

# Exhibit 1

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1 UNITED STATES DISTRICT COURT  
2 NORTHERN DISTRICT OF CALIFORNIA  
3 OAKLAND DIVISION  
4  
5 THE APPLE IPOD iTUNES ) Lead Case No. C 05-00037  
6 ANTI-TRUST LITIGATION )  
7 )  
8 This Document Relates To: )  
9 ALL ACTIONS )  
10 )  
11 )  
12 )  
13 )  
14 )  
15 CONFIDENTIAL - ATTORNEYS' EYES ONLY  
16 VIDEOTAPED DEPOSITION OF KEVIN M. MURPHY, PH.D.  
17 VOLUME II  
18 January 08, 2014  
19 Phoenix, Arizona  
20  
21  
22 Reported By:  
23 Cathy A. Miccolis  
24 RPR, CRR, CSR No. 50068  
25 Job No. 10009198

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A P P E A R A N C E S

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21  
22  
23  
24  
25

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1 THE VIDEOTAPED DEPOSITION OF KEVIN M. MURPHY,  
2 Ph.D., VOLUME II, was continued on January 8, 2014,  
3 commencing at 9:11 a.m. at the offices of BONNETT,  
4 FAIRBOURN, FRIEDMAN & BALINT, P.C., 2325 East Camelback  
5 Road, Suite 300, Phoenix, Arizona, before CATHY MICCOLIS,  
6 a Certified Reporter in the State of Arizona.  
7  
8 THE VIDEOGRAPHER: The time on the record is  
9 9:11 a.m. Today's date is January 8, 2014. My name is  
10 Tom Tracy of Aptus Court Reporting. The court reporter is  
11 Cathy Miccolis of Aptus Court Reporting located at 600  
12 West Broadway, Suite 300, San Diego, California 92101.  
13 This begins the videotaped deposition of Kevin  
14 Murphy, Volume II, testifying in the matter of the Apple  
15 iPod iTunes Trust (sic) Litigation, pending in the  
16 District Court of California, Oakland Division, Case  
17 Number C 05-00037 YGR. This deposition is taking place at  
18 2325 East Camelback, Suite 300, Phoenix, Arizona 85016.  
19 Will counsel please identify themselves,  
20 starting with the plaintiffs' counsel.  
21 MS. SWEENEY: Bonny Sweeney for the plaintiffs.  
22 MR. KIERNAN: David Kiernan for Defendant  
23 Apple, and Scott Murray, in-house counsel from Apple, may  
24 be on the phone.  
25 Scott, are you on the phone?

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1 Okay. No answer.

2 THE VIDEOGRAPHER: Thank you, Counsel. The

3 court reporter may swear in the witness so we can proceed.

4

5 KEVIN M. MURPHY, Ph.D.,

6 having been first duly sworn to tell the truth, the whole

7 truth, and nothing but the truth, was examined and

8 testified as follows:

9

10 EXAMINATION

11 BY MS. SWEENEY:

12 Q. Good morning, Professor Murphy. We have met

13 before. My name is Bonny Sweeney. I'm going to be taking

14 your deposition again today in the Apple case.

15 MS. SWEENEY: Before we get started, I just

16 wanted to ask counsel for Apple a question. So I just

17 want to make sure, you have an open telephone line. I

18 want to know anyone who is on that line.

19 MR. KIERNAN: There is no one else on the line.

20 MS. SWEENEY: Okay.

21 MR. KIERNAN: It's just an open line for Scott

22 Murray, counsel from Apple, and if he joins, he will

23 announce himself.

24 MS. SWEENEY: Will there be any indication as

25 to when and who joins?

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1 Q. Okay. And for the -- and we will just refer to

2 that as the supplemental Murphy and Topel report, if

3 that's okay with you.

4 A. That's fine.

5 Q. So with respect to the supplemental Murphy and

6 Topel report, did both you and Professor Topel write the

7 report?

8 A. Yes, we worked on it together.

9 Q. And how does that work when two people are

10 writing a single document in your case, how does that

11 work?

12 A. We first talk about what it is we want to do

13 and what -- you know, what we are, what we are presenting

14 in the report. We then set out to write that up.

15 Obviously one person at a time writes. We don't sit next

16 to each other and write. So one of us will take a

17 different part and work on writing that part up. And then

18 the other one will review it, make changes, edits,

19 whatever, probably discuss it further back and forth

20 between us with writing and discussing material that's in

21 the report.

22 Q. And you said that "each of us would take

23 different parts." What part or parts did you have primary

24 responsibility for?

25 A. You know, I don't really recall. I don't

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1 MR. KIERNAN: There is a -- it makes a beeping

2 sound.

3 MS. SWEENEY: Okay.

4 BY MS. SWEENEY:

5 Q. So Professor Murphy, you remember that I

6 deposed you once before in this matter; correct?

7 A. Yes, I do.

8 Q. And that was in November of 2013?

9 A. Sounds about right, although I couldn't tell

10 you for sure.

11 Q. And since that deposition what work have you

12 done on the Apple case?

