and prices lower for consumers, and
2 where there is a body of economic learning, though not
3 etched in stone and, certainly as we have seen in the
4 past 50 year of antitrust policy subject to change and
5 learning, but when there is a body of learning that
6 supports a presumption in favor of competition to get
7 those consumer benefits, it becomes very hard to expand
8 up out of this policy in a systematic way to factor in a
9 goal like innovation that does not lend itself to such
10 systematic presumptions.

11 That is what is so hard about bringing
12 innovation into antitrust, and that is why I think the
13 results that Rich showed about very careful case by case
14 analysis is the way the policy will proceed in the future
15 and the way that it should proceed.

16 MS. DeSANTI: Thank you very much, Howard. And
17 we will now turn to Professor Mark Lemley, who is
18 Professor of Law at the Boalt Hall School of Law and
19 Director at the Berkeley Center for Law and Technology.
20 He teaches Intellectual Property, Computer Law, Patent
21 Law, Electronic Commerce, and he is also of counsel to
22 the law firm of Pepper and Bennass (phonetic).

23 MR. LEMLEY: Thanks, Susan. First I have to
24 comment. I cannot help but notice that this panel is
25 composed of five Berkeley Professors, one Stanford

1 Professor, and one professor from the rest of the world.
2 And that ratio strikes me at about right. It is

1 They are much less likely to involve abandonment and
2 refiling practice. They have fewer claims. They are
3 shorter. By any measure of sort of complexity, those
4 patents are less complex -- the prosecution process is
5 less difficult for the patentee than the patentee in
6 areas like biotechnology, for example, pharmaceuticals,
7 or chemistry.

8 So the first thing to understand about dealing
9 with patents from an antitrust perspective is that not
10 all patents are created equal and that there are very
11 serious systemic differences between industries in how
12 much effort it takes to get a patent.

13 Second, it seems to me that there is pretty
14 good evidence that there are rather serious differences
15 between industries in how important the incentives of a
16 patent are to encouraging research and development. And
17 here, to take just a stylized example, you can imagine
18 the difference between an industry like a software which
19 has a relatively low R&D cost to duplication ratio, and
20 compare it to an industry like pharmaceuticals which has
21 an enormous R&D cost, and while a relatively higher
22 absolute duplication cost, still a much higher ratio of
23 R&D costs to duplication costs.

24 What that means is that the exclusivity
25 requirement is much more important if you are a

1 pharmaceutical company than it is even if you were a
2 software company. You can get by on other factors like
3 first mover advantages, trademark and branding, and so
4 forth, much more easily in some industries with a lower
5 ratio than you can in an industry like pharmaceuticals.

6 Third, it seems to me that industries are
7 heterogeneous with respect to the role of improvement and
8 cumulative innovation, that some industries again one
9 might point to Pharmaceuticals as an example, or many
10 mechanical inventions are really sort of self-contained
11 inventions. And the power or the value of a particular
12 patent captures most of the value of that product.

13 By contrast, if you take an industry like
14 software or the Internet, or an industry like
15 semiconductors, the role of cumulative innovation is much
16 greater. That plays into, I think, something that our
17 other commentators have raised, which is the importance
18 of broad vs. narrow patents.

19 If you give broad patent protection in an
20 industry in which cumulative innovation is important, you
21 are in effect gambling that one initial innovator will be
22 able to effectively coordinate improvement, will be able
23 to effectively act as a central planner for all
24 subsequent innovation. That gamble strikes me for
25 reasons that Ken Arrow, among others, have written about

1 as an unwise one where innovation is particularly likely
2 to be cumulative. The more it is that people have to
3 build on each other, the more problematic strong initial
4 grants of rights are because they rely on an assumption
5 of efficient licensing, which turns out in practice not
6 to be particularly robust.

7 And to give just one example, it seems to me
8 that we are much better off with respect to the Internet
9 by virtue of having had competition to create new types
10 of technologies than we would have if we had given AT&T
11 in the 1970's sort of broad patent rights that gave it
12 control over networks and said, "Okay, let AT&T
13 coordinate the development of computer networks."

14 Fourth, and perhaps most significantly, patents
15 are heterogeneous with respect to what I call the patent
16 to product ratio. In Pharmaceuticals, for the most part,
17 and with some notable exceptions, a patent covers a
18 product. What I patent is a chemical, which I actually
19 deliver as a drug, similarly in many chemistry type
20 inventions, what I patent is a product.

21 The ratio of the number of patents to the
22 number of products is about 1:1. The ratio gets a little
23 higher in industries like Biotechnology where you have
24 patents on upstream research and development tools, or in
25 software where you might have a number of different

1 inventions that are put together into a computer program.
2 It gets astonishingly high, something on the order of
3 1,000-1 when you get to semiconductors. You cannot
4 produce a new microprocessor without infringing hundreds
5 if not thousands of patents because the inventions are
6 not semiconductors. Nobody gets a patent on a
7 semiconductor chip.

8 They are small changes in process, they are
9 small changes in product, they are circuit design
10 innovations, they are little pieces of the innovation.
11 What this means is that in those industries with a high
12 ratio like semiconductors, blocking patent problems and
13 hold-up problems are much greater than they are in other
14 industries. Now, there is more of course to
15 heterogeneity, but I wanted to say a little bit about the
16 implications of it.

17 First off, you are going to hear from a lot of
18 people over the course of the week who represent various
19 industries. And you will hear, I predict, very different
20 things about the patent system. You will have people
21 from the computer networking field come here and tell you
22 that patents do their firms no good at all, and if you
23 could get rid of them, life would be good. You will have
24 people who come in from the Pharmaceutical and the
25 Biotech industries who will tell you that patents are the

1 lifeblood of their industry and that if you do anything
2 to restrict the power of patents, you are going to shut
3 down R&D.

4 Both of these statements can be true because
5 each of these industries is looking at one part of the
6 elephant. And I think it is important for the agencies
7 to focus on the fact that you cannot have a policy with
8 respect to patents. You have got to have an industry-
9 specific approach.

10 Now, patent law has some difficulty itself
11 having an industry-specific approach. We have at least
12 nominally a unitary set of patent laws. We have got a
13 set of non-obviousness rules or enablement rules which,
14 while it does in practice differ a little bit from
15 industry to industry, it is supposed to be legally
16 neutral.

17 But the antitrust agencies, it seems to me, can
18 and should take this industry specificity into account in
19 determining whether or not they ought to be enforcing the
20 antitrust laws vigorously where patents are at issue.
21 Now one way which they might take it into account, you
22 might say, "Well, gosh, if patents are really important
23 in the pharmaceutical industry, but they are really
24 problematic in software, we ought to enforce antitrust
25 heavily in software and leave them alone in the

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1 pharmaceutical industry." I am not sure it is that
2 simple, right?

3 You might for example take patents more
4 seriously in an industry like pharmaceuticals within
5 their scope. Give them greater deference, not try to
6 push on them, but still be more worried about effects to
7 leverage those patents outside their effective scope, or
8 to use them to promote cartels as happened in a number of
9 recent cases involving patents owning pharmaceutical
10 companies agreeing with generics effectively to extend
11 the life of their patent. Right?

12 So the fact that patents are more important
13 does not mean that the Antitrust Division should
14 necessarily stay away, but it may mean that we want to
15 change the focus of the inquiry to focus in particular on
16 efforts to extend patents there, while we might think
17 more about other market clearing mechanisms in areas like
18 semi-conductors and computer software.

19 And that takes me to the final point I want to
20 make which is I do not think the antitrust agencies can
21 or should ignore the fact that a patent is not a
22 guarantee. The empirical evidence suggests that patents
23 issue all the time with very little examination at the
24 PTO, that there is no opportunity effectively for
25 competitors to object to a patent or submit prior art,

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1 there is no requirement that even patent applicants
2 search for prior art and disclose it to the Patent and
3 Trademark Office and, not surprisingly, as a result,
4 about 45 or 46 percent of all patents ultimately
5 litigated turn out to be invalid.

