

EXHIBIT B

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15 UNITED STATES DISTRICT COURT
 16 NORTHERN DISTRICT OF CALIFORNIA
 17 SAN FRANCISCO DIVISION

18 UNITED STATES OF AMERICA

19 v.

20 AU OPTRONICS CORPORATION;
 21 AU OPTRONICS CORPORATION AMERICA;
 22 HSUAN BIN CHEN, aka H.B. CHEN;
 23 HUI HSIUNG, aka KUMA;
 24 LAI-JUH CHEN, aka L.J. CHEN;
 25 SHIU LUNG LEUNG, aka CHAO-LUNG
 26 LIANG and STEVEN LEUNG;
 27 BORLONG BAI, aka RICHARD BAI;
 28 TSANNRONG LEE, aka TSAN-JUNG LEE and
 HUBERT LEE;
 CHENG YUAN LIN, aka C.Y. LIN;
 WEN JUN CHENG, aka TONY CHENG; and
 DUK MO KOO,

Defendants.

No. CR-09-0110 SI

DRAFT -- DECLARATION OF DR.
 KEITH LEFFLER REGARDING
 AUO's U.S. VOLUME OF
 COMMERCE FOR SENTENCING
 HEARING

Date: September 14, 2012
 Time: 11:00 a.m.
 Court: Hon. Susan Illston
 Place: Courtroom 10, 19th Floor

- 1 1. I am Keith Leffler. I testified in the U.S. Department of Justice case against AUO. My
2 experience and background were summarized therein.
- 3 2. I have been asked by the Department of Justice to calculate the total dollar sales of the
4 AUO LCD panels named in the AUO Superseding Indictment ("Indictment panels") that
5 were incorporated into computer monitors, notebook computers, or televisions sold in the
6 United States (hereafter "AUO US VoC") over the period October 2001 through
7 December 1, 2006.¹
- 8 3. To make this calculation, I have relied on data from five large U.S. PC OEMs: Dell, HP,
9 Apple, Gateway and IBM. Using these data, I estimate the AUO US VoC for these five
10 OEMs. I then extrapolate for the rest of the US PC market using data from Gartner
11 Dataquest, the same data source I relied upon during my trial testimony in making my
12 estimate of the U.S. affected commerce. Leffler Tr. 3313-14. I estimate that AUO made
13 sales of Indictment panels of over \$2.34 billion that were incorporated into products sold
14 in the United States.² This is a conservative estimate because it includes only AUO
15 panels that were incorporated into computer monitors and notebook computers. It does
16 not include any of AUO's panels that were incorporated into televisions sold in the
17 United States because I have not found data sufficient to make a reliable estimate of those
18 sales.
- 19
20

21 ¹ This is the period in which AUO participated in conspiratorial activity including group Crystal
22 Meetings (through January 2006) and bilateral meetings (through November 2006). In my trial
23 testimony, I found that the group Crystal Meetings had a substantial effect on prices. Leffler Tr. 3274,
24 3282. After those group meetings ended, the conspirators during their bilateral meetings continued to
25 exchange the same kind of price information that they had exchanged in the group meetings. Kuan Tr.
26 3792-96. And during this bilateral meeting time period, AUO continued to rely on the price information
27 it was receiving from its conspirators when setting its own panel prices. *E.g.*, trial exhibits 106T, 107,
28 108, 111, 112, 189. Therefore, in my opinion, the conduct during this bilateral meeting time period had at
least some effect on AUO's panel prices.

² For my trial testimony, I calculated the direct imports of AUO Indictment panels into the United States
of \$154 million. See trial exhibit 776. However, because I do not know how much of these panels might
be included in the final product calculations, I have not included any additional volume of commerce
from such directly imported panels.

- 1 4. I discuss the details of the calculations of AUO US VoC for each of these five OEMs, as
2 well as my estimate of the total AUO US VoC.

3 **Dell**

- 4
5 5. A number of data files from Dell were analyzed: DELL-00615008.xls; DELL-
6 00615009.xls; DELL-00615010.xls; DELL-00615011.xls; DELL-00615012.xls; DELL-
7 00615015.xls; DELL-00615018.xls; DELL-00615019.xls; DELL-00615021.xls; DELL-
8 00615023.xls; DELL-00615024.xls; DELL-00615026.xls; DELL-00615028.xls; DELL-
9 00615029.xls; DELL-00615032.xls; DELL-00615034.xls; DELL-00615036.xls; DELL-
10 00615039.xls; DELL-00615042.xls; DELL-00615043.xls; DELL-00615045.xls;
11 DELL-01278733-HIGHLY CONFIDENTIAL-GLOVIA_dm2gp_620687_records.txt;
12 DELL-01278735-HIGHLY CONFIDENTIAL-GLOVIA_mm2gp_2315321_records.txt;

- 13 6. The accounts receivables files contain Dell worldwide monitor panel purchases from
14 2004 to June 2005. The GLOVIA text files contain Dell worldwide monitor panel
15 purchases from June 2005 through December 1, 2006, Dell monitor purchases by region,
16 and Dell notebook panel purchases for Dell notebooks shipped to North and South
17 America. GLOVIA is Dell's inventory database. Duplicate records from the accounts
18 receivables files and the GLOVIA files in June 2005 were removed.

19
20 AUO Indictment panel purchases in Dell notebooks shipped to the U.S.

- 21 7. All Dell notebook panels that go into notebooks shipped to North and South America are
22 purchased by Dell's entity Malaysia Direct Ship (MDS). MDS ships all of the notebooks
23 it produces to the Americas. From these data, I determined the total purchases by quarter
24 of AUO Indictment panels that went into notebooks sold in the Americas (Dell AUO A
25 NBs). The panels that go into notebooks sold to Central and South America (C&S
26 America) and to Canada must be netted out of the MDS purchases to obtain the Dell
27 notebook component of AUO US VoC.
28

8. In order to determine the volume of MDS notebook panels purchased from AUO that were in notebooks sold in Canada and in Central and South America, I rely on Gartner data on Dell PC sales by region. These data allow calculation of the percentage of total Dell sales in the Americas that are sales to the United States (%US Dell A):

$$(1) \%US\ Dell\ A = US\ Dell\ PCs / (US\ Dell\ PCs + Canada\ Dell\ PCs + C\&S\ America\ PCs).$$

9. This percentage is estimated on a quarterly basis. Multiplying this percentage by the MDS AUO Indictment panel purchases provides estimated purchases of AUO Indictment panels included in Dell notebooks sold in the U.S. (US Dell AUO NBs):

$$(2) US\ Dell\ AUO\ NBs = \%US\ Dell\ A * Dell\ AUO\ A\ NBs.$$

AUO Indictment panels in Dell computer monitors shipped to the U.S.

10. Dell uses a single entity, Dell Global Procurement Malaysia (DGPM), to buy all of its LCD monitor panels. DGPM made purchases from AUO beginning in the third quarter of 2005. The panels purchased by DGPM are resold to system integrators (LCD monitor producers) who then sell finished monitors back to Dell through Dell regional purchasers. From the Dell data I calculated by quarter the value of the purchases of AUO Indictment monitor panels (Dell AUO Mon).

11. All monitor purchases for the Americas are through Dell Americas Operations (DAO). From Dell data I determined annually the percentage of all Dell monitors that are monitors going to the U.S. (% Dell Mon US):

$$(3) \% Dell\ Mon\ US = \%US\ Dell\ A * (DAO\ Mon / DGPM\ Panels).$$

12. Multiplying the Dell purchases of AUO Indictment panels (Dell AUO Mon) by the percentage of monitors going to the U.S. (% Dell Mon U.S.), I obtain the estimated

1 purchases of Indictment panels included in Dell monitors sold in the U.S. (US Dell AUO
2 Mon):

3 (4) $\text{US Dell AUO Mon} = \% \text{Dell Mon US} * \text{Dell AUO Mon}.$
4

5 13. Adding the purchases of Indictment panels in Dell notebooks and in Dell monitors sold in
6 the U.S. gives the total Dell Indictment panel purchases for PC sales to the U.S. (US Dell
7 AUO Panels):

8 (5) $\text{US Dell AUO Panels} = \text{US Dell AUO NBs} + \text{US Dell AUO Mon}.$
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10 14. All underlying data and the results of the calculations for Dell are provided in the
11 attached Table 1A Dell Data and Table 2.

12 **HP**

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14 15. A number of data files from HP were analyzed: HP, Panel Purchases Con't.xls; HP
15 Monitor Panel Purchase Spreadsheet (Jan03 to Dec 06).xls; Commercial LCD Monitor
16 Shipments to North America (2001 to 2006)--Highly Confidential.xlsx; Consumer LCD
17 Monitor Shipments to United States (2001 to 2006)--Highly Confidential.xlsx; 2002-
18 2006 shipments.xls. The titles of these files explain the data each contain.