13 A. I have done the work that's reflected in the

14 declaration that I gave here. I have continued to read

15 through the declarations prepared by plaintiffs' experts,

16 both Professor Noll and Professor Wooldridge, and evaluate

17 those reports and the claims that are made therein.

18 Q. Okay. When you say you've done the work that's

19 reflected in the declaration, are you referring to the

20 supplemental report that you submitted together with

21 Professor Topel dated December 20, 2013?

22 A. Yes, because that was produced after our

23 earlier deposition, so when you asked me what we had

24 worked on since then, that was a component that I

25 definitely had worked on since that date.

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1 recall whether I had primary responsibility for one or the

2 other. I know I worked on the whole thing, so I don't

3 even remember which one I started with.

4 Q. Did anyone assist you and Professor Topel in

5 writing the supplemental report?

6 A. Yes, we had some assistance from Anita Garten

7 who we work with regularly. And certainly in preparation

8 in terms of the tables and other things that went in

9 there, other people, Ricardo Cossa would be a primary

10 person who worked on doing a lot of the programming and

11 statistical work based on our direction that's in the

12 report.

13 Q. Anyone else?

14 A. There would be others. I don't recall all the

15 people who worked on the statistical end of things. In

16 terms of drafting the report it would be me, Professor

17 Topel, Anita Garten. I believe other people looked at it

18 and gave us their thoughts. That would be Ricardo Cossa

19 and Bin Chen I believe would be the other one and possibly

20 Naraj.

21 Q. And when you and Professor Topel sat down to

22 put together the supplemental report, what were you

23 addressing in that report?

24 A. We -- I think we state right at the beginning

25 of the report, we address some of the issues that

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1 Professor Noll brought up in his -- I don't know exactly  
2 what the title of his rebuttal or his most recent report  
3 that was filed after our earlier reports. So we based our  
4 discussion there on the claims made by Professor Noll in  
5 his report. And we focused on the topics he discussed in  
6 his supplemental report or whatever the specific -- actual  
7 name of it is, not back to his original report, and we  
8 make reference to his original report only when it's  
9 needed for context. I think this is described directly in  
10 the report that we filed.

11 **Q. And in preparing the supplemental report, did**  
12 **you or staff at CRA take any additional statistical**  
13 **analysis?**

14 MR. KIERNAN: Object to form.

15 THE WITNESS: Yes, I believe there is  
16 statistical analyses presented in that report. Yes. So  
17 we did do statistical analysis for purposes of that  
18 report.

19 BY MS. SWEENEY:

20 **Q. Can you describe the analyses that you did?**

21 A. They are contained in the report. It mostly  
22 consisted of variations of the regression model that  
23 Professor Noll estimated, many of the variations we had  
24 done before. Although since he had changed the  
25 specification in some ways, it was a little different.

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1 **data that were in the Noll rebuttal report?**

2 A. No, I think we did -- I think we did some  
3 things that were different. I think the basic thrust of  
4 what we did was very similar. I believe we did some  
5 different things in this, in this report than we did in  
6 the other. They are not inconsistent with what we did  
7 before, but we did add some to that. But the biggest  
8 difference, particularly in terms of the regression  
9 models, would be the basis for those, would have been his  
10 new regression specification rather than the old one.

11 **Q. So what are the different things that you did?**

12 A. You know, I don't recall each one of them  
13 individually so there may be some that I leave out. For  
14 example, I know we did some F-tests on various blocks of  
15 coefficients in this draft that we had not done in the  
16 earlier one. We did I think two different versions of  
17 clustering in this particular report that we hadn't -- we  
18 had done just the single version before. We also examined  
19 the correlation of the residuals somewhat further from  
20 what we had done in the previous example. So we had done  
21 a few things different. I don't recall all of them off  
22 the top of my head.

23 **Q. So you said you did F-tests on blocks of**  
24 **coefficients. You hadn't done any F-tests prior to this**  
25 **supplemental report?**

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1 But the basic take of what we did there in terms of  
2 redoing his regression analysis was very similar to what  
3 we had done before. It just simply worked with his latest  
4 specification rather than the specification that was in  
5 his earlier report. I think the substance of what we  
6 discussed there is very similar. We went on and because  
7 he had changed the way he did his weighting and  
8 calculation of his standard errors, we went and did some  
9 new work using the same methodology to illustrate that  
10 there was still a correlation problem with his residuals  
11 from his regression. That would be different than what we  
12 had in the earlier report, not in the sense that the  
13 methodology is different, is because he had done something  
14 different. The specifics of the results would be somewhat  
15 different, although the basic conclusion would be the same  
16 that he continues to have a rather severe problem with  
17 correlation between different observations in his dataset  
18 that causes him to greatly understate the standard errors  
19 of his estimates.

20 **Q. So when you say you conducted some new work**  
21 **using the same methodology that you had used in your**  
22 **previous reports, and when I say reports here I'm**  
23 **referring to the earlier Murphy and Topel reports, am I**  
24 **correct in sort of rephrasing to say that you didn't**  
25 **conduct any new tests, but you just used the different**

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1 A. I think -- I don't know if we did some F-tests  
2 or not. I know we did some specific ones here I believe  
3 than we did before.