6 Now it seems to me that the agencies ought not
7 ignore this fact. It is not enough as a sort of defense
8 to an antitrust claim for a company to assert, "Look, we
9 have a patent," and therefore that is the end of it. I
10 think the antitrust agencies ought properly to inquire
11 into whether patents are likely to be held valid and into
12 what the effective scope of that patent is likely to be.

13 And it is often a scope that is narrower than
14 is asserted by intellectual property owners, not for the
15 purpose of attacking the ownership of the patent itself,
16 but for purposes like determining whether a licensing
17 transaction between two competitors, in which two patents
18 are cross licensed, is in fact really a sham transaction
19 or really a cross license of blocking patents. If the
20 standard is merely do we own patents, virtually any
21 company is going to be able to come up with a patent that
22 they can assert as an immunity from any inquiry into
23 their cross licensing activity.

24 At the same time, it seems to me that you do
25 have to respect valid patents within their scope, that

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1 the antitrust laws ought not be going after unilateral
2 refusals to license patents, but instead ought to be
3 focusing attention on plus factors or plus conduct --
4 agreements involving the use of patents that might extend
5 their scope, or conditions that are placed on a license
6 so that it is not truly unilateral and unconditioned,
7 right?

8 So that the effect of this, it seems to me -- I
9 guess what I would suggest is both with respect to
10 different industries and with respect to different
11 patents even within an industry -- it is not enough to
12 treat patents as a unitary phenomenon, you have got to
13 drill down and you have got to focus on the actual
14 characteristics of the industry and the actual
15 characteristics of the patent to try to decide how
16 important it is to innovation and how antitrust law ought
17 to treat it.

18 MS. DeSANTI: Thank you very much. We have a
19 wealth of material all ready on the table for discussion
20 and where I would like to go from here is to ask some
21 questions, but also get discussion going among our
22 panelists.

23 Please, Professor Varian, Professor Arrow,
24 Professor Arora, join us.

25 I know that there are many points that you have

1 that are overlapping with the issues that we have already
2 raised, and just turn your name tag on its side, and then
3 we will be sure to know when people have things that they
4 want to contribute. I would like to for starters go back
5 and explore a little of the notion that anecdotal
6 evidence is what we have got at this point, that the
7 firmest of it in support of a role for competition in
8 terms of promoting innovation.

9 I guess one question is, does that mean we
10 should be looking for case studies? Or does it mean that
11 the same kind of careful fact by fact analysis that we
12 typically do in merger analysis and in non-merger
13 analysis, for that matter, is the right way to go.
14 Professor Arrow?

15 MR. ARROW: I would like to ask one question of
16 each of two of the speakers, just for clarification. One
17 is Professor Rubinfeld, Dan, you referred to the
18 difficulties of collaboration in R&D, suggesting in a
19 competitive situation of an independent R&D, that it is
20 not likely to lead to problems of collaboration. You say
21 that. Am I quoting you correctly? Why do we have such a
22 high frequency of strategic alliances?

23 We seem to have a lot of collaboration on the
24 research side, there are already many examples, I do not
25 know statistically what a large fraction it is -- how do

1 strategic alliances on -- to what extent are they
2 compatible with competition? Why send out a cloak core
3 conspiracy and Smith Alliance or whatever? He talked
4 about merriment and diversion, but maybe --

5 MR. RUBINFELD: You know, I think that is a
6 good question and others may want to comment. My overall
7 sense is that there are many areas where, in the end,
8 because of compatibility issues, or whatever, there is
9 going to be a need for a strategic alliances, but that it
10 best evolves if a lot of the core innovative work is done
11 independently and the strategic alliance may resolve
12 standard setting problems, or marketing, or other
13 problems.

14 But if the strategic alliance is doing R&D, it
15 may work in some cases, but it strikes me as risky to at
16 least have it broad industry-wise for strategic alliance
17 at that stage. Joint R&D ought to be done on a smaller
18 scale by one or two or three firms, but not on at a broad
19 industry level. The problem --

20 MR. ARROW: You mean for competition?

21 MR. RUBINFELD: Right.

22 MR. ARROW: You used the word "risky." It
23 creates a risk of a monopolistic --

24 MR. RUBINFELD: Yes, yes, a risk of anti-
25 competitive effect. And the problem is, once you start

1 to deal with the standard setting compatibility issues,
2 you have created a real tension because obviously the
3 standard setting body, if it is, say, a patent pool that
4 is going to achieve some real benefits of achieving
5 compatibility, but there is a risk that it will control
6 blocking patents and deter others who are not part of the
7 pool. And that is a standard tension that the guidelines
8 are worried about. But I think that comes at a later
9 stage than the innovation.

10 MR. ARROW: I have a question for Professor
11 Shelanski. This point struck me a long time -- you
12 referred again to Shumpeter as saying, you know,
13 monopolies are oversized with innovation, but it struck
14 me that you reached simply to Camfrey (phonetic). He's
15 close on a lot of things. One of them seems to be that
16 the monopoly that is encouraged with innovation works the
17 other way. It is the prospect of monopoly that
18 encourages innovation -- existing monopoly. I do not
19 think he ever says -- maybe he says -- but it does seem
20 to follow from his logic.

21 (Tape blank for these portions. Transcript not
22 available.)

23 MR. SHELANSKI: Entry barriers are going to be
24 an extremely important part of the analysis. For any
25 point that you are thinking about, let us say having an

1 unusual remedy, or making innovation part of the
2 enforcement decision, I think that -- in some ways, this
3 goes back to the very first question you asked -- the
4 inquiry is going to be very case-by-case and very
5 industry-by-industry.

6 In Aerospace where there are huge entry
7 barriers, you are obviously not going to be able to
8 presume fringe firms and unpredictable sources of
9 innovation. In Biotech it may be a very very different
10 story depending on the level of innovation you are
11 looking at, you know, basic science vs. final product.

12 But that is going to factor in there the same
13 way any of the other considerations are going to factor
14 in, the likelihood of licensing, the likelihood of
15 multiple sources being foreclosed and consolidated. You
16 are going to look at a firm-specific analysis in the
17 first place just like you do for efficiencies. What is
18 uniquely tied to this merger? What is going to result
19 here? And an industry-specific analysis.

20 And I think when it comes to entry barriers, it
21 is going to be the same kind of thing. Are we worried
22 about innovation as between these two firms when there
23 are low entry barriers? No, we are not. There is
24 nothing merger-specific that is going to create new entry
25 barriers that we are not going to follow through with the

1 innovation concern. If it is an industry in which there
2 are high entry barriers, you will have a very different
3 analysis for that particular case.

4 So I think it does matter. The cross-licensing
5 issue does tie in, though, to the entry barrier question
6 because if you are presuming that innovation that
7 requires complimentary assets is going to occur from
8 fringe firms, you are obviously going to make some
9 presumptions about what the merging firms are going to do
10 with their combined intellectual property and whether
11 they are more or less likely to cross-license separate
12 firms or as a combined entity. But it all comes back to
13 the case-by-case analysis.

14 And just the other point that I wanted to make
15 very quickly in responding to Hal's point about what kind
16 of innovation. I think that is also very important.
17 Cost-cutting innovation is perhaps less of a concern in
18 the entry barriers context and may raise less concerns
19 overall. It seems non-controversial to say it is a
20 theoretical matter, that even monopolists have an
21 incentive to reduce costs.

22 The problem empirically is that any true
23 monopolist -- most true monopolists we have had in this
24 century have been regulated and have had rate regulatory
25 regimes that deter them or make it uninteresting for them

1 to cut costs. That is less so now. We may start to see
2 evidence, but we do not have to worry about cost cutting
3 innovation. But when you are talking about product
4 improvement in an innovation or product or production,
5 that is a different and more complicated story.

6 MS. DeSANTI: Rich?

7 MR. GILBERT: Well, Susan, I know that you know
8 the answer to this question about innovation and entry
9 barriers and all because I remember working on the IP
10 Guidelines and you were sitting there and talking about
11 asset specificity.