19 AUO Indictment panels in HP notebooks shipped to the U.S.
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21 16. From the file HP, Panel Purchases Con't.xls, I determined the total purchases by quarter
22 of AUO Indictment panels that went into HP notebooks (HP AUO NBs). From the file
23 2002-2006 shipments.xls, I calculated the annual percentages of HP notebooks that were
24 shipped to North America (% HP NBs NA). North America is defined by HP as the U.S.
25 and Canada. Multiplying these percentages by the purchases of AUO Indictment panels
26 in HP notebooks gives the purchases of AUO Indictment panels shipped to North
27 America in HP notebooks (HP AUO NA NBs):
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(6) $HP\ AUO\ NA\ NBs = HP\ AUO\ NBs * \% HP\ NBs\ NA.$

17. The purchases of Indictment AUO panels that are incorporated into notebooks sold in Canada must be netted out of the estimated HP purchases of Indictment panels that are in notebooks sold in North America. This was done using the same Gartner data sources described above.³ I first estimate HP PC sales in Canada (HP Can PCs) using the HP market share in Canada (HP Can MS) multiplied by total PC sales in Canada (Can PCs):

(7) $HP\ Can\ PCs = HP\ Can\ MS * Can\ PCs.$

18. I then estimate the percentage of HP notebooks shipped to North America that are shipped to the US (% US HP NA NBs) by the ratio of HP U.S. PC sales (HP US PCs) divided by U.S. plus Canadian sales:

(8) $\% US\ HP\ NA\ NBs = HP\ US\ PCs / (HP\ US\ PCs + HP\ Can\ PCs).$

19. The final step in estimating HP purchases of Indictment panels that are in notebooks sold in the U.S. (US HP AUO NBs) is to multiply the estimated percent of North America notebooks going to the U.S. (% US HP NA NBs) by the HP Indictment panel purchases for notebooks sold in North America (HP AUO NA NBs):

(9) $US\ HP\ AUO\ NBs = \% US\ HP\ NA\ NBs * HP\ AUO\ A\ NBs.$

AUO Indictment panels in HP computer monitors shipped to the U.S.

20. HP provided data on its worldwide monitor panel purchases (HP Mon). From these data, I calculated by quarter the total number of monitor panels purchased by HP (HP Mon) and the purchases by HP of AUO Indictment monitor panels (HP AUO Mon).

³ HP purchased notebook panels from AUO throughout the October 2001 through November 2006 period. I did not have complete Gartner data over this period. For periods when the Gartner data was not available, interpolations and backcasts were used.

21. HP also provided data on its North America commercial LCD monitor sales by quarter for fiscal years 2001 to 2006. HP reported that 93% of these North American sales were to the U.S. By multiplying the North America sales by 93%, these data gave me the estimated commercial monitor sales by quarter to the U.S. (US HP Comm Mon).⁴ HP also provided data on its U.S. consumer LCD monitor sales, by fiscal year, 2001 to 2006. From these data I calculated the HP consumer LCD monitor sales by quarter to the U.S. (US HP Cons Mon).⁵ The quarterly HP commercial monitor sales estimate for the US was added to the quarterly HP consumer monitor sales estimate for the US to get an estimate for HP's total LCD monitors sold in the U.S. (US HP Mon).⁶

$$(10) \text{ US HP Mon} = \text{US HP Comm Mon} + \text{US HP Cons Mon}.$$

22. I next calculated the percentage of total HP monitor panel purchases that were for monitors sold in the U.S. (% US HP Mon) by dividing the number of monitors sold in the U.S. by total monitor panel purchases.

$$(11) \% \text{ US HP Mon} = \text{US HP Mon} / \text{HP Mon}.$$

23. The final step in estimating the HP purchases of AUO Indictment panels incorporated into monitors sold the U.S. is to multiply the total HP Indictment panel purchases by the % of LCD monitors sold in the U.S. by HP:

$$(12) \text{ US HP AUO Mon} = \text{HP AUO Mon} * \% \text{ US HP Mon}.$$

⁴ Fiscal year (November 1 through October 31) data was converted to calendar years.

⁵ The data were converted to calendar quarterly data based on the quarterly commercial HP LCD monitor sales.

⁶ These data were not available for the last quarter of 2006. The fourth quarter was estimated by adjusting HP's third quarter U.S. LCD monitor sales for the change in HP's worldwide monitor purchases third to fourth quarter (\$73,900,000 for Q3/06, \$67,000,000 for Q4/06).

24. Adding the HP notebooks and monitors using AUO panels sold in the U.S. gives the total HP PC sales to the U.S. that have AUO panels (US HP AUO Panels):

$$(13) \text{ US HP AUO Panels} = \text{US HP AUO NBs} + \text{US HP AUO Mon.}$$

25. All underlying data and the results of the calculations for HP are provided in the attached Table 1B HP Data and Table 2.

Apple

26. A number of data files from Apple were analyzed: TFT-LCD Purchase Data-AU Subpoena-Highly Confidential.xls; SFI_642590_1_TFT-LCD_product Class Sales Data.xlsx; Apple Part Numbers by Supplier_3-9-11.xls.

27. From the purchase data file, I calculated the quarterly Apple purchases of AUO Indictment panels (Apple AUO Panels). From the Class Sales file, I calculated the quarterly percentage of Apple PCs that went to the US (% Apple PC US) by dividing US Apple PCs by total Apple PCs worldwide (US Apple PCs, Worldwide Apple PCs). Multiplying this percentage by the Apple AUO panel purchases gives the estimated Apple AUO Indictment panels incorporated into Apple notebooks and monitors sold in the U.S. (US Apple AUO Panels):

$$(14) \text{ US Apple AUO Panels} = \text{Apple AUO Panels} * \% \text{Apple PC US.}$$

28. All underlying data and the results of the calculations for Apple are provided in the attached Table 1C Apple Data and Table 2.

Gateway and IBM

29. Data on Gateway and IBM LCD panel purchases were received. Examination of these data found that neither Gateway nor IBM purchased panels from AUO during the relevant time period.

Total U.S. AUO Indictment panel purchases.

30. Table 2 summarizes the estimated purchases of AUO Indictment panels that were sold into the U.S. in notebooks and monitors for Dell, HP, Apple, Gateway and IBM (AUO US Five). As shown in the Table, these five sellers are estimated to have purchased \$1.51 billion of AUO Indictment panels from October 2001 through December 1, 2006.

31. According to data from Gartner, these five PC sellers (Dell, HP, Apple, Gateway and IBM), accounted for about 62 percent of PC sales from October 2001 through December 2006 (US Share Five). To account for the remaining 38 percent of the market, I use quarterly Gartner data to estimate the total U.S. AUO Indictment panel purchases by adjusting the purchases of these five PC sellers for the portion of the U.S. market that is not included:

$$(15) \quad \text{AUO US VoC} = \text{AUO US Five} / \text{US Share Five}$$

This calculation assumes that the OEMs accounting for the remaining 38 percent of U.S. PC sales purchased panels from AUO from October 2001 through November 2006 in the same proportion as did Dell, HP, Apple, Gateway and IBM during that same time period. This is a reasonable assumption because there were large periods of time during that period when AUO did not sell any monitor or notebook panels to these five OEMs. Neither Gateway nor IBM purchased any panels from AUO during this entire time period. Dell did not directly purchase any notebook panels from AUO before the second quarter of 2004, and did not directly purchase any monitor panels from AUO before the third quarter of 2005. Similarly, HP did not start directly purchasing AUO notebook panels until the third quarter of 2002.

32. Under the formula above, as shown in Table 2, the estimated total purchases of AUO Indictment panels that were sold into the U.S. over the period October 2001 through November 2006 were \$2.34 billion. That estimate is a conservative one because it

1 excludes AUO's panels that were incorporated into televisions sold in the United States.⁷
2 From the AUO invoice database, AUO's sales of television panels on a worldwide basis
3 accounted for about 7% of its total sales of Indictment panels during the October 2001
4 through November 2006 time period.
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27 ⁷ It is possible that a minimal number of Dell TV panel purchases are included in the Dell Monitor panel
28 purchases.

Table 1A: Dell Data

	Dell Can MS	Dell C&S Americas MS	Can PCs	C&S Americas	Dell AUO A NBs	Dell AUO Mon	DAO Mon	DGPM Mon
Q4/01								
2001								
Q1/02	20.3%	6.5%						
Q2/02								
Q3/02								
Q4/02								
2002								
Q1/03	21.9%	8.5%						
Q2/03								
Q3/03								
Q4/03								
2003								
Q1/04		10.0%						
Q2/04					948,472			
Q3/04	24.6%				3,683,862			
Q4/04					5,172,179			
2004			5,829	11,671				
Q1/05		6.8%			8,301,312			
Q2/05		7.3%			15,200,000			
Q3/05					22,600,000	162,000,000		
Q4/05					29,900,000	129,000,000		
2005			6,583	14,711			10,626,763	15,294,638
Q1/06					34,400,000	229,000,000		
Q2/06		8.5%			41,500,000	168,000,000		
Q3/06		9.2%			39,600,000	165,000,000		
Q4/06*			4,900	18,600	30,300,000	117,000,000	13,648,127	23,691,389
2006								