4 **Q. And are those reflected in the report?**

5 A. Yes, they are reflected in I believe Table 5.  
6 It's JT-5 or something like that is the table that has  
7 those.

8 **Q. And then you said you did two different**  
9 **versions of clustering, whereas in your prior report you'd**  
10 **only done one different version of clustering. What do**  
11 **you mean by that?**

12 A. In this one we did I believe clustering by  
13 family as opposed to by family quarter. I think if I  
14 recall correctly, that's -- I don't want to -- it's either  
15 JT-3 or JT-4. I can't remember which one, but we did that  
16 in this report.

17 **Q. And did you also do clustering by family**  
18 **quarter?**

19 A. Yes. That's a primary thing, but that's what  
20 we had done before, so that wouldn't be different. That  
21 was how we had done it previously.

22 **Q. And when you say "family," what are you**  
23 **referring to?**

24 A. It's the iPod family, which is a categorization  
25 that Apple uses to distinguish different models of their

1 iPod, so it might be like an iPod mini, second generation,  
2 given quality level, say good, better or best, one of  
3 those.

4 **Q. And then you said that you also examined**  
5 **correlation of residuals in a way that you hadn't before.**  
6 **Can you explain that a little more?**

7 A. I don't recall everything that we put -- that's  
8 in the report, so I just know that we redid that analysis  
9 based on his new results, and I'm not sure everything we  
10 did there is exactly the same as what we did before. I'd  
11 have to go back and look at the report to tell you.

12 **Q. You also testified that you evaluated the**  
13 **plaintiffs' experts' declarations, including the**  
14 **Wooldridge report. Have you done any subsequent**  
15 **statistical analysis since reviewing the Wooldridge**  
16 **report?**

17 A. Yes, I have. I have looked at the data to  
18 evaluate whether his claims are correct or not, and I  
19 think the data overwhelmingly say that his claims are  
20 incorrect.

21 **Q. And when you say you looked at the data, what**  
22 **data did you look at?**

23 A. The data based on Professor Noll's regression  
24 data in his regression model.

25 **Q. And do you have -- do you anticipate doing any**

1 **have considered in preparing his or her report. And**  
2 **paragraph 6 of the stipulation order should not be**  
3 **construed to preclude reasonable questions at deposition**  
4 **going to the expert's compensation, hours expended in**  
5 **preparing his or her report and testimony and frequency**  
6 **and duration of meetings with counsel.**

7 **So what I'm getting at is I think that counsel**  
8 **for Apple has construed overly broadly the restrictions of**  
9 **the stipulation. So let me ask you again --**

10 MR. KIERNAN: Bonny?

11 MS. SWEENEY: Yeah.

12 MR. KIERNAN: I'm happy for you to ask him  
13 about the categories in 5 or 6, but your question was  
14 whether or not he has been asked to or that he will submit  
15 any additional writing in response to either Drs. Noll's  
16 or Wooldridge which is not covered by Categories 5 or 6.  
17 So you can ask him about 5 or 6.

18 MS. SWEENEY: Let me ask you, David, is there  
19 anything in the stipulation that prohibits oral questions  
20 at deposition about the expert's discussions with the  
21 attorneys? I see it talks about documents. I don't see  
22 anything that says I can't ask him what the lawyers asked  
23 him to do. If you can point that out to me, maybe I'm  
24 missing it, but I don't see it.

25 MR. KIERNAN: Well, I will pull out previous

1 **further writing of reports or presenting of analyses that**  
2 **will reflect your conclusions regarding Professor**  
3 **Wooldridge's analysis?**

4 MR. KIERNAN: And I'm going to object and  
5 instruct the witness not to answer any, to the extent it  
6 reveals any communication or requests from counsel. So  
7 I'm instructing you not to answer the question to the  
8 extent that it would reveal requests from counsel.

9 BY MS. SWEENEY:

10 **Q. Are you going to answer the question?**

11 A. I have been instructed not to answer, so...

12 **Q. Well, let's break that up a little bit. So the**  
13 **stipulation in this case says that certain categories of**  
14 **data, information, documents and materials need not be**  
15 **produced, and that includes written correspondence between**  
16 **an expert and the attorneys, notes taken and prepared by**  
17 **or for an expert in connection with the matter, including**  
18 **notes of conversations with the attorneys, but then the**  
19 **stipulation goes on to say, and what I was paraphrasing**  
20 **was in paragraph 3 of the stipulation, goes on to say**  
21 **paragraph 3 -- excuse me, paragraph 5 says, nothing in**  
22 **paragraph 3 however shall be construed to prevent**  
23 **substantive deposition questions with respect to**  
24 **alternative theories, methodologies, variables, data,**  
25 **production of materials or assumptions that the expert may**

1 objections and instructions that you gave Dr. Noll,  
2 relying upon --

3 MS. SWEENEY: Good luck with that. I never  
4 stopped him from answering those kind of questions.

5 MR. KIERNAN: Are you going to continue to  
6 interrupt me?

7 MS. SWEENEY: No. Go ahead. Let's create this  
8 record.

9 MR. KIERNAN: Okay.

10 -- instructing him not to answer questions  
11 about communications between counsel and himself. And Xan  
12 Bernay also instructed Dr. Martin not to answer any  
13 questions about communications that she had or that you  
14 had with Dr. Martin --