12 And one of the key characteristics identified
13 in the Guidelines is that a necessary condition to worry
14 about innovation in a merger case is the ability to
15 identify assets that are specific for the R&D that the
16 merging companies are performing because, otherwise, you
17 do not know where the innovation is going to come from
18 and there are all kinds of stories of innovations coming
19 from very unexpected places. And the cases that are
20 brought, that have been brought, are ones where the R&D
21 is extremely asset specific like pharmaceutical R&D where
22 you just know there is a pipeline and the issue is who is
23 in the pipeline to innovate with respect to some
24 therapeutic class of drugs.

25 But I want to also add another point to this,

1 which is if you observe competition or lack of
2 competition in R&D, you should be very careful about
3 making inferences about entry barriers from that. For
4 example, you could have situations where the dynamics of
5 R&D result in only two firms engaged in R&D even though
6 anybody can do it because there could be lots of learning
7 economies or experienced economies that lead to drop-out
8 behavior if you are not far enough along the experience
9 curve.

10 You can have preemption where some firm
11 preempts the R&D that others do -- it might lead to a lot
12 of R&D being done, but it still leads to the observation
13 of high concentration, even if perhaps you had a very low
14 entry barrier, so you have to be real careful about
15 inferring entry barriers from observing R&D competition.
16 That is true for price competition as well, but
17 particularly true for R&D competition.

18 MS. DeSANTI: Thanks, Rich. And Dan, I see you
19 are ready to follow-up, but let me ask you to talk about
20 core competencies as to some of the specific assets that
21 may be at issue in looking at entry barriers and
22 innovation, in addition to whatever else it is that you
23 are going to talk about.

24 MR. RUBINFELD: Okay, well, I was going to say
25 one thing in that regard. In areas like the defense

1 merger that I was talking about earlier, there is not
2 much stuff. There were significant barriers to entry in
3 almost all areas.

4 But one area where core competency became
5 important was looking at prime contractors. And those
6 are the folks that really have to contract with DOD to
7 produce weapon systems. They are having to put together
8 sort of a whole set of subsystems, so they have to be
9 sort of knowledgeable in a number of different areas.
10 And one of the problems in looking at a merger was to
11 make sure that post-merger there would be enough folks
12 around who could fill this role of being prime
13 contractors.

14 And the barrier to entry there is not a patent
15 or anything, or a license, it is really just the know-how
16 that comes with having that core competency. And so the
17 agency worried a lot about the possibility that, if they
18 did not maintain enough firms that had that core
19 competency that there would be created a significant
20 barrier to entry and that would have very harmful effects
21 on innovation.

22 The other view about the markets was very
23 difficult for the agencies because all of the effects I
24 am talking about occur over a long period of time. And
25 it has always troubled me that the guidelines typically

1 sort of take about, say, a two-year perspective. And
2 when we worry about entry, we worry about entry that
3 might be viable within two years. The kind of entry we
4 are talking about here is, if it is going to arise, will
5 probably take place over a longer period of time. And if
6 it is lost, if you create a barrier because you lose
7 know-how, it is going to be lost for a long period of
8 time.

9 So these decisions about whether to support or
10 not a merger are going to have huge long term effects
11 that are going to be difficult to out-do. It is just not
12 easy to go out there and certainly in an area like
13 Defense and say, "We have decided to have a new firm in
14 the industry, so DOD is going to issue a contract to a
15 new firm." It just does not work that way. These
16 competencies have to be developed over very long periods
17 of time.

18 MS. DeSANTI: Ray, you are patiently awaiting
19 to raise your question.

20 MR. CHEN: Thanks. I just have one short
21 question. I am just interested in learning more about
22 the heterogenous effect of patents in various industries
23 that Professor Lemley commented on. And while there is
24 no doubt that, in the past, say, 20 years, the pace of
25 technological change in various industries like software,

1 hardware, or semi-conductor processing has been fast and
2 furious, it sounds like later on this week we will be
3 hearing a variety of anecdotal stories.

4 But I guess what I was wondering about is, is
5 there any empirical evidence or studies that have been
6 conducted so far for a particular industry on whether
7 patents have had a deleterious effect on innovation or
8 somehow have exceedingly high transaction costs for that
9 particular industry? Or maybe a different way to put it
10 is, maybe any studies for a particular industry that
11 patents do not have as beneficial of an effect as in
12 other industries?

13 MR. LEMLEY: Well, I mean, let me take the
14 questions in reverse. I mean, there is certainly
15 evidence suggesting that intellectual property owners
16 value their intellectual property differently by
17 industry. The classic work is Levin, Clavorick, Nelson &
18 Winter in the 80's and updated by Wesley Cohen
19 (phonetic), et al. at Carnegie Mellon in the late 1990's.
20 And that evidence strongly suggests that, if you ask
21 licensing managers and technology managers how important
22 are patents to you as an appropriability mechanism
23 relative to other appropriability mechanisms -- trade
24 secrecy, first mover advantages, whatever else there may
25 be -- you get very different answers by industry.

1 So, I mean, that strongly suggests, I think,
2 that industry owners, even companies who are acquiring
3 intellectual property rights -- right? -- or acquiring
4 them even in industries in which they may not think they
5 are particularly important as appropriability mechanisms.
6 Now, evidence going the other way I am going to defer to
7 anybody else on the antitrust side who knows the answer
8 to that question.

9 I mean, I do not know of empirical studies that
10 suggest that the costs of patents are particularly
11 greater in one industry than another. I know of
12 anecdotal evidence, right, that suggests particular
13 problems with hold-up in some industries and so forth,
14 but if others want to jump in on that?

15 MS. DeSANTI: Ashish, I am sure you have things
16 to say on this, and then we will take our break.

17 MR. ARORA: Sure. I want to report on a study
18 with Wesley Cohen (phonetic) and other colleagues at
19 Carnegie Mellon where we tried to ask exactly this
20 question, which is could we quantify the impact of
21 patents on R&D. Specifically, we were interested in
22 investments in R&D. And what we measured is what we call
23 the patent premium, which is what is the incremental pay-
24 off to being able to file a patent for an invention vs.
25 not being able to file it. And, as Mark pointed out, and

1 consistent with our studies, there is a great deal of
2 variation across industries.

3 Here is some of what we find. The average pay-
4 off for all inventions, whether patented or not, is less
5 than -- is negative. So, in other words, for the typical
6 invention filing a patent, you would actually lose money,
7 not even counting the direct costs of filing, the filing
8 fees and so on.

9 For patented invention, the incremental pay-off
10 varies between 120 percent incremental pay-off to about
11 180 percent, depending on how exactly you do the
12 analysis. If you are interested in cross industries, for
13 the unpatented invention, there is tremendous variation
14 across industries. Semiconductors is on the order of,
15 you know, negative 50 percent. So you would lose for the
16 typical invention 50 percent.

17 But conditional on filing a patent, in other
18 words, for patented inventions, it is about 180 percent
19 for semiconductors, about 200 percent on average for
20 biotech, so that gives you a sense of what the impact,
21 what the patent premium is. Probably a more direct way
22 to answer your question is to say, "Well, what would
23 happen if we increased this premium by ten percent? What
24 impact would there be?"

25 And our preliminary estimates suggest that a

1 ten percent increase in premium would increase R&D by
2 three and a half percent, patenting by nine and a half
3 percent, and so patent per R&D would increase by six
4 percent. And that is roughly consistent with what we
5 have seen over the last 20 years. There has been a
6 steady increase in patent per R&D dollar. Once again,
7 this varies greatly across industries.

8 So for semiconductors, the impact on patenting
9 would be much greater, and the impact on R&D is
10 relatively small, it is 2.5 percent. If you look at
11 Biotech, a ten percent in premium would increase R&D by
12 five percent, and would increase patenting by eight
13 percent.