* through 12/1/06

Table 1B: HP Data

	HP AUO NBs	% HP NBs NA	% HP NBs NA	Can PCs	HP Can MS	HP US PCs	US HP Mon	HP Mon	HP AUO Mon
Q4/01		6.5%				2,855	75,340		
2001									
Q1/02		6.5%			18.0%	2,325	130,321		
Q2/02		7.0%				1,978	120,166		
Q3/02	18,803,500	7.5%				2,273	161,399		
Q4/02	28,516,950	8.0%				2,642	266,569		
2002			45.6%						
Q1/03	9,823,300	8.5%			20.3%	2,248	285,563		
Q2/03	49,195,500	8.9%				2,257	355,750		
Q3/03	30,755,000	9.3%				3,042	504,210	1,176,100	\$ 57,300,000
Q4/03	54,806,446	9.6%				3,167	475,105	1,581,700	\$ 73,100,000
2003			45.7%						
Q1/04	44,980,390	10.0%				2,536	562,404	1,407,268	\$ 76,900,000
Q2/04	26,648,050	9.2%				2,547	625,365	2,039,770	\$ 95,500,000
Q3/04	54,260,181	8.4%			20.2%	3,093	632,748	1,600,650	\$ 64,900,000
Q4/04	48,972,180	7.6%				3,277	557,750	1,652,069	\$ 54,900,000
2004			41.7%	5,829					
Q1/05	37,266,407	6.8%				2,620	731,333	2,090,526	\$ 87,700,000
Q2/05	21,972,978	7.3%				2,711	779,019	2,803,800	\$ 106,000,000
Q3/05	47,568,979	7.6%				3,430	823,093	2,565,440	\$ 86,000,000
Q4/05	89,121,950	7.9%				3,491	928,125	2,725,800	\$ 105,000,000
2005			41.7%	6,583					
Q1/06	83,459,950	8.2%				3,027	1,031,363	2,793,981	\$ 93,700,000
Q2/06	56,876,510	8.5%				3,135	1,091,828	2,954,130	\$ 79,200,000
Q3/06	52,849,615	9.2%				3,656	1,072,705	3,372,550	\$ 73,900,000
Q4/06*	74,433,365	9.2%		4,900		4,053		4,000,925	\$ 67,000,000
2006			40.2%						

* through 12/1/06

Table 1C: Apple Data

	Worldwide Apple PCs	US Apple PCs	Apple AUO Panels
Q4/01	607,973	311,351	
2001			
Q1/02	671,942	349,878	\$ 26,300
Q2/02	691,506	409,881	\$ 6,489,851
Q3/02	613,002	420,825	\$ 4,532,000
Q4/02	631,740	340,442	\$ 9,357,240
2002			
Q1/03	633,592	329,138	\$ 8,047,000
Q2/03	700,099	427,555	\$ 4,183,600
Q3/03	650,650	422,314	\$ 2,164,350
Q4/03	702,585	371,866	\$ 6,635,600
2003			
Q1/04	660,697	355,239	\$ 8,081,000
Q2/04	781,340	470,322	\$ 7,830,000
Q3/04	771,722	487,103	\$ 9,858,900
Q4/04	946,506	500,468	\$ 3,657,000
2004			
Q1/05	823,307	445,586	\$ 4,327,500
Q2/05	944,737	563,518	\$ 1,650,000
Q3/05	1,080,265	672,875	
Q4/05	1,082,347	546,748	
2005			
Q1/06	963,538	505,008	\$ 2,900,625
Q2/06	1,201,309	705,146	\$ 34,200,000
Q3/06	1,480,412	918,777	\$ 21,300,000
Q4/06*	1,521,852	770,942	\$ 13,100,000
2006			

* through 12/1/06

Table 2: AUO Volume of U.S. Commerce

	US Dell AUO Panels	US HP AUO Panels	US Apple AUO Panels	US IBM AUO Panels	US Gateway AUO	AUO US Five	Dell US	HP US	Apple US	IBM US	Gateway US	All US	US Share Five	AUO US VoC
Q4/01														
Q1/02			\$13,694	\$0	\$0	\$13,694	2,933	2,325	350	579	645	11,001	62%	\$ 22,051
Q2/02			\$3,846,773	\$0	\$0	\$3,846,773	2,925	1,978	455	662	651	10,664	63%	\$ 6,150,188
Q3/02		\$7,674,523	\$3,111,212	\$0	\$0	\$10,785,735	3,433	2,273	466	651	729	13,150	57%	\$ 18,781,734
Q4/02		\$11,639,003	\$5,042,577	\$0	\$0	\$16,681,580	3,692	2,642	430	648	700	16,537	49%	\$ 34,009,055
Q1/03		\$4,024,774	\$4,180,251	\$0	\$0	\$8,205,025	3,634	2,248	334	568	506	11,846	62%	\$ 13,333,505
Q2/03		\$20,156,237	\$2,554,952	\$0	\$0	\$22,711,189	3,689	2,257	447	688	493	11,847	64%	\$ 35,527,635
Q3/03		\$37,166,145	\$1,404,803	\$0	\$0	\$38,570,948	4,288	3,042	470	715	521	15,657	58%	\$ 66,838,522
Q4/03		\$44,412,627	\$3,512,108	\$0	\$0	\$47,924,735	4,334	3,167	442	772	495	18,385	50%	\$ 95,679,283
Q1/04		\$47,516,609	\$4,344,937	\$0	\$0	\$51,861,546	4,489	2,536	393	612	1,078	14,901	61%	\$ 84,847,265
Q2/04	\$828,149	\$39,226,992	\$4,713,213	\$0	\$0	\$44,768,354	4,295	2,547	505	668	703	14,157	62%	\$ 72,698,507
Q3/04	\$3,269,197	\$46,289,941	\$6,222,836	\$0	\$0	\$55,781,974	4,920	3,093	521	721	800	16,227	62%	\$ 90,022,842
Q4/04	\$4,615,529	\$37,249,566	\$1,933,650	\$0	\$0	\$43,798,745	5,174	3,277	546	906	1,020	16,992	64%	\$ 68,134,055
Q1/05	\$7,202,449	\$44,477,706	\$2,342,108	\$0	\$0	\$54,022,263	4,870	2,620	571	623	826	15,238	62%	\$ 86,560,593
Q2/05	\$13,229,370	\$37,617,648	\$984,194	\$0	\$0	\$51,831,213	4,988	2,711	663	607	890	15,567	63%	\$ 81,839,587
Q3/05	\$119,087,060	\$45,686,567	\$0	\$0	\$164,773,627	5,506	3,430	744	752	1,070	17,930	17,930	64%	\$ 256,865,605
Q4/05	\$105,576,564	\$69,705,128	\$0	\$0	\$175,281,692	5,622	3,491	619	0	1,145	16,530	16,530	66%	\$ 266,379,183
Q1/06	\$144,315,654	\$65,571,897	\$1,520,271	\$0	\$0	\$211,407,822	4,881	3,027	570	0	1,225	14,395	67%	\$ 313,636,566
Q2/06	\$121,258,932	\$50,441,975	\$70,100,000	\$0	\$0	\$191,800,906	5,302	3,135	666	0	1,038	14,853	68%	\$ 280,920,902
Q3/06	\$117,542,471	\$43,384,498	\$13,200,000	\$0	\$0	\$174,126,968	5,113	3,656	975	0	1,011	15,837	68%	\$ 256,406,211
Q4/06*	\$84,223,089	\$49,483,940	\$6,633,255	\$0	\$0	\$140,340,284	4,651	4,053	808	0	1,011	15,887	66%	\$ 211,877,420
Total	\$721,148,464	\$701,725,776	\$85,660,835	\$0	\$0	\$1,508,535,074							62%	\$ 2,340,508,656

* through 12/1/06

EXHIBIT C

Expert Declaration of Edward A. Snyder, Ph.D.

August 10, 2012

I, Edward A. Snyder, Ph.D., declare as follows:

I. QUALIFICATIONS

1. I am Dean of the Yale School of Management and the William S. Beinecke Professor of Economics and Management. From July 1, 2001 until June 30, 2010 I was the George Schultz Professor of Economics at the University of Chicago Booth School of Business and served as Dean of the School.

2. I earned my M.A. in Public Policy and Ph.D. in Economics from the University of Chicago. My Ph.D. thesis focused on price-fixing and examined enforcement of Section 1 of the Sherman Act by the U.S. Department of Justice; this involved reviewing over 200 price-fixing conspiracies. My primary expertise is Industrial Organization, which is the field of economics that deals most directly with pricing and distribution of products, the interactions among competitors, contracting practices, and antitrust issues. My research draws on relevant theory, investigates real-world behavior, and is predominantly empirical in nature.

3. I have analyzed economic and business issues in a rich variety of settings. I consider myself to be an expert on pricing practices, distribution of products, vertical integration and contracting, and industrial organization in general. I also consider myself to be an expert on allegations of price-fixing and collusive agreements, monopolization, other anti-competitive practices, and economic analysis relating to class certification matters.

4. I include my curriculum vitae with this declaration as Appendix A.

II. ASSIGNMENT

5. In this declaration, I summarize work and analysis done both by me and under my direction in connection with the recently-concluded Indirect Purchasers (“IPP”) civil class action related to this matter. I incorporate my full reports filed therein by reference.¹

¹ Expert Report of Edward A. Snyder, Ph.D., and Supporting Materials, *In Re: TFT-LCD (Flat Panel) Antitrust Litigation*, No. C07-1827 SI, MDL No. 1827, United States District Court, Northern District of California, San Francisco Division, July 28, 2011; Sur-Reply Report of Edward A. Snyder, Ph.D., and Supporting Materials, *In Re: TFT-LCD (Flat*

6. In that action, I was asked to evaluate the claims of injury and damages to the end users who made up the certified classes based on their purchases of finished products containing LCD panels. These finished products fell into three major categories: monitors, televisions and notebook computers. I did not conduct any empirical work to estimate any alleged overcharges in those actions. My opinions were focused primarily on whether and to what extent overcharges on panels were “passed on” and thereby reflected in the prices paid by end users for finished products.