15 MS. SWEENEY: Well --

16 MR. KIERNAN: -- based on the stipulation.

17 MS. SWEENEY: Are you done? I'm sorry. I  
18 don't want to interrupt you.

19 MR. KIERNAN: I am done.

20 MS. SWEENEY: I don't believe that that's a  
21 proper interpretation of the stipulation, and to the  
22 extent you let that pass, I can't explain that. I'm sure  
23 I never instructed Professor Noll not to answer your  
24 questions on that basis. And if you can point me to some  
25 deposition testimony, I would be very, very surprised

1 because that is just completely false. So if you're  
2 instructing the witness not to answer, that is an improper  
3 instruction, and I will take it to the court. So let me  
4 make sure the record is clear on this.

5 BY MS. SWEENEY:

6 Q. Professor Murr- -- strike that.

7 Professor Murphy, are you on the advice of  
8 counsel for Apple refusing to answer my question about  
9 communications that you had with Apple's counsel about  
10 work that you have performed or will perform in this  
11 matter?

12 A. Yeah, I'm taking the advice of the counsel for  
13 Apple. Since I'm not a lawyer, I can't tell you all the  
14 interpretation, and I can -- best I can do is go with the  
15 advice of counsel.

16 Q. So you're refusing to answer any question that  
17 I ask about instructions given to you by counsel for  
18 Apple?

19 A. If that's what I'm instructed to do by counsel  
20 for Apple, that's presumably what I should do.

21 Q. So if counsel for Apple has instructed you or  
22 provided information to you that you've relied on, are you  
23 going to refuse to answer questions about that based on  
24 the advice of counsel?

25 MR. KIERNAN: Objection. Object to form.

1 anticipate doing in this matter?

2 A. I anticipate continuing my work, evaluating the  
3 claims made by Professor Noll and by Professor Wooldridge,  
4 that's ongoing, and I can -- I would, I would presume that  
5 I would continue to do that in the coming days and weeks  
6 and however long it takes.

7 Q. Are you writing a report to be submitted next  
8 week in opposition to plaintiffs' motion to exclude  
9 portions of your testimony and Professor Topel's  
10 testimony?

11 A. I don't know whether there is going to be a  
12 report submitted or not. I -- I know I'm continuing to do  
13 work. And there is a possibility that that would lead to  
14 a report. I would understand, but I can't tell you  
15 whether there is going to be one submitted or not.  
16 That's -- I'm just going to do my work and continue to try  
17 to evaluate the claims of plaintiffs' experts.

18 Q. Did you receive input from Apple's counsel in  
19 your report, your supplemental report?

20 A. What do you mean by received input from them?  
21 They gave -- they gave us comments. That's pretty much  
22 standard on drafts of the report. I don't know. Usually  
23 that's covered by stipulation, the specifics of those  
24 comments, but again, you guys are the lawyers, so, yes, we  
25 did discuss the report and the contents of the report with

1 THE WITNESS: I --

2 MR. KIERNAN: And that was not the instruction  
3 I gave.

4 THE WITNESS: -- will do my best to answer your  
5 questions. If there are specific things that I'm not  
6 supposed to answer because they are covered by  
7 stipulation, the best I can do to comply with the desires  
8 of the court I see is to try to follow those directions to  
9 the best I can, and for that I need to rely on counsel.

10 MR. KIERNAN: And just so the record is clear,  
11 I have not made a broad objection as you're stating --  
12 that you're suggesting that Dr. Murphy -- this should go  
13 question by question, and if there is a question you want  
14 to ask him about whatever you want to ask him, then we  
15 will go question by question, and if I feel that it's  
16 violating or outside the stipulation, I will assert the  
17 objection and instruct the witness not to answer. If I  
18 feel that it's not covered by the stipulation, then I  
19 won't assert the objection.

20 MS. SWEENEY: Well, this is an issue on which  
21 we strongly disagree. I think that we will just see how  
22 it goes, but this is something we will probably have to  
23 raise with the Court.

24 BY MS. SWEENEY:

25 Q. Professor Murphy, what additional work do you

1 counsel.

2 Q. Did you adopt the suggestions of Apple's  
3 counsel in your supplemental report?

4 A. Not really.

5 Q. Did they write any of the report, that is,  
6 Apple's counsel?

7 A. No.

8 Q. Did you write or did Professor Topel write all  
9 of the supplemental report?

10 A. No, there would have been help from -- I  
11 believe Anita Garten helped. Ricardo Cossa maybe did a  
12 little bit. I know he provided some comments and edits,  
13 but I would say we wrote the report between Bob and  
14 myself. Some of the cites and footnotes were filled in by  
15 people. We would say cite to a particular document or  
16 particular book or chapter. We wouldn't necessarily know  
17 the exact title it would be, you know, cite to Angrist and  
18 Pischke. Somebody would have to fill it in with the  
19 entire Angrist and Pischke cite. So if you consider that  
20 writing a report, other people filled in the rest of those  
21 footnotes and things like that. But the substance was  
22 written by Bob and myself.