14 So patents per R&D would grow by much less in
15 Biotech than they would in semiconductors which is,
16 again, consistent with what I think we see: in the
17 aggregate, patent per R&D dollar has increased far more
18 rapidly in the IP sector than in the health care sector.
19 And I would be happy to sort of talk more about this if
20 folks are interested.

21 MS. DeSANTI: Thanks. Okay, let us take a ten-
22 minute break and come back at 3:10.

23 (Whereupon, a brief recess was taken.)

24 MS. DeSANTI: Thank you very much for your
25 patience as we work through our technical issues. We are

1 going to start once again, this time with Professor
2 Kenneth Arrow, who is a Nobel Prize winning Economist,
3 now a Professor Emeritus at Stanford, author of 22 books,
4 230 papers, served in numerous academic societies.
5 Professor Arrow.

6 MR. ARROW: Thank you. First off, a remark,
7 one thing that every analysis of patent for the
8 discussions here, in other words, any model of patents
9 whatever I know of, leads to one conclusion -- that the
10 optimal patent provisions -- the length, breadth,
11 whatever you want, depends on circumstances and are
12 different from industry to industry and even within
13 industry they differ according to the nature of the thing
14 and so forth in time.

15 So we have a problem, on the other hand, I
16 suppose, is a demand for adjudicability and so forth
17 creates the problem that you are likely to have a kind of
18 procrustean bed into which you have to fit the bright
19 line, I guess, in order to fit these things. So there is
20 a tremendous amount of heterogeneity.

21 I have been thinking about -- this discussion
22 arose from a case -- some thoughts about the nature of
23 what everybody calls "Dynamic Competition." It suggests
24 ways of modeling, some theorists I am going to -- I am
25 not going to try to present the details here, these are

1 still in process, but the general idea. This work has
2 been going on with Andrew Rosenfeld, the lawyer and
3 economist.

4 Now this is going to apply only to a certain
5 set of circumstances and is not by any means a universal
6 -- I mean, it is universal in a sense, but not universal
7 in any sense, let me put it that way. The real question
8 is how important they are and maybe at the end of class
9 we will come to the end fitting into some of the
10 discussion earlier, and there may be some questions as to
11 the relevance of this concept in the patents field.

12 Now one of the things I do like to assume is
13 that diversity is good. Now if you have differing
14 sources of R&D -- I am using the word "sources," but they
15 might be "firms," "Laboratories," and whatever that
16 measurement is -- if there is a problem to be solved at
17 the next stage of the quality ladder of products that
18 different groups will come at it differently, somewhat
19 differently.

20 I mean, obviously there is a correlation in
21 them because one of the things is there is kind of a
22 basic knowledge that everybody in the industry possesses,
23 and this knowledge is changing over time. It is changing
24 endogenously in part because the solving of the previous
25 problems isn't out; it is also changing exogenously, at

1 least exogenous to the industry because basic R&D and
2 basic research has changed the perimeters and so forth.
3 And there are many interactions between these two causal
4 connections in any one way.

5 But at any one moment, there are a big number
6 of firms tackling this and some will have a better chance
7 of getting anything at all. If one goes to get it, they
8 will get somewhat different things, and maybe better
9 solutions. I am going to be more or less assuming these
10 solutions are arrayed on the single quality dimension.
11 Actually, that is over-simplifying because we may have
12 several dimensions of quality and may have different
13 issues in the market, but let me just assume they are
14 single-quality things.

15 Now, I am going to assume -- and this is
16 confining myself to industries in which at any one moment
17 of time there is no competition, or the competition is
18 very limited. There are increasing returns in
19 production, increasing returns in innovation themselves,
20 the network effects -- so there is a variety of
21 industries in which we expect at any one moment to have a
22 dominant firm or a few dominant -- or at least very very
23 limited competition for classically understood reasons,
24 but essentially in one form or another you have got
25 increasing returns.

1 But the idea of dynamic competitions, while
2 there is monopoly all the time, there can be new
3 monopolists and the existing monopoly is not necessarily
4 a persistent one, and the entry is by innovation.
5 However, we do want to add one more thing and this is
6 where, in particular, patents are a possibility, but it
7 is not only patents, and that is the idea that there is
8 an entry barrier. Whatever firm is in existence has an
9 advantage. It could be, you know, installed base, or it
10 could be patents which block further innovation.

11 Now the question whether that is a real
12 obstacle or not has been discussed earlier and I do not
13 know that it is true. The case which stimulated me was
14 one in which there were very elaborate discussions and
15 there was a blocking patent, and in the middle of the
16 case it was settled. I do not know what the agreement
17 was. It was a licensing agreement. So in fact, it did
18 not block. It threatened to block.

19 Obviously the blocking was used as a basis for
20 the settlement, the disagreement point in a national
21 bargaining situation, but it nevertheless -- I said
22 national -- you can be sure it was under the joint game,
23 I am not saying to society as a whole, although in this
24 case it probably was. But joint game certainly to the
25 two participants.

1 So the question where the blocking -- there has
2 certainly has been a lot in the literature and it is not
3 purely an empirical question -- to what extent blocking
4 patents are real. Do we really get the anti-commons,
5 tragedy in the anti-commons that people have talked
6 about.

7 Certainly I have seen a number of articles
8 alleging this occurs in Biotechnology, particularly with
9 what is thought of as being an overly generous patent
10 policy in that field. Others say -- there seemed to be
11 some consensus this morning that this is not true, that
12 you will eventually get into licensing agreements, some
13 kind of joint ventures which overcome. I do not know if
14 it is true. There are other entry barriers and the
15 analysis will be valid in general for entry barriers, but
16 the question whether it is relevant to patents, I am
17 afraid, is something I will have to leave open.

18 The model is that essentially at any one
19 moment there is a monopoly, it is incumbent. The firms
20 try to essentially invest in R&D and try to develop any

1 best entrant -- so essentially the model is one of what
2 is called "order statistics" in statistical theory. You
3 take the maximum of some random variables. If the best
4 entrant's quality exceeds the incumbent's quality by more
5 than the entry barrier, then it wins monopoly for the
6 next period which of course includes return that is now
7 the incumbent, which gives it some advantage in the
8 future.

9 Now it seems to me this sort of captures a lot
10 of things. And I think it captures a big class of cases
11 where entry barriers are relevant. One can think of
12 antitrust cases. It is clear to me that this model fits
13 a lot of cases. Whether it fits patents, I am not so
14 sure. And that is an empirical question. In principle,
15 blocking patents as though they should do this, but there
16 are some issues which seem to be in dispute, but perhaps
17 there is a consensus that it is not big.

18 As the best entrant -- and the best entrant
19 wins the monopoly, of course, if it is sufficiently good.
20 If it is not sufficiently good, if it does not exceed the
21 quality of the incumbent who is also doing some research
22 possibly -- may or may not be -- the incumbent raises the
23 quality.

24 Now, I will be very brief here since the
25 implications, I think, are fairly clear. In the first

1 place, proposing that some firms do try to enter, well,
2 the probability that the incumbent will change -- it
3 would be a new incumbent -- increases with the number of
4 entrants, and decreases with the size of the entry
5 barrier. The higher the entry barrier, the less probable
6 it is that the incumbent will be displaced.

7 Now this member -- this probability, of course,
8 is known to the potential entrants. I am assuming
9 everybody understands the situation. And of course,
10 well, the best entrant is -- the incumbent loses and the
11 best entrant wins, which means that the firms --
12 conditional on the incumbent being ousted, there probably
13 is only one over N that will succeed. So presumably the
14 firm takes that into account in deciding whether there
15 will be incentive to enter.

16 So if the number of firms is large enough, no
17 additional firms will enter. It also gives a measure of
18 the incentives on the existing firm to do research. The
19 more firms try to enter, the less the incentive on the
20 existing firm because the probability of winning is less.
21 So there could be an excessive competition.

22 Now I said something clear enough under C , but
23 I didn't realize I left out a point which I thought about
24 that somehow did not get in here, which is the role of
25 the entry barrier. Suppose the entry barrier increases?