III. ANALYTICAL FRAMEWORK AND PRINCIPAL CONCLUSIONS

7. The two conditions that must be met for end users to be impacted by price fixing are: (i) the relevant direct purchasers must have paid overcharges on the LCD panels embodied in the end users’ products, and (ii) at least some part of those overcharges must have been passed on through the relevant distribution chain of intermediaries to the end user, as it was resold in its original form and/or as it was potentially transformed into another form. The primary focus of my expert report in the IPP class action, and in this declaration, is the second condition.

8. Whether or not direct purchasers and other intermediaries pass on higher prices, if any, is a classic issue in antitrust matters. Pass-on decisions by intermediaries are influenced by the nature of competition at each stage of the distribution channel and may diverge as a result of rivalries among competitors and time- and location-specific circumstances.

9. In some settings, tracing an alleged overcharge may be straightforward, e.g., in the case of a large and uniform overcharge on a non-differentiated product that is resold only once in its same form by direct purchasers to end users in a single distribution channel. In other settings, tracing an alleged overcharge may be exceedingly complex, particularly when finished products are differentiated, distribution channels are numerous and the chain is composed of multiple resellers with varying degrees of vertical integration, each transforming the product through added value to create the final product.

Panel) Antitrust Litigation, No. C07-1827 SI, MDL No. 1827, United States District Court, Northern District of California, San Francisco Division, September 6, 2011.

10. The economic literature on pass-on, which I will discuss, tends to focus on more straightforward examples. For instance, economists have investigated pass-on in markets for commodities such as gasoline, coffee and fruit juice. These commodities are less differentiated than LCD finished products, i.e., gasoline sold by one intermediary is essentially identical to that sold by another.

11. In other settings, alleged overcharges due to a cartel's effort to fix prices may be significantly more difficult to trace. In some industries, significant value is added at several steps in the distribution channel, including (a) multiple assembly stages (where various components are combined into the finished product), and (b) marketing and distribution stages (where firms offer associated services, such as customer technical support). As products move down the channel and as value is added by intermediaries, alleged overcharges at the top of the channel becomes an increasingly small component of product prices. The distribution channels themselves may be complex and long, in which case the number and type of pass-on decisions are numerous. The pass-on decisions themselves will be affected by many elements including the nature of the finished products, the preferences of end users, the extent to which particular intermediaries are vertically integrated and the nature of competition at each step of the distribution chain. If the number of pass-on decisions varies depending on the particular distribution channel or chain used, then sorting out differences in end-user prices and, in particular, whether they reflect the effects of additional nonconspiratorial markups by intermediaries or alleged overcharges, is challenging.

12. Another complication arises if the distribution channels target different customers. For example, Apple Computer and Acer both manufacture notebook computers including LCD panels, but Apple targets the premium customers segment, and sells on-line and through a network of brick-and-

mortar stores.² By contrast, Acer sells on-line but does not maintain brick-and-mortar stores in the U.S., and targets the “value” segment.³ Depending on the nature of demand and the extent of rivalry in each segment, these firms may make different decisions about passing on cost changes.

13. If pass-on is not evaluated at each stage of distribution, analyses may substantially overstate any harm to consumers. For example, if a product passes through three intermediaries before reaching the end user, and each passes on 80 percent of an overcharge, then 51 percent of the overcharge will have been passed on to the end user. However, if an additional intermediary is involved in the distribution and also passes on 80 percent of the overcharge, then in total only 41 percent of the overcharge will have been passed on to the end user. Similarly, if the pass-on rate was estimated incorrectly for one of the four stages, and was actually 10 percent, then the cumulative pass-on rate would have been even lower.

14. Failing to consider such complexities will result in a failure to properly assess impact on purchasers of finished LCD products. Any method, whether empirical or conceptual, should attempt to evaluate the particular decision made by business decision-makers when confronted with a change in costs. Economic theory alone is not sufficient support for an assumption that all cost changes were passed on to end users of finished LCD products that are sold at the end of a long and complex process of making and distributing innovative, technologically complex finished products. The decision to pass on that change in costs in the form of a change in prices may be influenced by a variety of factors, including the magnitude of the cost changes relative to the finished product prices, the extent of both

² Chaffin, Bryan, “Barclay’s Analyst Praises Apple Business Model, Raise Price Target,” *The Mac Observer*, July 22, 2009, http://www.macobserver.com/tmo/article/barclays_analyst_praises_apple_business_model/, visited on October 11, 2010; Dedrick, Jason, Kenneth L. Kraemer and Greg Linden, “Who Profits from Innovation in Global Value Chains? A Study of the iPod and Notebook PCs,” *Industry Studies Association*, Working Paper Series No. WP-2008-15, 2008, p. 7.

³ Spring, Tom, “Acer Expands Aspire Line – Online,” *PC World*, April 2, 1999, http://www.pcworld.com/article/10390/acer_expands_aspire_lineonline.html, visited on July 28, 2011; Vance, Ashlee, “Acer’s Everywhere, How Did that Happen?” *The New York Times Online*, June 27, 2009, <http://www.nytimes.com/2009/06/28/technology/companies/28acer.html?pagewanted=all>, visited on July 28, 2011; “Retail and Online Stores,” *US.Acer.com*, <http://us.acer.com/ac/en/US/content/authorized-retail>, visited on July 28, 2011.

horizontal and vertical competition among firms in the distribution chain, and the characteristics of consumer demand for the products.

IV. RELEVANT CHARACTERISTICS OF THE LCD PANEL INDUSTRY AND THE DISTRIBUTION CHAIN FOR FINISHED PRODUCTS

15. In this section, I review facts about the LCD industry and its distribution chain which may influence whether and to what extent alleged overcharges on LCD panels might be passed-on. My analysis indicates that the complexity of the distribution chain, the multiple intermediaries within that chain and the varying level of competition and value added at each level of the chain is unlikely to result in a uniform pass-on rate of 100 percent to all consumers at all times. Rather, I would expect pass-on through the distribution chain to vary, ultimately mitigating impact to end users.

A. The Distribution of LCD Panels to End Users in Finished LCD Products

16. The typical “value chain” involved in the distribution of finished computer monitors, notebook computers and televisions includes several categories of activity along the chain where value is added.⁴ Broadly described, these categories are: (1) the design and manufacture of components or elements of the finished product from raw materials; (2) the design and assembly of components into finished products; and (3) the marketing, distribution, sales and servicing of finished products. However, these three categories of activity can be distributed across numerous steps of the distribution chain, such as component manufacturers, component distributors, contract manufacturers, original design manufacturers (ODMs), system integrators, branded OEMs, distributors, and online and traditional retailers.⁵

⁴ Dedrick, Jason, Kenneth L. Kraemer and Greg Linden, “Who Profits from Innovation in Global Value Chains? A Study of the iPod and Notebook PCs,” *Industry Studies Association*, Working Paper Series No. WP-2008-15, 2008, p. 7; Dedrick, Jason and Kenneth L. Kraemer, “The Impacts of IT on Firm and Industry Structure: The Personal Computer Industry,” *California Management Review*, Vol. 47(3), Spring 2005, p. 128.

⁵ Dedrick, Jason, and Kenneth L. Kraemer, “The Impacts of IT on Firm and Industry Structure: The Personal Computer Industry,” *California Management Review*, Vol. 47(3), Spring 2005, p. 128.

17. Some firms use several different distribution chains. According to data from DisplaySearch, Dell is involved in the manufacturing of many of its own notebook computers,⁶ in addition to designing, marketing and selling the products directly to end users. However, according to the same data, Dell also uses firms such as Compal, TPV and others to manufacture both notebook computers and monitors.⁷ Therefore, Dell offers finished products that have been manufactured and sold both through a single firm and also products that have several firms involved in the manufacture, even though the finished good itself may be similar or even identical.⁸

18. In Exhibits 1.1 - 1.3, I have produced diagrams to describe the distribution of monitors, notebook computers, and televisions containing LCD panels, respectively. Exhibits 1.1 through 1.3 illustrate that the relevant distribution chains for end users are complex and varied. These exhibits make clear that the number of steps required for the LCD panel to reach the end user can differ significantly from one end user to another. This observation is important because a difference in the number of intermediaries across relevant distribution chains implies that a different number of pass-on decisions are made. As an example, consider that a finished monitor that is part of a PC system, including a monitor, purchased by an end user could be involved in seven separate transactions in the relevant distribution chain: (1) the sale of the LCD panel from a panel manufacturer to an electronic parts distributor, (2) the sale of the LCD panel from the electronic parts distributor to an ODM that manufactures a finished monitor, (3) the sale of the finished monitor from the monitor ODM to a system integrator that combines the monitor with the rest of the components in a PC system, (4) the sale of the

⁶ DisplaySearch, Notebook PC Value Chain Pivot Tables, 2001-2006, SECm00093474-20070905_DS_ValueChain_PivotTables_Note_PC.xls.