23 Q. How long -- strike that.

24 How many hours did you spend preparing the  
25 supplemental report?

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1 A. I don't recall.  
2 **Q. More than 10?**  
3 A. Yeah, it would have been more than 10.  
4 **Q. More than 100?**  
5 A. It would have been less than 100.  
6 **Q. Less than 50?**  
7 A. I would assume so.  
8 **Q. Less than 40?**  
9 A. That I -- now we are getting down to -- my  
10 level of resolution I think is about that level.  
11 **Q. Do you know how much time Professor Topel spent**  
12 **on it?**  
13 A. I do not. You'd have to ask him.  
14 **Q. Is there anything today that you would like to**  
15 **revise or correct in your supplemental report?**  
16 A. Nothing that specifically I'm aware of, no.  
17 **Q. Is there anything in your prior report that you**  
18 **want to correct or revise?**  
19 A. No, not that I'm aware of.  
20 **Q. Have you reviewed the Wooldridge deposition**  
21 **transcript?**  
22 A. I skimmed through it. I just got it yesterday,  
23 and I was busy at school with things yesterday, so I only  
24 had a chance to skim through it.  
25 **Q. And did you review the deposition transcript**

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1 pricing that he leaves out which biases his results and  
2 causes him to misestimate the impact of any of the iTunes  
3 7.0 release. He continues to use the wrong but-for world  
4 and the wrong specification of the impact of iTunes 7 on  
5 iPod prices.  
6 The basic methodology he continues to use is  
7 greatly flawed because of the fact that again his  
8 estimates are not isolating the impact of the challenged  
9 conduct, that simultaneous with the release of iTunes 7  
10 other things in the marketplace changed, including the  
11 models being offered by Apple, the characteristics of  
12 those products, and rendering his analysis sort of invalid  
13 conceptually. Those are the ones I remember. There might  
14 be some more conclusions, but those are the basic ones.  
15 **Q. And are the bases for all of the opinions that**  
16 **you've just summarized set forth in your supplemental**  
17 **report?**  
18 A. Yes. I think we tried to summarize the bases  
19 for those opinions at the time we wrote the report, yes.  
20 **Q. Now, you said that Professor Noll has continued**  
21 **to overstate the significance of his results, and you say**  
22 **that there is a strong degree of correlation. Did you**  
23 **rely upon any economic literature other than the**  
24 **literature you cited in your first report to support your**  
25 **conclusions regarding the clustering?**

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1 **from Professor Noll's deposition?**  
2 A. I did. I did, but that was a while back.  
3 **Q. Can you summarize for me the opinions that are**  
4 **stated in your supplemental report?**  
5 A. Probably not all of them. I mean, I think  
6 there is some basic ones. One is I think the first and  
7 foremost is Professor Noll has continued to overstate the  
8 significance of his results by un -- by failing to account  
9 for the strong degree of correlation across transactions,  
10 and that's a very substantial error. It results in him  
11 calculating standard errors that are roughly 100 times too  
12 small. I mean, not always exactly that. Sometimes a lot  
13 more; sometimes less. But it's a gross misestimate of the  
14 precision of his estimates.  
15 That the -- his reasons for not taking account  
16 of the correlation are invalid, and we go through each of  
17 those in the report. The residuals at the family by  
18 quarter level are demonstrably correlated to a high  
19 degree. The fact that he has all the transactions,  
20 actually nearly -- or nearly all the transactions, what he  
21 calls it's a population rather than a sample doesn't  
22 diminish the need to account for the correlation that's  
23 present in the data that he has.  
24 That he continues to have omitted variables in  
25 his regression, that important determinants of iPod

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1 A. I don't recall what all we cited in our first  
2 report. There is certainly a broad economic literature  
3 that supports what we put forward there. I would say what  
4 we cite here is certainly you could find other cites that  
5 would echo the same points. The articles we have cited,  
6 you know, sort of Cameron and Miller and Donald and Lang  
7 and Angrist and Pischke and the Hansen, Chris Hansen's  
8 work, I mean a number of things that we have referred to  
9 and looked at all support the same thing.  
10 If you want to see more, I think Cameron and  
11 Miller have a pretty extensive discussion of the  
12 underlying further literature that you might want to look  
13 at if you wanted more literature, but we didn't cite those  
14 directly.  
15 **Q. Do you consider yourself an expert on**  
16 **clustering issues?**  
17 A. I would consider myself an expert at applied  
18 econometrics generally and in particular methods to be  
19 used for these type of data. I have spent my career  
20 analyzing aggregate -- more aggregated phenomena using  
21 microdata, so this is an area I'm very familiar with. So  
22 it's something that I would say, yeah, I would consider  
23 myself very well versed in.  
24 **Q. Have you ever written any articles that have**  
25 **been published specifically relating to clustering?**

1 A. I don't think I published any specific articles  
2 on clustering. I have certainly talked about how you use  
3 data of this type where you have market-level phenomena  
4 you're interested in and micro-level data used to estimate  
5 it.