1 Well, this will decrease -- it would appear, in the first
2 place, that this will decrease potential competition.
3 That, unfortunately, needs a little more analysis, as I
4 realized, and is a point I had thought of and somehow did
5 not incorporate it into this.

6 Namely, the potential competitor is buying --
7 with some probability -- is buying incumbency; therefore,
8 if you win, part of the reward is that you are the
9 incumbent for the next period. So there is a delicate
10 balancing act here in terms of which of the improvements
11 -- because you are buying, that of course is the logic
12 behind patents in the first place, that if you win, you
13 get a monopoly. The difficulty here is if you have
14 blocking patents.

15 In other words, the problem of that here is you

1 worked on -- is that there is a blocking or a payment,
2 which is a little bit of a blocking, by the way, even if
3 it gets unscrambled, it is something of a blocking too,
4 now that I think of it -- I mean, it is a partial
5 blocking. So the existing patents will just scourge out.

6 On the other hand, the counterpart is that, if
7 you do win, you have acquired that monopoly power, so
8 there is an offsetting figure here which I must say -- I
9 am sure you could work out the answer. Once you set up
10 the model, you can do these things by simulation, if
11 nothing else, you could work out the answer. The trouble
12 is, it is going to be a very very circumstance- dependent
13 answer.

14 The only general observation I thought I would
15 make is the following. We have set up certain rules on
16 patents, saying, "We have agreed -- somehow we have come
17 to a social decision, a joint social judgment, that a
18 monopoly for 17 years is the appropriate reward."

19 Now if it turns out that the existing patent
20 gives you an advantage in keeping your incumbency, and
21 therefore it in effect means the effect of a patent is
22 longer than the planned period, and therefore, although
23 it might seem to say that we should take action to
24 prevent patents from being used to extend themselves
25 beyond the period originally entitled. Thank you.

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1 MS. DeSANTI: Thank you very much, Professor
2 Arrow. Next we will hear from Professor Ashish Arora.
3 He is an Associate Professor of Economics and Public
4 Policy at Carnegie Mellon University in Pittsburgh, a
5 representative of another university, but he is also
6 currently a visiting Associate Professor of Economics at
7 Stanford University. He is also the Research Director of
8 the Software Industry Center at Carnegie Mellon. His
9 research focuses on many things, including the economics

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1 So what sense, then, remains of the not calling
2 the present decade the Knowledge Economy? Let me offer
3 one and see if you agree, which is the increasingly
4 independent identity of knowledge as an economic
5 commodity, in other words, as a tradeable economic
6 commodity. And if you will indulge me with that, what it
7 leads to is thinking about the possibilities of markets
8 for such knowledge, which I am going to call "Market for
9 Technology" as a shorthand. And as an important
10 implication of having such markets is the possibility of
11 specialization and knowledge production.

12 And as implicpf m apnt zatte,0 -24.75 TD (

1 correspond well with the existing FTC DOJ Guidelines.
2 The first column, you could think of as markets for
3 technology, and the second column of what the Guidelines
4 call the "Markets for Innovation," or the "Innovation
5 Markets." And within each of those, you could think
6 about horizontal transactions, which is licensing or
7 transactions with potential rivals and vertical
8 transactions which . And it sometimes is we tend to
9 think about either the top left or the bottom left boxes
10 as the most interesting, but it may well be that we
11 should think about these other boxes as well.

12 And I suspect each of these transactions and
13 each of these raise somewhat different sets of concerns
14 if you are thinking from the point of view of antitrust,
15 and some of these have already been raised. Let me skip
16 to the second bullet. The first task, if I am going to
17 talk to you about Markets for Technology, is to give you
18 some sense of how big they are. And you can measure them
19 a couple of different ways.

20 You can look at the royalty flows from the
21 stock of existing deals, or you could look at the value
22 of deals in any particular year. And whichever way you
23 look at them, you get slightly different numbers and, as
24 you will readily appreciate, you should expect to get
25 different numbers if you are counting the value of

1 focus on is by no means the only one, but what I would
2 like you to look at -- the one that I am concerned about
3 is where do these entrants get their technology from.

4 And what is interesting, if you look at the
5 second column, that says the share of licenses from SEF's
6 -- SEF's are Specialized Engineering Firms. These are
7 firms that specialize in the business of plant
8 construction design and providing technology and know-
9 how, and frequently act as agents for other chemical
10 firms that want to license their intellectual property.

1 What is also interesting if you just look at
2 the rich countries alone and you divide the producers
3 there between large -- the top 100 chemical producers and
4 the rest -- the small first-world firms look a lot like
5 third-world firms in terms of their reliance on outside
6 sources of technology and in the reliance on the
7 specialized technology suppliers for technology.

8 The bottom line from that chart is, where you
9 have functioning markets for technology and where you
10 have these firms that specialize to some extent in
11 technology generation, but to a much greater extent in
12 selling technology and providing the complimentary know-
13 how and services that need to go with it, that you get
14 tremendous social gains in terms of rapid technology
15 diffusion and entry.

16 As some of you know, the chemical industry is
17 highly competitive and the competitive pressures that
18 force a far-reaching restructuring in the industry and
19 the U.S. and other European countries. More broadly,
20 if you think about markets for technology, what they do
21 is -- we talked about whether small companies are more
22 innovative than large companies -- one way to think about
23 markets for technology is they find you a way out of this
24 dilemma.

25 You know, you can do -- and Professor Arrow has

1 written on this as well -- is that you can get a kind of
2 division of labor where firms can specialize in those
3 aspects of innovation where they have a competitive
4 advantage and, in particular, small companies do not need
5 to acquire the extensive downstream complimentary assets.
6 For R&D intensive companies, having such a market
7 provides an additional option -- they can always choose
8 to license. And from a social point of view, having such
9 markets has additional benefits in terms of awarding
10 duplicate of R&D.

11 So, to conclude, having markets for technology
12 is, I think, a very important component for having this
13 kind of vertical specialization and division of labor in
14 innovation. And when you have such a division of labor,
15 in particular that tends to lower entry barriers even in
16 the downstream product markets. The other part that --
17 Susan, am I over my time limit?

18 MS. DeSANTI: No.

19 MR. ARORA: Okay. So let me come back to then
20 the other theme, which is what role do patents play in
21 such markets for typology. And I will submit to you that
22 patents play an important role. They enhance the
23 efficiency of knowledge transfer and they help structure
24 the kinds of licensing contracts that I have talked
25 about.

1 And let me conclude by saying that -- I do not
2 want to sound as if there are no downsides -- I think
3 there are a number of issues that have to do with the
4 role of intellectual property rights and the market for
5 technology. These have already been raised.

6 This question of blocking patents that
7 Professor Arrow talked about and Mark Lemley talked
8 about, and others did, and semiconductors and biotech,
9 what kinds of social costs are involved in coming to
10 terms or making these kinds of arrangements to get access
11 to the technology through this market, and in particular
12 what are the social costs involved when these
13 transactions break down?

14 And moreover, there is some evidence that
15 suggests that legal costs -- litigation costs -- may be
16 especially burdensome for small innovative firms. There
17 are specific concerns about whether the patents are
18 playing the roles that they are supposed to play and, in
19 particular, whether they are sort of adequately
20 disclosing what they are supposed to disclose.

21 And the last bullet, I think, is perhaps not
22 relevant for the immediate topic, but is relevant for
23 where we are, which is what impact markets for technology
24 in general will have on academic norms and academic
25 research. Thank you.

1 MS. DeSANTI: Thank you very much. For our
2 final speaker, we move to Professor Hal Varian, who is
3 the Dean of the School of Information Management and
4 Systems at the University of California at Berkeley. He
5 also holds joint appointments in the Haas School of
6 Business and the Department of Economics and occupies the
7 Class of 1944 University Professorship. He has written
8 numerous papers and books on Economic Theory,
9 Econometrics, Industrial Organization, and the Economics
10 of Information Technology.