⁷ DisplaySearch, Notebook PC Value Chain Pivot Tables, 2001-2006, SECm00093474-20070905_DS_ValueChain_PivotTables_Note_PC.xls; DisplaySearch, LCD Monitor Value Chain Pivot Tables, 2001-2006, SECm00093707-20070905_DS_ValueChain_PivotTables_Monitor.xls.

⁸ Kawakami, Momoko, "Exploiting the Modularity of Value Chains: Inter-firm Dynamics of the Taiwanese Notebook PC Industry," *Institute of Developing Economies (IDE), JETRO*, Discussion Paper No. 146, April 2008, p. 9; Yang, Daniel You-Ren, and Yun-Chung Chen, "Globalizing Innovation Beyond Modularization: The Case of Taiwanese ODM Manufacturers," *The 6th Asia Pacific International Conference*, 2009, pp. 10, 23.

PC system from the system integrator to a PC OEM, (5) the sale of the PC system from the PC OEM to an electronic products distributor, (6) the sale of the PC system from the electronic products distributor to a retailer, and (7) the sale of the PC system from the retailer to the end user. Transaction (1) represents the sale to the direct purchaser. Transactions (2) through (7) are all independent indirect sales that each have an associated pass-on decision. Not all panels will go through all of these steps, and the precise path taken by a panel varies significantly.

B. Value Added to Finished LCD Product Types

1. Monitors

19. As illustrated in Exhibit 1.1, there are potentially six intermediaries between the sale of an LCD panel and the purchase of a finished LCD monitor by an end user.⁹ For each of the stages of the distribution channel identified in Exhibit 1.1, I have identified examples of the intermediaries. Several such entities may be involved in the incorporation of the LCD panel into a finished monitor. An original equipment manufacturer (OEM) may design and coordinate the manufacture of a PC system that will be sold under its brand name. In some cases an OEM will buy LCD panels directly from LCD panel manufacturers, while in other cases, they may choose to have the LCD panels that will be incorporated into its computers sold directly to an original design manufacturer (ODM), contract manufacturer, or system integrator that performs the manufacturing of finished products on behalf of the OEM.

20. The LCD panel cost is a larger portion of the price of a monitor compared to other finished LCD products. Previously, I have calculated the percent of panel cost as a share of the monitor's price to be 49 to 52 percent on average.¹⁰ Nevertheless, there are a host of non-display features and characteristics that firms along the value chain add to differentiate products to end users. I

⁹ To the extent that intermediaries in the same stage sell LCD panels or LCD products to one another (e.g., an electronics part distributor such as, Ingram Micro, sells to another electronics part distributor, such as CDW), there are more than six intermediaries involved in the distribution chain.

¹⁰ Expert Report of Edward A. Snyder, Ph.D., and Supporting Materials, *In Re: TFT-LCD (Flat Panel) Antitrust Litigation*, No. C07-1827 SI, MDL No. 1827, United States District Court, Northern District of California, San Francisco Division, August 10, 2009 (hereafter "Snyder Expert Report, August 10, 2009"), p. 17.

show in my report examples of monitors having identical screen sizes and resolutions which differ as to power consumption, weight, brightness and contrast ratio. Once an LCD panel has been incorporated into a finished monitor, other intermediaries ranging from PC OEMs to distributors to retailers may purchase and resell the finished monitor, and may or may not add considerable economic value to what is sold before the purchase by the end user. The added value incorporated into the finished LCD monitor through the distribution chain creates a complex finished product substantially different from the LCD panel whose price was the subject of the conspiracy in this matter. The price of the panel is therefore just one consideration among many that is considered by makers and sellers at each stage of the distribution chain when setting prices for the finished LCD monitor.

2. Notebook Computers

21. Exhibit 1.2 diagrams the distribution of notebook PC LCD panels and finished notebook PCs from the manufacturer level to end users, which involves potentially five intermediate steps, and provides examples of the intermediaries at these stages. Intermediaries include electronic parts distributors, PC ODMs, contract manufacturers, system integrators, PC OEMs, electronic products distributors, and resellers. Again, certain sales may bypass certain steps of the distribution illustrated in Exhibit 1.2.

22. Among the products at issue, notebook computers are the most complex, and LCD panels contribute the least value to them as a percentage of the finished product price. Previously, I have calculated that the panel cost represents between 11 and 12 percent of the notebook price on average.¹¹ Many firms add value to the LCD panel and differentiate their notebook computers through combinations of features. I show in my report examples of notebook computers having similar display sizes and relatively similar screen resolutions which differ as to the microprocessor, the operating memory and the storage memory. Even more than for LCD monitors, the incorporation of

¹¹ Snyder Expert Report, August 10, 2009, p. 59.

differentiating features and capabilities into the finished notebook computer means that the price of the LCD panel is therefore just one consideration among many that is considered by makers and sellers at each stage of the distribution chain when setting prices for finished notebook computers.

3. Televisions

23. Exhibit 1.3 diagrams the distribution channels for LCD television panels and finished televisions containing LCD panels, which involve potentially five intermediate steps, and provides examples of intermediaries at these stages, some of which involve value-added manufacturing. Intermediaries include OEMs, electronic parts distributors, ODMs, contract manufacturers, electronic products distributors, and retailers.

24. I have calculated the percent of panel cost as a share of the monitor's price as 35 to 45 percent on average.¹² However, while the LCD panel cost is a significant share of the price of a television, televisions include other critical inputs, including the tuner and speakers. As with monitors, screen size and resolution appear to be critical display-related features that users might evaluate in deciding whether to purchase the TV. In addition, users may also evaluate such features¹³ as dimensions and weight; power consumption; tuner type(s); sound features, including the number and type of speakers, the output power and sound effects included; the availability of integrated electronic devices, and additional interfaces.

25. The presence of additional features and capabilities allows intermediaries to differentiate their TV products through the addition of these value-added elements. I show in my report examples of LCD televisions having similar display characteristics which differ as to television tuners and sound features. As with notebook computers and monitors, the finished LCD TV is a complex, differentiated

¹² Snyder Expert Report, August 10, 2009, p. 17.

¹³ See, for example, "Panasonic TC-P55VT30 Specs - Flat-panel TVs - CNET Reviews," *CNET*, http://reviews.cnet.com/flat-panel-tvs/panasonic-tc-p55vt30/4507-6482_7-34468892.html?tag=lwrspecs, visited on July 2, 2011.

product of which the LCD panel is just one part. The LCD panel prices are among many complex considerations that makers and sellers at each stage of the distribution chain evaluate when setting prices for finished LCD TVs.

V. IMPLICATIONS OF INDUSTRY CHARACTERISTICS FOR PASS-ON DECISIONS

26. As noted above, the necessary conditions for end users to pay overcharges are (i) that direct purchasers of LCD panels paid overcharges, and (ii) that some of the overcharges were passed on at each stage of the distribution chain between the direct purchaser and the end users.

27. The second condition involves the relationship between (i) changes in the costs of producing and distributing products, and (ii) changes in the prices of those products. In general firms seek to charge prices sufficient to cover their costs and ensure a rate of return. At any point in time, a variety of factors may restrict a firm's ability to respond to a change in costs with a commensurate change in prices. To the extent these factors are present, the question of pass-on must be addressed empirically, based upon data that are detailed and comprehensive enough to evaluate pass-on at every step in the distribution chain. Such analysis should isolate the relationship between changes in costs and changes in prices.

28. For several reasons, my comprehensive review of the pass-on decisions made across various distribution chains in the LCD industry does not support a presumption of 100 percent pass-on:

- First, economic theory suggests that collusive prices are unlikely to be maintained uniformly. These differences may limit the ability of firms that pay overcharges to pass on fully, if at all. I understand that this issue is discussed in detail in the declaration of Dr. Robert E. Hall.
- Second, the economic literature does not support an assumption of 100 percent pass-on. Instead, that literature provides frequent examples of pass-on rates significantly below 100 percent. For instance, there is evidence that firms that are upstream in a distribution chain, such as a wholesaler, are less likely to pass on cost changes than a downstream firm.
- Third, as I have described above, the distribution chains for these finished products are often long and complex. A presumption of 100 percent pass-on would only make sense if all intermediaries would be expected to pass on fully. In addition, the length and complexity make it difficult to trace the overcharge through each step of the distribution chain, and determine the extent of any overcharge actually passed on to end users.

- Fourth, the distribution chain for these finished products includes several steps where value is added to differentiate finished products. This leads to differences in industry structure at each stage of that chain, which I would expect to lead to differences in pass-on rates.
- Fifth, industry participants have testified in connection with the related civil actions that changes in costs are often not fully passed on, either because of complex distribution chain relationships, competitive conditions for particular products, or because the changes in cost are too small.

29. For these reasons, I would not expect that an effort to collude to fix prices would have a systematic and significant impact on finished product prices sold to end users even if the relevant direct purchaser of the LCD manufacturer may have experienced an overcharge on LCD panels. As noted, Professor Hall addresses the first of these reasons; in the section that follows, I will discuss the implications of these industry factors for reaching conclusions about pass-on in this context.

A. Empirical Studies of Pass-On Show Cost Changes May Not Be Passed on Consistently

30. I have reviewed the economic literature concerning pass-on to determine whether one would expect pass-on to be lower than, equal to, or greater than 100 percent given the characteristics of the LCD panel industry and the distribution of LCD finished products. The empirical studies in the economic literature find a variety of pass-on rates and many estimates of pass-on are below 100 percent across a range of industries. Some studies focus on pass-on in the context of upstream firms (such as wholesalers) and downstream firms (such as retailers), and find that the relationship between these firms may contribute to incomplete pass-on. Neither the empirical nor theoretical literature supports the universal assumption of 100 percent pass-on, much less in an industry as dynamic as this one.