6 I did a lot of well-cited work on the wage  
7 structure, which we made exactly the point that we are  
8 talking about here, that even though you might have  
9 hundreds of thousands of observations from underlying  
10 datasets, when it comes to estimating the determinants of  
11 market prices, you have much less data because in fact you  
12 only have data on a limited number of market equilibrium.  
13 And that's exactly the same point that's being made here.  
14 And my work in that area goes back probably almost 30  
15 years.

16 Q. Now, why don't we go ahead and mark the  
17 supplemental report as Murphy Exhibit 6, because there  
18 were five exhibits marked in your prior deposition.  
19 (Exhibit 6 marked.)

20 Q. Now, you said that you and Professor Topel  
21 jointly wrote the report; correct?

22 A. That's correct.

23 Q. For those parts that you didn't yourself write,  
24 do you agree with them?

25 A. Yeah, I mean, I worked on every part of the

1 Q. Professor Noll disagrees with you that there is  
2 a clustering problem; isn't that correct?

3 A. Yes, but he disagrees by just denying it, not  
4 by presenting evidence that there is no correlation. He  
5 doesn't -- he doesn't calculate the correlation and say,  
6 look, the correlation is low. He never -- he never does  
7 that. I mean, we present a graphical representation of  
8 just how highly correlated the residuals are and uses --  
9 you know, he just asserts things without really doing any  
10 analysis.

11 Q. That's interesting.

12 Did you perform any cluster analyses that are  
13 not presented in your exhibits?

14 A. What does that mean?

15 Q. Well, you and your staff at CRA performed some  
16 analyses on the clusters; correct?

17 A. We have continued to work on the clustering  
18 analysis. Well, it's actually not really the clustering  
19 analysis. Analysis of Professor Noll's model and analysis  
20 of the error terms in that model and their properties. So  
21 we have continued to work on that subsequent to the  
22 report. Is that what you're asking?

23 Q. No. What I want to know is, did you perform  
24 any analyses that relate to your opinion regarding  
25 clustering that are not presented in the tables in your

1 report. I mean, we didn't like write them and then glue  
2 them together and send them in. We worked on them back  
3 and forth. We talked about it before we ever wrote  
4 anything. Even if one of us wrote the paragraph the first  
5 time, the other one went through it, and we ended up with  
6 something we were both satisfied with.

7 Q. So you agree with all the statements in the  
8 report; is that correct?

9 A. To the best of my knowledge, yes.

10 Q. In paragraph 5.a., you say that Professor Noll  
11 simply ignores the clustering problem. In your opinion  
12 did Professor (sic) in his rebuttal --

13 MR. KIERNAN: Page 2.

14 BY MS. SWEENEY:

15 Q. -- report ignore the clustering problem?



1 supplemental report?

2 A. Are you referring to analyses done before the  
3 report or after the report?

4 Q. Let's start with before the report.

5 A. Yeah, I'm sure we did additional analyses that  
6 we are not relying on. I don't -- there is nothing that  
7 would be inconsistent with what we have done there. There  
8 are often many ways to do things, and when it comes time  
9 to write a report, you settle on one that you think  
10 accurately what you did. But nothing that I'm relying on,  
11 no.

12 Q. And is that true also for your initial report,  
13 that is, that you conducted certain analyses relating to  
14 your clustering opinions that are not reflected in the  
15 tables and exhibits attached to your report?

16 MR. KIERNAN: Objection; argumentative.

17 THE WITNESS: Nothing that I would be relying  
18 on.

19 BY MS. SWEENEY:

20 Q. But nonetheless, is it your testimony, let's  
21 start with the supplemental report, that those analyses  
22 that are not reflected in your exhibits in which you're  
23 not relying on are nonetheless consistent with your  
24 opinions?

25 A. Yes, I would say the analysis we have done is



And we settled on quarter  
 6 because we thought it represented a reasonable compromise  
 7 between taking account of that correlation while still  
 8 allowing for some independence over time. I think that's  
 9 the best justification you have for focusing on quarters.  
 10 If somebody wanted to aggregate further, I think that  
 11 could be reasonable. I think aggregating less is going in  
 12 the wrong direction. I think I would continue to stand by  
 13 that. And certainly doing what Professor Noll did because  
 14 it neither aggregates over time nor across transactions at  
 15 a point in time doesn't make any sense.

16 BY MS. SWEENEY:

17 **Q. So you think it's going in the wrong direction**  
 18 **to cluster at any shorter time interval, but you don't**  
 19 **know in fact whether your staff at CRA conducted the**  
 20 **clustering analysis by week; correct?**

21 MR. KIERNAN: Object to form.

22 THE WITNESS: I don't believe they did because  
 23 I didn't ask them to do that because I wouldn't have  
 24 thought going in that direction made much sense. It's not  
 25 something that would tell -- economics or the data or the

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1 allow for clustering.