11 MR. VARIAN: Thank you. Let us see if I can
12 operate this. You know, I am a believer in this
13 principle that power corrupts and Powerpoint corrupts,
14 absolutely! But nevertheless, I decided to use that
15 technology for this demonstration. I knew that I was
16 coming at the end of the talks this afternoon, so I
17 decided that, rather than being repetitive, I would try
18 to be provocative.

19 So what I have put together are some PBI's,
20 Partially Baked Ideas, about the subject matter and maybe
21 a little bit orthogonal to some of the ideas that have
22 come so far but, as you will see, there are also several
23 overlaps.

24 So I want to go back to the basics, really, and
25 sketch out the typical analysis. And if you look at the

1 text books, I could recommend a few, but if you look at
2 the text books, they start generally with monopoly and
3 then they say, "Well, what are the losses? Prices are
4 too high, output is too low." And then they might say,
5 "Well, where did the monopoly come from?" And it might
6 come from government regulation or it might come from
7 returns to scale, or it might come from bad behavior.

8 And then they say, "Well, how do you remedy
9 it?" Well, you might deregulate if it is a government
10 and you might regulate if it is returns to scale. I
11 always thought it was kind of amusing that you could both
12 deregulate and regulate as a cure to monopoly. And then
13 you might adjudicate if it comes from bad behavior. So
14 that is pretty much a summary of what we see in the
15 textbook analysis.

16 But the problem with this, I think, is in many
17 cases -- and you might even say most cases these days --
18 firms compete to acquire the monopoly. So there is the
19 discussion we have had today about patents where you are
20 competing and in many cases there are patent races to
21 acquire monopoly, there is lock-in, where you could
22 acquire a position where you have some monopoly power,
23 but of course there is a competitive stage to acquire
24 that power because there are switching costs.

25 Their network effects or demand-side of

1 economies of scale, supply-side of economies of scale,
2 competing for proprietary standards, and what the
3 textbooks tend to leave out is this competitive stage,
4 the prior stage of monopoly. And I think this is what
5 professor Arrow is addressing a little bit earlier. And
6 of course, if competition is very intense in all these
7 cases, the profits are completely competed away. Of
8 course, we still have the dead-weight loss, even though
9 the profits could be competed away.

10 But even with dead-weight loss, I think there
11 is a big problem with the standard analysis because the
12 concept is pretty clear -- it is the value of the lost
13 output that results from price being greater than
14 marginal costs, but of course, in a lot of industries
15 that we are concerned with today, if you have a flat
16 price, it has got to be greater than marginal cost
17 because of the returns to scale component. And
18 additionally, it is very very common to see firms
19 engaging in various kinds of price discrimination.

20 In fact, here is a pet peeve of mine, that if
21 you look at a lot of this efficiency condition, people
22 say price equals marginal cost, price equals marginal
23 cost, but that is not really true. It should be marginal
24 price equals marginal cost. Right? That is what you
25 want for efficiency, that the willingness to pay by

1 marginal consumer for the marginal unit should equal the
2 marginal cost of production.

3 And in many cases, the real efficiency loss
4 does not end up being so much an output loss, but rather
5 the quality distortions that you get from attempts to
6 satisfy the soft selection constraints.

7 So take my favorite example of looking at
8 movies and videos and so on, it might cost you \$30 to
9 take your family out to see the movies, but if you wait
10 for six months, you can see it at home for \$3.00 or
11 \$4.00. And so the marginal cost which is something that
12 I think pretty much approximates the marginal cost of
13 providing that particular product, so the marginal cost
14 is really the six months that you have to wait rather
15 than the output distortions.

16 Now that is the kind of thing that I think is
17 more and more present and, of course, there are many many
18 other cost monopolies besides just the output distortion.
19 I am going to talk about that a little bit later on. And
20 of course, those factors have always been around, but
21 they are of growing importance because of the ease and
22 the incentive to engage in this kind of price quality
23 discrimination.

24 So it has certainly been facilitated by
25 improved monitoring technologies, more and more

1 transactions are computer mediated, more and more
2 merchants have records of purchase history, loyalty clubs
3 that trend towards licensing for both information goods
4 and physical goods, and I think more and more cases where
5 price is going to depend on conditions of use.

6 So, for example, if you go to the supermarket
7 and you are in the loyalty club, you get coupons, and
8 those coupons depend not only on what you have bought in
9 the past, but even on what you are buying now. If you go
10 on-line, of course, there are all sorts of price
11 discrimination. I will give you all a good reason to be
12 here this afternoon, despite the beautiful day outside,
13 by giving you a tip on how to buy on-line.

14 So whenever you want to buy anything, what you
15 should do is go to your search engine and type in Amazon
16 coupon, or Buy.com coupon, and nine times out of ten, you
17 come up with a coupon for \$10 or \$25 off, so you
18 immediately save \$10 or \$25 right there just by using
19 that coupon. I also discovered another kind of cute
20 thing.

21 A while ago I was at Amazon and I put a product
22 in my wish list -- they have got a wish list there -- and
23 the next thing you know, a day later, I got an e-mail
24 saying, "Hey, we will give you \$10 off anything on your
25 wish list." And if you think about it, it's kind of cute

1 because, to say that it is on your wish list says, "Well,
2 I want to buy it, but I am not quite ready to pay that
3 price." So, of course, in that case, they like to make
4 you another offer.

5 So you are doing a kind of iterated negotiation
6 in that case. And, of course, it is not a secret that

1 cost both of you. And here are a few diagrams from Econ
2 1. I mean, that is the ideal perfect competition.

3 The color code here is "Green is Good" and Blue
4 is Bad," at least for non-economists. And black is real
5 bad. We all agree black is bad. So you have got the
6 consumer surplus, the producer surplus, and the dead-
7 weight loss. That is the picture you usually see.

8 But then, if you compete for the monopoly,
9 well, at least sometimes the competition -- maybe that
10 all gets passed along to the consumers and so you will
11 have the dead-weight loss, but the consumers get a great
12 deal. And then, if you have a perfectly discriminating
13 monopolist, well, everything is producer-surplus, but if
14 you have firms that compete to become perfectly
15 discriminating monopolists, which I think is a very real
16 case, well, then, it is great because all the benefits go
17 back to the consumers.

18 So, in fact, I think you might want to call
19 this the -- maybe this is apologies to Ken Arrow -- this
20 is the third theorem of Welfare Economics -- that if
21 firms that compete to become a price discriminating
22 monopolist, then you should get an efficient outcome and,
23 in fact, consumers get the bulk of the gains. Now that
24 is obviously an extreme case, but so is perfect
25 competition and perfect monopoly.

1 In fact, somebody told me this was just too
2 perfect because it has got to be perfect competition for
3 a perfectly price discriminating, perfect monopoly. So
4 it is three orders of perfection here.

5 But I think you ought to take it seriously,
6 particularly when you try to look at an analysis of what
7 happens in increasing returns industries, or industries
8 with a lock-in or network effects, and it is important to
9 look at the entire history of competition in the industry
10 and also, of course, to evaluate the impact of price
11 discrimination appropriately.

12 And in that last factor, I think, there is a
13 real conflict between the way the Law views price

1 But the trouble is, the output effect is clear-cut -- if
2 monopolists, at least the non-price discriminating
3 monopolists, produces too little output, whereas if you
4 look at quality and choice of innovation it can go either
5 way. Maybe you can have too high a quality.

6 I mean, people have argued that AT&T, for
7 example, maybe due to regulation incentives, or maybe due
8 to quality as an entry barrier, had too high a quality of
9 their product. Or it can have too low. Maybe your
10 favorite example is some other telecommunication
11 companies might go in there. And innovation? Well, we
12 have heard a lot about that.

13 And I think what we have heard is, on the one
14 hand, on the other hand, the monopoly has the money, so
15 they have got the money to invent to put into R&D, they
16 have got an incentive to save cost, and they have perhaps
17 an incentive to do something to quality. But they
18 certainly do not have an incentive to destroy revenue to
19 do really disruptive innovations.