31. I have reviewed 38 empirical studies of pass-on using regression analysis published in the literature. Thirty-five of these studies report estimates of pass-on below 100 percent. Among the 30 studies that do not evaluate changes in taxes, all include estimates pass-on below 100 percent. Pass-on

rates below 100 percent have been found, even in industries with less differentiated products such as gasoline and coffee, in the long-run as well as the short-run.¹⁴

32. In particular, studies have recognized that the relationship between wholesalers and retailers can result in less than complete pass-on both in the long run and in the short run.¹⁵ Because relationships between upstream firms and downstream firms are costly to attain and involve substantial direct negotiation, it can be difficult for intermediaries such as wholesalers to pass on all cost changes.¹⁶ In addition, factors such as local distribution costs and variable markup may make wholesale prices more rigid than retail prices.¹⁷ For example, one paper evaluating exchange rate shocks that affect costs on shipped goods found that “[w]hile pass-through is less than one in both cases, pass-through into retail prices is always much lower than into at-the-dock prices.”¹⁸

33. In sum, the most current research does not support the presumption that pass-on in the LCD industry is 100 percent. In fact, research indicates that pass-on rates vary across industries and depend on market circumstances.¹⁹ Consequently, a correctly implemented empirical study of each stage of the distribution chains in this industry is essential to addressing the question of whether and to what extent any overcharges identified in this matter were passed on to end users in the form of higher finished product prices.

¹⁴ Nakamura, Emi, and Dawit Zerom, “Accounting for Incomplete Pass-Through,” *NBER*, Working Paper No. 15255, August 2009; Reilly, Barry, and Robert Witt, “Petrol Price Asymmetries Revisited,” *Energy Economics*, Vol. 20, 1998, p. 304; Kadiyali, V., “Exchange rate pass-through for strategic pricing and advertising: An empirical analysis of the U.S. photographic film industry,” *Journal of International Economics*, Vol. 43(3-4), pp. 437-461.

¹⁵ Abbritti, Mirko, “Incomplete Pass-Through in a Model of Retailers-Wholesalers Relationship,” Working Paper, *Universidad de Navarra*, December 2010; See also, Nakamura, Emi, “Pass-Through in Retail and Wholesale,” *American Economic Review*, American Economic Association, Vol. 98(2), May 2008, pp. 430-437.

¹⁶ Abbritti, Mirko, “Incomplete Pass-Through in a Model of Retailers-Wholesalers Relationship,” Working Paper, *Universidad de Navarra*, December 2010, pp. 1-2.

¹⁷ Nakamura, Emi, and Dawit Zerom, “Accounting for Incomplete Pass-Through,” *NBER*, Working Paper No. 15255, August 2009, p. 3.

¹⁸ Gopinath, Gita, and Oleg Itskhoki, “In Search of Real Rigidities,” *NBER*, Working Paper No. 16065, June 2010.

¹⁹ Benigno, Pierpaolo, and Ester Faia, “Globalization, Pass-Through and Inflation Dynamic,” *NBER*, Working Paper No. 15842, March 2010.

B. Product Differentiation and Competitive Conditions Vary Across the Distribution Chains

34. The complex distribution chain for LCD products has implications for an analysis of the measurement of pass-on rates in this case. In particular, the number of steps involved provides numerous cases where pass-on must be measured to properly capture the effect of any cost changes to end users. The addition of substantial value to the LCD panel at several of these steps creates product differentiation and divergence from perfect competition, leading to opportunities for cost changes to be absorbed rather than passed on. The complexity of the distribution chain and the value-add process makes it impossible to rely on economic theory to predict what the rate of pass-on would be in this industry. In this section, I will discuss the implications of the LCD product distribution chain in more detail.

35. First, the number of steps involved in distribution varies across products, meaning that comprehensive data across all steps of distribution are necessary to estimate pass-on. At each stage, intermediaries are required to decide whether to pass on changes in costs in the form of changes in prices. As value is added to a product, the decision to pass on becomes more complex, taking into account demand, competition and product differentiation. Therefore, to the extent that an analysis ignores critical steps of the distribution process, particularly those where value is added, it would fail to properly capture the impact of cost changes on prices paid for finished products.

36. Aspects of the specific relationships among firms involved in distribution of finished products may influence pricing practices and pass-on decisions. For example, an OEM such as HP must negotiate both with ODMs and contract manufacturers about the prices it will pay for finished products and with its own customers about the prices it will charge. These negotiations are conducted separately

and the price HP will charge its own customers is often decided *before* HP negotiates the price it will pay its suppliers.²⁰

37. Given that there are potentially six distinct pass-on decisions (see Exhibits 1.1-1.3) involving the cost of LCD panels in a relevant distribution chain, and given the testimony in the civil cases that firms may be unable to pass on cost changes due to the complexity of these relationships, it is critical that an analysis of pass-on accounts for pass-on at each stage of the distribution chain. Simplifying the chain into broad categories of activity will fail to capture relevant stages at which overcharges may be passed on, or not. These decisions are intertwined with a variety of different pass-on decisions made for each of a variety of other inputs, which may follow a similarly complex path before being combined into the finished product. Not surprisingly, it is difficult to observe the effect of any particular pass-on decision on the price of a finished good.

38. As an LCD panel becomes a component in a more complex finished product, the decision to pass on a cost change must be weighed with other factors that determine prices, such as demand and competitive conditions. This has critical implications for an analysis of pass-on, and for evaluating the impact of overcharges on finished product prices.

39. Intermediaries who made pass-on decisions faced substantially different competitive conditions, depending on the stage of the distribution channel, on whether value-added processing was involved, on the time period, and on the potential for substitution with other products.²¹ Intermediaries such as retailers often have different pricing practices and strategies, which, in some cases, are adjusted based on the nature of rivalries with small numbers of key competitors in local areas.²²

²⁰ Deposition of Tim Tierney, April 5, 2011, pp. 41-45.

²¹ See, for example, Nakamura, Emi, and Dawit Zerom, "Accounting for Incomplete Pass-Through," *NBER*, Working Paper No. 15255, August 2009, Tables 1-2; Poterba, James, "Retail Price Reactions to Changes in State and Local Sales Tax," *National Tax Journal*, Vol. 49(2), June 1996, pp. 165-176.

²² See, for example, Duffy-Deno, Kevin T., "Retail Price Asymmetries in Local Gasoline Markets," *Energy Economics*, Vol. 18, 1996, pp. 81-92.

40. Because intermediaries added value to LCD panels and differentiated their finished products, conditions are likely to have diverged from perfect competition.²³ In perfectly competitive industries with constant costs, economic theory indicates that pass-on will be 100 percent in the long run.²⁴ However, these conditions are not typical of most industries and are certainly not the case here. Where conditions diverge from perfect competition, any overcharges may be absorbed in part, or passed on to the next step in the distribution chain.²⁵ Imperfect competition may include circumstances where firms earn positive economic margins that upstream firms may attempt to capture by increasing input prices. Depending on the nature of consumer demand for finished products, cost changes may not be passed on.

41. These characteristics confirm the importance of empirical analysis, which is what ultimately matters. Even if direct purchasers paid overcharges on panel prices, competitive conditions and demand downstream may lead intermediaries to absorb the overcharges, in whole or in part. This would be particularly likely in cases where the overcharge on an input that was itself a small portion of the value of the finished product.

C. Industry Participants Recognize that Cost Changes Are Not Consistently Passed On

42. There is significant evidence in the related civil matters which indicates that many firms do not routinely pass along all changes in costs. Many OEMs have relationships with original design manufacturers, system integrators and contract manufacturers that assemble some or all components of the finished product according to the design and at the direction of the OEM.²⁶ In certain situations, an

²³ Besanko, David, et al., *Economics of Strategy, Second Edition*, 2000, pp. 409-411; Pindyck, Robert, and Daniel Rubinfeld, *Microeconomics, Seventh Edition*, Prentice Hall, 2008, pp. 424-425.

²⁴ Harris, Robert G., and Lawrence A. Sullivan, "Passing on the Monopoly Overcharge: A Comprehensive Analysis," *University of Pennsylvania Law Review*, Vol. 128(2), December 1979, p. 292.

²⁵ Fullerton, Don, and Gilbert E. Metcalf, "Tax Incidence," *Handbook of Public Economics*, Vol. 4, Elsevier Science, 2002, p. 1825.

²⁶ See, Deposition of Troy Ignatowski, March 4, 2011, p. 49; Deposition of Tim Tierney, April 5, 2011, Vol. 1, pp. 27, 29, 40, 53-57, 59, 61-69.