2 Or when people analyze -- go back to the  
 3 original work of Fama and McBeth. They have -- you know,  
 4 they have all the stock market data. They have all the  
 5 closing prices on a daily basis for all the stocks in  
 6 their universe. They don't have a sample of dates. They  
 7 got every date, and they have got, you know, all the  
 8 stocks in their universe. They didn't draw -- they didn't  
 9 draw a random sample. They had that. And Fama and  
 10 McBeth, they essentially did original work actually kind  
 11 of related to clustering. They used a different  
 12 methodology, but they were concerned with exactly that  
 13 same phenomena.

14 **Q. Anything else?**

15 A. I mean, there is bunches of them, but there is  
 16 nothing, there is nothing unusual about that, about doing  
 17 it.

18 I think Professor Wooldridge in his textbook  
 19 talks about the Michigan teachers and clustering in the  
 20 context of --

21 (A brief interruption.)

22 A. So he has one on Michigan teachers I believe in  
 23 his textbook where again he is dealing essentially with  
 24 population data. So yeah, it's not hard to find examples  
 25 of that.

1 documents or anything in this case would tell me to move  
 2 in that direction. So that's not something I would have  
 3 instructed them to do, at least as I recall. I can't tell  
 4 you what all -- anything they did, but not that I know of.  
 5 It's the best answer I can give.

6 BY MS. SWEENEY:

7 **Q. You testified a little bit ago about the**  
 8 **difference that Professor Noll asserted between samples of**  
 9 **data and the population of data. Are you familiar with**  
 10 **any other instance in which the kind of adjustment that**  
 11 **you performed with respect to the standard errors was used**  
 12 **to adjust standard errors for clustering when the dataset**  
 13 **was a population rather than a sample?**

14 A. Yeah. I mean, for example, in Professor  
 15 Wooldridge's work that he did on unilateral divorce, the  
 16 sample -- the data on divorce there are population. They  
 17 are the divorces that occurred in each state from vital  
 18 statistics, which is a population, not a, not a sample.  
 19 The --

20 **Q. Anything else?**

21 A. Yeah. I mean, in like price-fixing cases and  
 22 things like that where you have all the transactions for a  
 23 company, you don't -- and you're doing a price analysis,  
 24 you typically don't treat all the prices as independent  
 25 because they are determined by common factors. You would

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1 **Q. So I asked you whether you tested weekly -- I**  
 2 **asked about weekly. Did I ask about monthly clusters?**  
 3 **Did you conduct that analysis?**

4 A. You know, I don't recall whether we did or not.  
 5 It's not something I remember. We might have done that as  
 6 a sensitivity check back when. It's not something I have  
 7 done recently. Might have done that before the first  
 8 report, but I don't recall one way or the other.

9 **Q. But if you --**

10 A. It's not relying on it for sure.

11 **Q. If you did do that, it's not reflected in the**  
 12 **report or its exhibits or attachments; correct?**

13 A. Yeah, because I wasn't relying on that. I  
 14 don't recall doing it specifically, but I don't want to  
 15 say something that's not true, so best I can say is I  
 16 don't recall.

17 **Q. So you don't know whether if you created**  
 18 **clusters at the weekly level, for example, the results**  
 19 **would be statistically significant?**

20 A. Yeah, but --

21 MR. KIERNAN: Object to form.

22 THE WITNESS: But if you do that and find the  
 23 standard errors fall significantly, it's mostly because of  
 24 the fact that you have inappropriately ignored correlation  
 25 that exists in the data. So that's what I'm saying. It's

1 that if you wanted to. You could do lots of different  
2 things. But the whole point is his analysis is not valid.  
3 He assumes that they are independent regardless of which  
4 one you did.

5 BY MS. SWEENEY:

6 **Q. If you have a situation where there are no**  
7 **clusters and you do this kind of clustering analysis, is**  
8 **that harmless error in your view?**

9 A. You know, I'm going to say, I think it's, I  
10 think it's -- if you suspect there is correlation, which  
11 we have strong reason to do in this case, economics tells  
12 us there will be correlation, the data tells us there is  
13 correlation, the documents in this case tells us there is  
14 going to be correlation, there is just so overwhelming  
15 prior that there will be correlation, then I think it's  
16 proper to allow for that correlation. I think that is the  
17 only prudent approach. To just bury your head in the sand  
18 and ignore the fact that they are correlated as Professor  
19 Noll does doesn't make any sense.

20 **Q. I'm going to move to strike as nonresponsive,**  
21 **and I'm going to ask the court reporter to read my**  
22 **question back.**

23 MR. KIERNAN: I oppose the motion.

24 (Record read.)

25 THE WITNESS: I don't want to -- here is what I

1 say there is very little downside to allowing for that  
2 clustering, and the reason is it doesn't create a bias.  
3 It doesn't bias your standard errors upward. If anything,  
4 it's going to tend to make your standard errors a little  
5 bit smaller is what the literature suggests. It's not  
6 generally going to lead to an upward bias in your standard  
7 errors.