20 I thought about this a few weeks ago. I went
21 to a conference on Moore's law and Intel demonstrated a
22 Terahertz transistor -- 1,000-gigahertz. So now we have
23 gigahertz chips. And just this morning there was an
24 announcement where IBM says that it is going to have a
25 100-gigahertz chip, but this was ten times that, so this

1 is a Terahertz transistor.

2 And they are putting huge amounts of money into
3 innovating in that particular approach to semiconductors,
4 but then we have people over in the EECS that are
5 printing integrated circuits on potato chip bags with
6 ink-jet printers, which is really a rather dramatically
7 different technology, especially if you look at the
8 difference between fixed cost and variable costs for how
9 those technologies play out.

10 And Intel just is not a player in that
11 particular industry, even though I think it has got quite
12 dramatic possibilities for changing not so much the
13 traditional semiconductor market, but in fact opening up
14 all sorts of new markets to semi-conductors that are
15 currently not available.

1 those consumers locked-in second period, but of course
2 there could be lots of other ways to compete that do not
3 necessarily benefit consumers, by lobbying and
4 regulation, and doing all sorts of things of that sort.
5 Of course, there is also path dependence, luck, strategy,
6 mistakes. You can look at a lot of situations where
7 little changes made a big impact in the Operating Systems
8 -- Steve Balmer.

9 In the race between OS-2 and Microsoft Windows,
10 there was apparently a bug in OS-2 where if you hit
11 certain keys at the same time, the whole Operating System
12 would crash. And Steve Balmer went around Comdex showing
13 every booth what keys to hit to crash OS-2, which I think
14 was a particularly interesting pivotal event in the war
15 between those two operating systems.

16 And of course there is also the preemption
17 races of duplication of effort issues that go on when you
18 look at competition to acquire monopoly. So this is the
19 kind of patent race stuff.

20 Finally, there is path time consistency and I
21 think that is a very interesting point because when the
22 monopoly phase goes away, will the consumer still be
23 willing to pay? And there is a big difference between a
24 one-year cell phone contract where you say, "I will give
25 you a phone if you sign up for a year," and pay high

1 prices for that year.

2 A three-year ink jet printer life where you pay
3 a high price up front, you get locked into using a
4 proprietary cartridge, or the last example were you
5 should pay a higher price for Excel because it only cost
6 \$50 back in 1985 where we were at a price war with Lotus
7 1-2-3.

8 Or you look at another kind of nice example
9 which is what is going to happen with those 3-G licenses
10 in Europe where companies that pay huge amounts of money
11 to acquire these third-generation wireless licenses and
12 maybe in ten years, after slugging down the marketplace,
13 you will get a monopoly or maybe a duopoly where there is
14 a lot of pricing power going forward and are the
15 antitrust authorities really going to stand by while
16 the companies say, "Well, we bid for this back in 1998
17 and now you are saying you want to take away the profit
18 flow that comes from that particular highly competitive
19 phase of the monopoly." And maybe, again, we might
20 say, "Well, if they are really good at price
21 discriminating, maybe there is not a lot of social cost
22 to that either."

23 So I think it is an issue we really have to
24 think about going forward in these cases. But the most
25 important issue, I think, is the tactics to acquire,

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1 maintain, and extend the monopoly where, of course, the
2 problem is not even in these partial-equilibrium examples
3 I gave with a single market. It is not so much the cost
4 in that market that is the problem as the attempts to
5 extend or protect that monopoly using socially
6 detrimental tactics. So the best player wins, not always
7 the incumbent.

8 So maybe we want to look at that model a little
9 differently where we could have full efficiency and even
10 dramatic consumer benefits in a particular market because
11 of this dynamic monopoly or competing for a monopoly
12 story that I have been telling. But it still could be
13 bad because of the spill-over effects into adjacent
14 markets. So I think that is also a fairly critical issue
15 to look at.

16 So in summary, I think the textbook case is
17 less and less relevant to the real world for many of
18 these examples because price is inevitably going to be
19 greater than marginal cost in lots of industries of
20 interest. Appropriate analysis of price discrimination
21 is critically important.

22 We have to keep this in the back of our mind, I
23 think, or maybe in the front of our mind that you want
24 the marginal price to equal marginal cost. And I like to
25 see a more systematic treatment of competition to acquire

1 monopoly because right now when you look at the
2 literature it is really very divided. There are many
3 many different cases you could look at and nobody has
4 really pulled those cases together in a systematic way.

1 contradiction, but let me clarify.

2 My statement was simply that transaction costs,
3 while they are important, they do not appear to be large
4 enough to block most of the sort of licensing
5 arrangements that people want. I did not mean to imply
6 that owners of intellectual property would always license
7 that intellectual property. And what you are saying is
8 that when certain firms were forced to license their
9 intellectual property -- I assume those are the consent
10 decrees you are talking about -- that they can have very
11 profound impact.

12 And I would agree that what they would
13 essentially do would be to allow a great deal of entry
14 into those and related markets. And I also agree with
15 Professor Rubinfeld's observation on the importance of
16 diversity. I think that can be a really important social
17 benefit.

18 MR. GILBERT: So is this the dog that does not
19 bark? I mean, maybe we are not finding a lot of problems
20 because the ones who have problems do not exist.

21 MR. ARORA: So to some extent, the idea of
22 intellectual property does include the right to do what
23 you want to do with it, including not license it to
24 somebody else. You might imagine situations where the
25 ownership of the intellectual property, in order to

1 derive value from that, it has to be commercialized. You
2 know, the knowledge is of a kind where it is best used by
3 a large number of users.

4 Research tools is a classic example of that.
5 And that is where we were looking for breakdown failures.
6 So we did come across a number of cases of the following
7 kind: somebody had developed a new therapeutic protein,
8 you know, that they were going to do for something. And
9 they refused to license to anybody else.

10 I do not consider that to be a breakdown in the
11 market for technology because, by its nature you would
12 expect this to be very tightly controlled in terms of
13 exclusivity. And refusal to license that protein to
14 somebody else where you would imagine that the uses will
15 be rivaled -- privately rivaled -- seems perfectly
16 consistent with the idea of intellectual property. That
17 is what a patent is supposed to allow you to do.

18 When the IPO owner has a lot of market power,
19 then the antitrust considerations come in and you might
20 get a different outcome.

21 MS. DeSANTI: I would like to put a couple of
22 questions on the table and see if people could comment on
23 these in the remaining few minutes that we have. One is
24 this question of short run vs. long run competition and
25 what should be the focus, Hal, this is one of the points

1 you were bringing up at the end. Implicit in your
2 competition for the monopoly point, I think some people
3 have said:

4 What the antitrust enforcers should pay
5 attention to is competition to acquire the monopoly; once
6 the monopoly occurs, then you simply leave it alone and
7 then pay attention to the next phase of the competition
8 for the monopoly.

9 But is it not correct that 1) that is not a lot
10 difference in the sense that antitrust law generally
11 says, you know, "If you acquire a monopoly because of
12 your talent and all of that, then you are allowed to do
13 that. What we look for is bad conduct...", which is
14 always hard to identify, "...in connection with acquiring
15 the monopoly or maintaining the monopoly." But at any
16 rate, my question goes to do you presume that, in some
17 long-range basis, antitrust would forego further
18 enforcement?

19 And I want to contrast that with Dan. I took
20 some of your points -- and tell me if I am misreading
21 you, but I took some of your points as saying, "When it
22 is innovation, we need to look far into the future." And
23 I am wondering, is there a tension here in terms of the
24 time frame in which antitrust should be looking at, "What
25 is the conduct with which we are concerned?" Anybody?

1 MR. ARROW: Implicit in my presentation that I
2 was thinking that, as a recurring event, that you do not
3 have a once and for all monopoly. And the forces of --
4 for the reasons that Hal mentioned -- the forces of
5 competition may lead to a monopoly under increasing
6 returns and all these other things. But we do not want
7 that to be permanent in any situation because of the
8 demand for diversity -- or conditions change. And
9 particular technological conditions change, maybe demand
10 conditions too.