OEM may purchase components directly, and then provide these components to an ODM for assembly into finished products for the OEM. The OEM may negotiate prices at which these components will be assembled, before knowing the prices it will pay for the individual components; if panel prices increase, the OEM cannot pass the price increase on to the ODM.²⁷ In essence, the decision not to pass on particular cost increases is a result of the long term and contractual relationship between the upstream firm (in this particular example, the OEM) and the downstream firm (in this particular example, the ODM); this result is consistent with the findings of the economic literature.²⁸

43. On-going relationships also affected pass-on between upstream firms and retailers. For instance, a representative of Syntax Brilliant (SB), an OEM that manufactured and distributed Olevia brand televisions, testified that the price of finished products sold to retailers such as Office Depot was set before SB knew what it would pay for panels.²⁹ The SB representative referred to the relationship between costs and prices as follows:

[A] loose relationship, more of a consideration as to the relationship, but it was driven by two totally separate components, one being what the customers would pay for the product; the other was just how we could control or manage the supply chain.³⁰

44. A representative of Electrograph, another branded firm that distributed televisions during the class period, acknowledged that “[t]he cost would be one of several factors certainly that would go into our target sales price...” but that not all cost changes could be passed on as “there were competitive

²⁷ Deposition of Tim Tierney, April 5, 2011, pp. 99-100.

²⁸ Abbritti, Mirko, “Incomplete Pass-Through in a Model of Retailers-Wholesalers Relationship,” Working Paper, *Universidad de Navarra*, December 2010. See also, Leibtag, Ephraim, et al., “Cost Pass-Through in the U.S. Coffee Industry,” *USDA*, Economic Research Report No. 38, March 2007.

²⁹ Deposition of Michael J. Miller, SB Liquidation 30(b)(6), *In Re: TFT-LCD (Flat Panel) Antitrust Litigation*, No. M-07-1827-SI, MDL No. 1827, United States District Court, For the Northern District of California, San Francisco Division, May 3, 2011 (hereafter “Deposition of Michael J. Miller, May 3, 2011”), pp. 124-125.

³⁰ Deposition of Michael J. Miller, May 3, 2011, pp. 175-176.

pricing pressures.”³¹ In a similar manner, customers purchasing large volumes of LCD panels or LCD products may receive more competitive pricing due to volume discounts.³² When firms not eligible for such discounts are presented with a cost increase, they may not pass it on.

45. Other participants in the LCD product distribution chain have also recognized that not all changes in cost may be passed on in finished product prices.³³ This is not surprising, given the characteristics and complexities of the distribution chain I describe above.

VI. CONCLUDING REMARKS

46. Given the analytical framework I provided in my expert report in the related civil matter, I have focused my analyses on the critical question of whether overcharges from the effort to fix prices of LCD panels were passed on to consumers of finished LCD products that contain these panels. While the antitrust problem of pass-on has been contemplated traditionally in the context of a product passing largely unchanged through a simple distribution chain, the overcharge in this matter is associated with a component (the LCD panel) of the finished product (televisions, monitors and notebook computers) purchased by consumers. Any effort to identify harm to those consumers must contemplate pass-on in this context, which was my task in the IPP matter. Based on my analyses, I reached three principle conclusions in this matter:

47. First, economic theory and empirical literature are insufficient to support a finding that pass-on is equal or greater than 100 percent for all the firms across the distribution chain. The conditions under which economists would expect 100 percent pass-on at all times are limited to

³¹ Deposition of Frank Lincks, Electrograph 30(b)(6), *In Re: TFT-LCD (Flat Panel) Antitrust Litigation*, No. 3:07-md-1827-SI, MDL No. 1827, United States District Court, For the Northern District of California, San Francisco Division, May 11, 2011, p. 205.

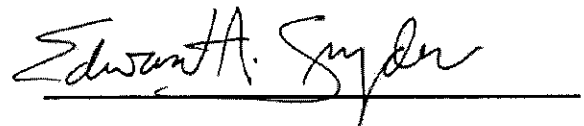
³² Declaration of Marshall Pinder, June 25, 2009, p. 4; Declaration of Yoong Ki Min, June 29, 2009, pp. 7-8.

³³ Deposition of Nick Nayar, Target 30(b)(6), *In Re: TFT-LCD (Flat Panel) Antitrust Litigation*, No. 3:10-cv-04945-SI, MDL No. 3:07-md-1827-SI, United States District Court, For the Northern District of California, San Francisco Division, May 9, 2011, pp. 71-73; Deposition of James Smith, Sears, Roebuck & Company 30(b)(6), *In Re: TFT-LCD (Flat Panel) Antitrust Litigation*, No. M-07-1827-SI, MDL No. 1827, United States District Court, For the Northern District of California, San Francisco Division, April 28, 2011, p. 59.

conditions of perfect competition, which are clearly not the case in this industry. Empirical studies regularly find pass-on rates below 100 percent, calling into question any presumption that firms “always” pass on 100 percent of cost changes.

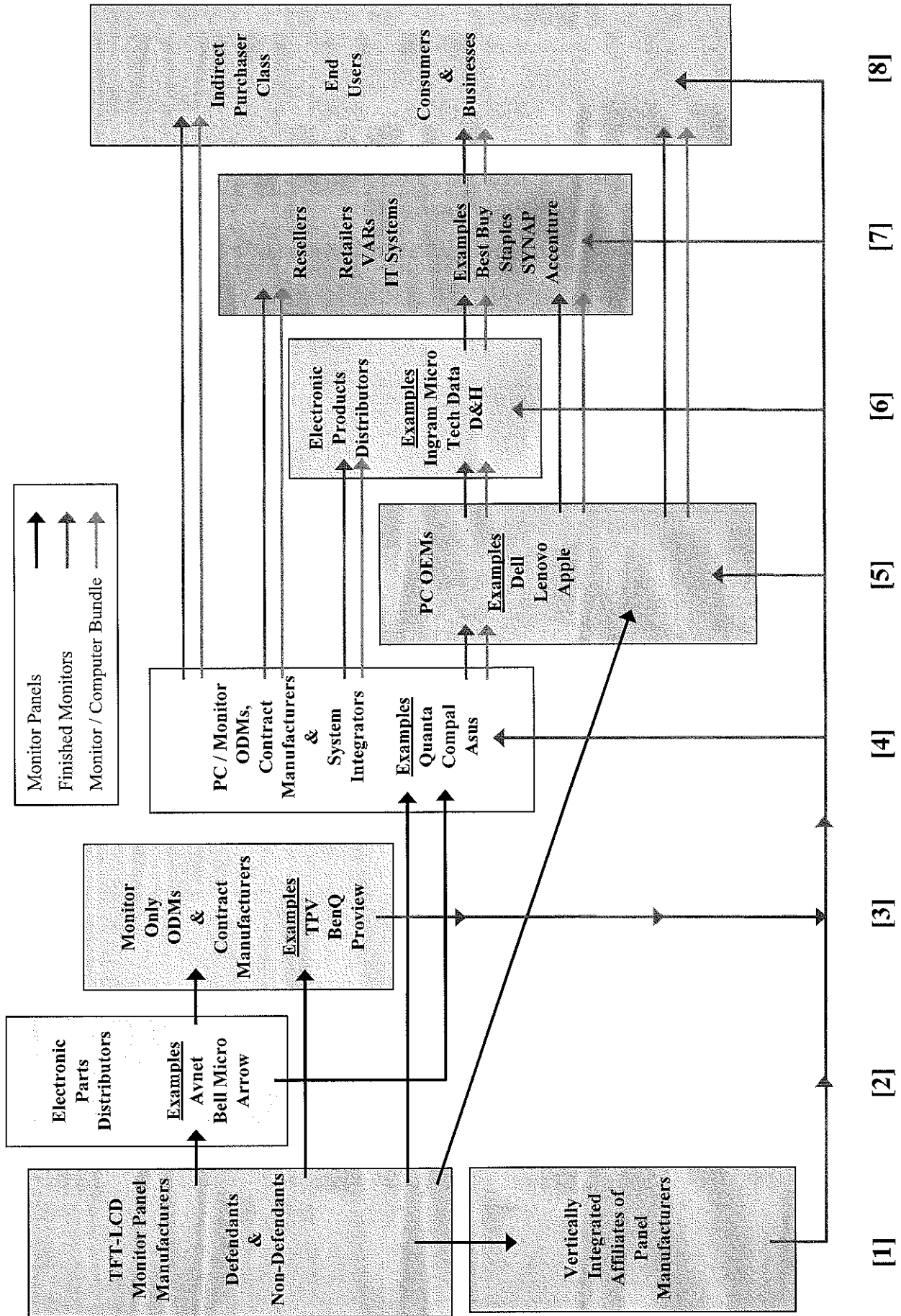
48. Second, the economic and business factors that affect the finished LCD product industry lead me to expect that pass-on of overcharges at the panel manufacturer level to end users of finished LCD products would vary. The industry is characterized by substantial value added and product differentiation activities that occur through complex distribution chains. Firms at each stage of those chains make independent decisions, often considering the decisions of a limited number of rivals competing in specific areas of the product space. A mixture of decisions whether and how much to pass-on is consistent with these conditions. The likelihood that any overcharges were inconsistently applied only emphasizes the importance of analyzing the pass-on of those overcharges through a specific distribution process. Furthermore, these conditions indicate that any overcharges will be very difficult to trace through the complex distribution chains.

49. Third, business decision makers involved in the process of making and distributing finished LCD products have recognized in their sworn testimony that they do not always pass on cost changes. Business decision makers offer a variety of reasons why they might choose to absorb cost increases, such as the introduction of new innovative products, seasonal sales patterns, and the existence of long-term relationships, including contracts, between firms in the distribution chain. These factors are likely to have mitigated the impact of overcharges, and would contribute to less than 100 percent pass-on to end users that purchased finished LCD products.