8 BY MS. SWEENEY:

9 **Q. Now, you added a number of characteristics to**  
10 **Professor Noll's regression; correct?**

11 A. Yes, this -- that's not new to this report. We  
12 had done that in the previous report as well.

13 **Q. And are the -- where in your report are those**  
14 **characteristics listed?**

15 A. Well, they are listed in the regression tables  
16 themselves.

17 **Q. Okay. Point to me a particular table that --**

18 A. Like just go to -- well, might as well just  
19 start at the beginning. Go to Table 1. They are listed  
20 at the bottom of the table. Well, not the very bottom,  
21 but the bottom of the coefficient portion. See where  
22 there is like a white space in the first three columns and  
23 then there is numbers in the last two columns? Those  
24 would be the additional characteristics.

25 **Q. So the first one is HP\_OEM?**

1 wanted to say is, it's -- the right way to proceed is to  
2 allow for the correlation if you think it's going to be  
3 there. You wouldn't want to allow for correlation if you  
4 had no reason to believe it were there. That doesn't make  
5 a whole lot of sense, but when economics tells you there  
6 is going to be correlation, when the facts of the case  
7 tells you there is going to be correlation, you should  
8 allow for that correlation.

9 Now, is it harmless? I should say it's the  
10 opposite of harmless. It's necessary; it's needed. And  
11 there is no reason to believe there isn't correlation in  
12 this case. You would expect that there would be  
13 correlation.

14 BY MS. SWEENEY:

15 **Q. Okay. Well, listen to my question. If you**  
16 **have a case where there is no reason to believe there is**  
17 **correlation and you conduct this kind of clustering, is**  
18 **that harmless error in your view?**

19 MR. KIERNAN: Objection; asked and answered.

20 THE WITNESS: I would say it will not -- if we  
21 do it -- I don't want to apply it to an abstract world  
22 other than this one. In the context like this given the  
23 number of clusters that we have, which is upwards of 300  
24 in one case and upwards of 400 in the other case, and  
25 given the nature of the data that we have here, I would

1 A. Correct. And it runs down to  
2 log\_recharge\_hours.

3 **Q. What is HP\_OEM?**

4 A. That was the specific iPods that were I believe  
5 HP-branded at one point in time, so they were a little bit  
6 different. So that allows for it was an OEM iPod as  
7 opposed to an Apple iPod. That sort of refers to some  
8 specific models.

9 **Q. What about -- what is USB?**

10 A. USB is whether the Ap- -- whether the iPod is  
11 USB-compatible. Some of the early generation iPods were  
12 not USB-compatible. They were FireWire based.

13 **Q. And so the next one, FireWire, is that sort of**  
14 **the opposite then of USB? Either it has USB or it has**  
15 **FireWire?**

16 A. No. There was some that I think had both,  
17 which is why there -- both effects can be there. The  
18 majority either had one or the other as I recall, and I  
19 don't remember the fraction that had both. There were  
20 some particular models as I recall that had both. That's  
21 why they are both in there.

22 **Q. So do you know whether all iPods sold to class**  
23 **members during the class period had USB capability?**

24 A. I'd have to go back and check. I don't recall.  
25 But that doesn't affect whether you'd want a control for

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1 (Concluded at 12:07 p.m.)

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1 DECLARATION UNDER PENALTY OF PERJURY

2 Case Name: The Apple iPod iTunes Anti-Trust Litigation

3 Date of Deposition: 1/8/2014

4 Job No: 10009199

5

6 I, KEVIN M. MURPHY, Ph.D., the witness herein,

7 declare under penalty of perjury that I have read the

8 foregoing in its entirety; and that the testimony

9 contained therein, as corrected by me, is a true and

10 accurate transcription of my testimony elicited at said

11 time and place.

12 Executed this \_\_\_\_ day of \_\_\_\_\_,

13 2014, at \_\_\_\_\_.

14

15 \_\_\_\_\_

16 KEVIN M. MURPHY, Ph.D. Date

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1 DEPOSITION ERRATA SHEET

2 Page No. \_\_\_\_ Line No. \_\_\_\_

3 Change: \_\_\_\_\_

4 Reason for change: \_\_\_\_\_

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24 \_\_\_\_\_ Dated

25 KEVIN M. MURPHY, PH.D.

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1 STATE OF ARIZONA )

2 ) ss.

3 COUNTY OF MARICOPA )

4 BE IT KNOWN that the foregoing deposition was

5 taken before me, Cathy A. Miccolis, RPR, a Certified

6 Reporter, Certificate #50068, for the State of Arizona,

7 and by virtue thereof authorized to administer an oath;

8 that the witness before testifying was duly sworn by me to

9 testify to the whole truth; that the questions propounded

10 to the witness and the answers of the witness thereto were

11 taken down by me in shorthand and thereafter reduced to

12 print by computer-aided transcription under my direction;

13 that pursuant to request, notification was provided that

14 the deposition is available for review and signature; that

15 the transcript consisting of pages 233 through 348 is a

16 full, true and accurate transcript of all proceedings and

17 testimony had and adduced upon the taking of said

18 deposition, all done to the best of my skill and ability.


19 I FURTHER CERTIFY that I am in no way related to

20 nor employed by any of the parties hereto nor am I in any

21 way interested in the outcome hereof.

22 DATED at Phoenix, Arizona, January 9, 2014.

23

24   
Cathy A. Miccolis, RPR, CRR  
Certified Reporter #50068

25