11 And you certainly do not want -- a permanent
12 existing monopoly is always sure to create situations in
13 which there is gross inefficiency and it would have been
14 better to prevent it in the first place. I mean, I
15 realize that the nature of the law is such that you look

1 of Hal Varian, I want to try to be provocative to the end
2 of the day, so I will just make a few comments. First of
3 all, with a lot of innovation, I think the stakes for the
4 antitrust enforcement are increased on both sides. The
5 benefit of encouraging the right kind of innovation is
6 that you move along a very different dynamic path. And
7 that can generate huge benefits.

8 The cost, if it is the wrong path, can be huge,
9 particularly because typically innovations, at least in
10 high tech, are not reversible. We cannot go back and, if
11 we find a problem five years down the road, and say,
12 "Let's just break up a company and put them back where
13 they were." So the stakes are really huge and I would
14 say generally vastly larger than in many of the static
15 kinds of mergers we look at.

16 So the bottom line is, for the reasons Ken
17 suggested in his comments, we really have to have a
18 longer time horizon because if we have an industry where
19 we are encouraging innovation which leads to a monopoly,
20 and that monopoly will then have an incentive to engage
21 in innovations which protect its monopoly position, the
22 benefits and costs of that are just going to be
23 phenomenal.

24 We just cannot -- whether one should intervene
25 is a difficult question, but I do not think we should

1 just put it off by saying it is too far in the future to
2 worry about. And I want to also say that the framework
3 and model that Ken was describing, all those issues which
4 I think are on the table are just compounded if we are
5 talking about a standard-setting world where we want to
6 encourage standard-setting because of all the benefits it
7 can bring about -- innovation and otherwise.

8 On the other hand, we have to understand that
9 when we help to support these standard-setting bodies, we
10 also create incentives which could deter entry for
11 parties that are playing in the game.

12 So everything Ken said in his story, I think,
13 is just compounded and made much more significant if we
14 are talking about competition for the market where we are
15 talking about standard-setting, which is why I am going
16 to be very interested to see what happens with the look
17 at the Music-net and Press-Play joint ventures in the
18 audio-streaming area. I think those are really
19 interesting issues and they are going to sort of put the
20 test to the division in this case, Sue, to sort of sort
21 out all these issues.

22 MS. DeSANTI: Hal?

23 MR. VARIAN: Yes, I was going to say on this
24 diversity point, it is also important to look at
25 incentives to invent around because if we take the Xerox

1 case that you brought up -- or I guess Rich brought it
2 up, sorry -- I mean, one could argue that there was a
3 great patent, there was a huge amount of effort that went
4 into invent around that patent, looking at various
5 technologies.

6 One technology was ink-jet technology which
7 never quite did it in the copier market, but ended up
8 being the right solution and a cost-effective solution in
9 the printer market. And of course it dominates
10 xerography in the color-printing market because it is
11 much easier to color print with ink-jet than with black
12 and white. And we might never have gone down that road
13 if Xerox had licensed its patent more liberally in the
14 early days.

15 So there was something you said for exploring
16 the design space and it is not so clear that, if you
17 believe in diversity, it is not so clear that licensing
18 helps you have more diversity, it helps you have less
19 diversity. But it may give you more cost-effectiveness.
20 So it is a trade-off here as well.

21 And, oh yes, I wanted to say a point about the
22 point Dan just made about what should we do in these
23 industries where you have got a monopolist who maybe
24 acquired the monopoly fair and square, or competed for
25 the monopoly and ended up with it because of scale

1 returns. I think you want to think about merger policy
2 very differently for those cases because, even if the
3 monopolist acquired that monopoly fair and square, the
4 danger then is extending that monopoly to other
5 industries and having undue leverage.

6 And I think you would want to analyze that
7 situation very very differently than you would other
8 kinds of mergers.

9 MS. DeSANTI: Rich, would you like to make our
10 final comment?

11 MR. GILBERT: Oh, gosh, if you put it that
12 way.

13 MS. DeSANTI: You began, we'll let you
14 conclude.

15 MR. GILBERT: I am not sure I want to do
16 that.

17 MS. DeSANTI: It better have great import, yes.

18 MR. GILBERT: I was just thinking about in the
19 context of this quality letter, or quality letter
20 competition and the acquisition to obtain a monopoly as
21 being part of the analysis of the subsequent monopoly --
22 I hate to bring these things too close to home -- but the
23 question I come to think of is would we want to change
24 our policies with respect to Microsoft under the basis
25 that, well, Microsoft had to compete to get this position

1 and therefore the consumers got some of the benefits.

2 I think one of the difficulties here is that we
3 rarely see an industry where it has a very regular
4 pattern of competing for a market and then experiencing
5 the benefits, and then something happening and competing
6 again. And I think when that does happen, it is a fairly
7 mature market.

8 So you have to separate that from these events
9 which often look pretty exogenous events or random events
10 that create a market in the first place, or create
11 dominance in the first place.

12 MR. VARIAN: Absolutely. I mean, I mean I
13 would say the Microsoft example is exactly what I was
14 thinking of when I raised some of those questions. And
15 it is interesting, I think, that Microsoft is running
16 into a problem of a maturing market in its core market
17 and a durable goods monopoly problem, in my opinion.

18 And then the question is how do you extend that
19 power they have to other areas? And that seems to me to
20 be the most critical issue. It is not so much the
21 monopoly in the Operating Systems market that is the
22 problem as it is the extension of monopoly. I think I am
23 one of the few people that can speak freely since I am
24 not involved in this case, but that is my analysis, at
25 least.

1 MS. DeSANTI: Yes, well, I was not going to say
2 anything about Microsoft, but this has provoked me to
3 think of one more question for all of you. As I think
4 about everything that you are saying, for the most part,
5 I believe that it fits within what I understand to be
6 current antitrust theory and application at the Federal
7 Antitrust Enforcement Agencies.

8 I am not aware of huge differences and I am
9 wondering if any of you have any areas in which you think
10 that there needs to be a radical change, or whether you
11 perceive it differently than I do.

12 MR. RUBINFELD: I just think as long as we
13 lock-in the Berkeley position at the Antitrust Division,
14 we will do fine. But beyond that, no, I actually think
15 seriously that we basically have -- the set-up is fine.
16 We have the tools we need. I do not think anything is
17 radically different myself.

18 MS. DeSANTI: Yes, Rich?

19 MR. GILBERT: This question of whether
20 intellectual property or, indeed, demands a different
21 framework for analysis is one that has been around for a
22 long time. And I think it is clear that the framework of
23 the analysis is the same, but I think there are lots of
24 issues -- and I imagine you will hear lots of issues
25 throughout the rest of the week and the rest of your

1 hearings -- where there will be arguments for looking at
2 things significantly differently.

3 I think these issues are unsettled and still
4 may require some different thinking.

5 MS. DeSANTI: Well, on the unsettled note,
6 then, will you please all join me in thanking our panel
7 of very distinguished speakers. We will start tomorrow
8 at 9:00 a.m. with a panel that will explore innovation
9 and patents. Thank you very much.

10 (Whereupon, the workshop was adjourned.)

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C E R T I F I C A T I O N O F R E P O R T E R

CASE TITLE: HEARINGS ON COMPETITION AND INTELLECTUAL
PROPERTY LAW AND POLICY IN THE KNOWLEDGE-BASED ECONOMY
HEARING DATE: FEBRUARY 25, 2002

I HEREBY CERTIFY that the transcript contained
herein is a full and accurate transcript of the notes
taken by me at the hearing on the above cause before the
FEDERAL TRADE COMMISSION to the best of my knowledge and
belief.

DATED: MARCH 8, 2002

KENT ANDREWS

C E R T I F I C A T I O N O F P R O O F R E A D E R

I HEREBY CERTIFY that I proofread the transcript
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