A handwritten signature in black ink, reading "Edward A. Snyder", written over a horizontal line.

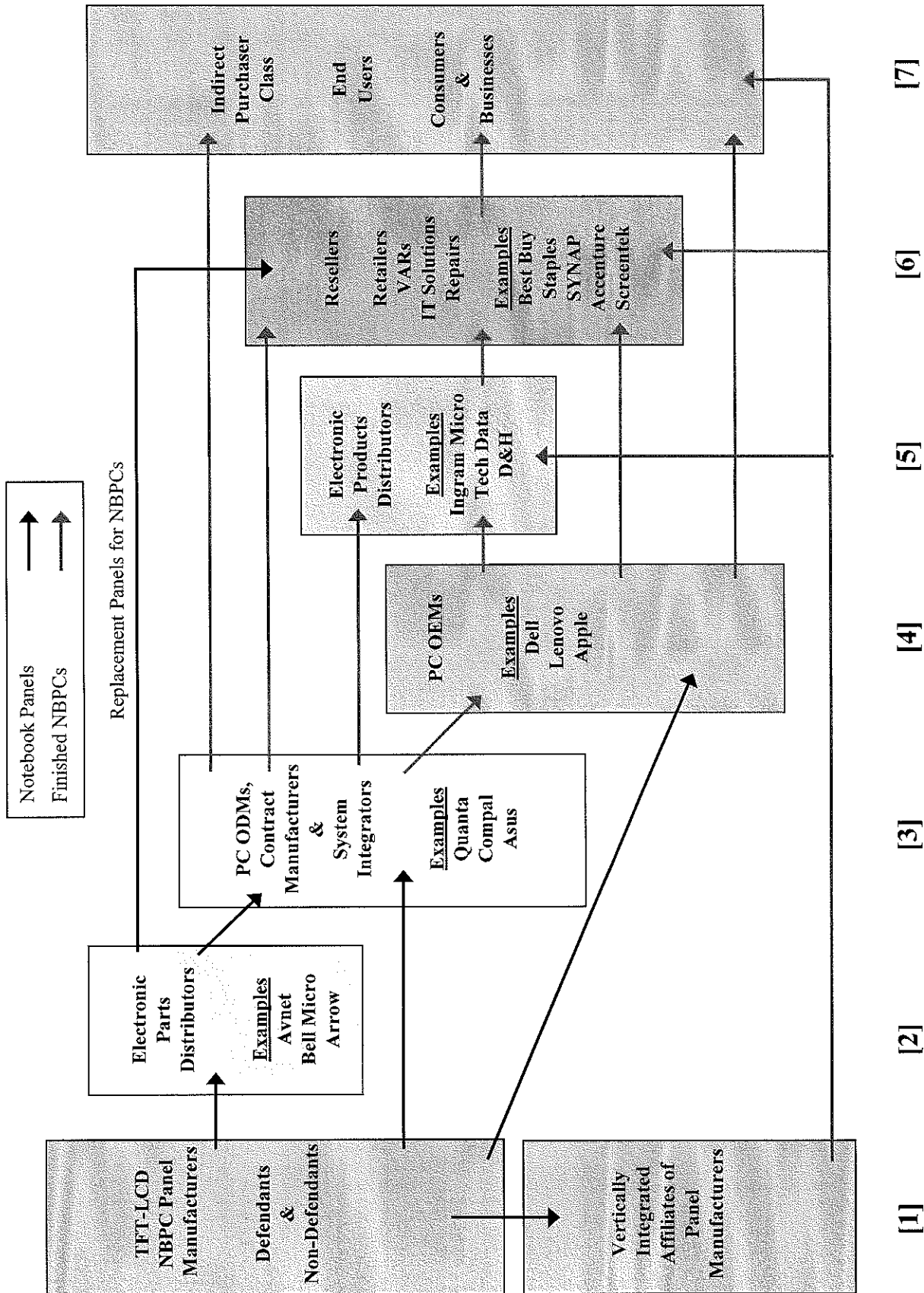
Edward A. Snyder, Ph.D

Exhibit 1.1
Distribution Channels for Monitors



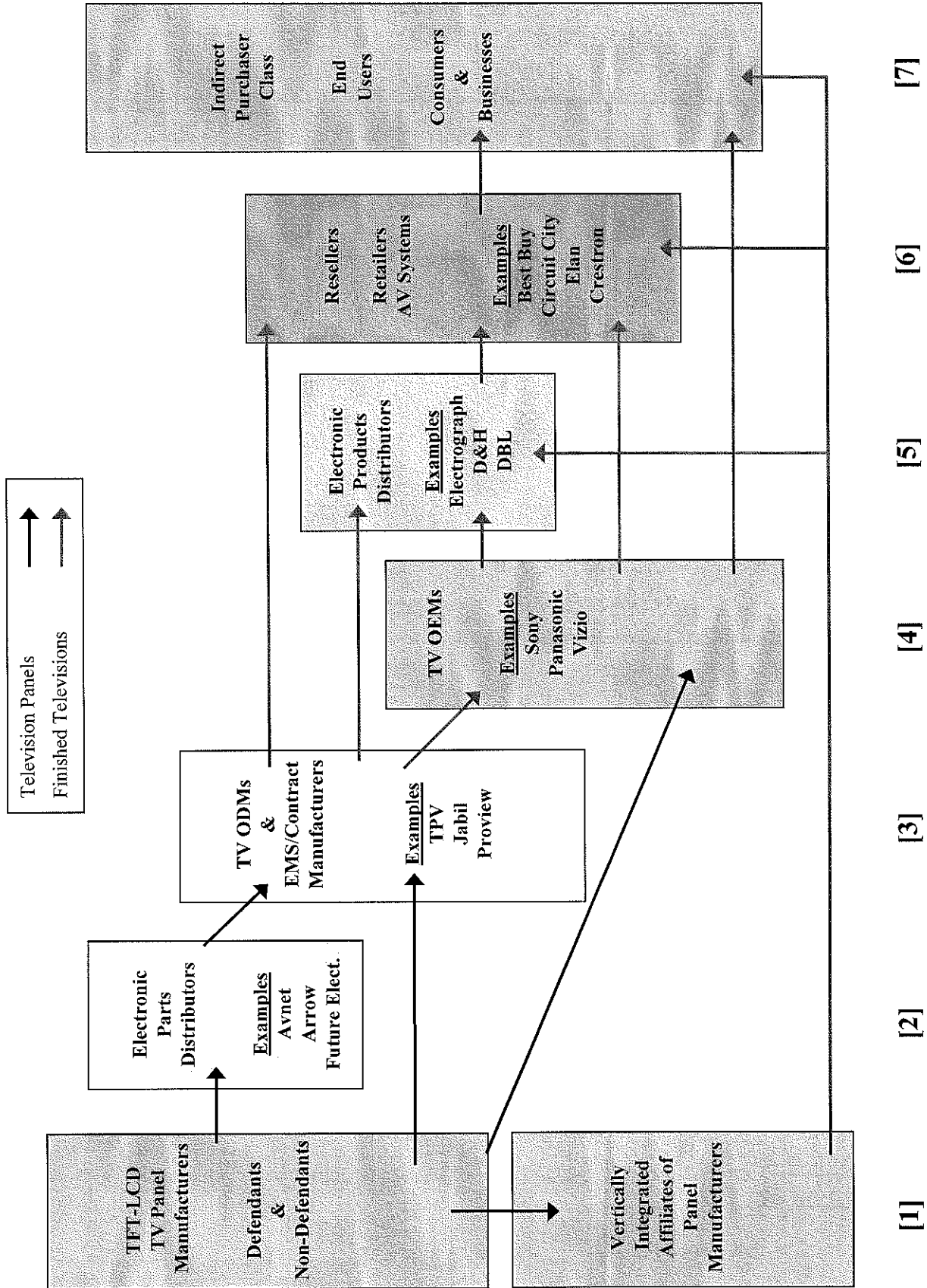
Note: For Notes and Sources, see Exhibit 1.4.

Exhibit 1.2
Distribution Channels for Notebook PCs



Note: For Notes and Sources, see Exhibit 1.4.

Exhibit 1.3
Distribution Channels for Televisions



Note: For Notes and Sources, see Exhibit 1.4.

Exhibit 1.4

Notes and Sources for Exhibits 1.1-1.3

General Notes:

- [1] Distribution channels were constructed based on information compiled from industry research, defendant ledger data, company websites, and direct purchaser deposition testimony.
- [2] The arrows indicate the various paths a panel can take to reach an end user. The different arrow colors represent when the panel has been transformed into a finished product.
- [3] Sources specific to each individual Exhibit are listed below. The source numbers correspond to the group numbers on the bottom of each Exhibit.

General Sources:

- [1] Foster, William, "Technology and Organizational Factors in the Notebook Industry Supply Chain," CAPS: Center for Strategic Supply Research, 2006, <http://www.capsresearch.org/publications/pdfs-public/foster2006es.pdf>
- [2] Dedrick, Jason and Kenneth L. Kraemer, "The Impacts of IT on Firm and Industry Structure: The Personal Computer Industry," *California Management Review*, Vol. 47(5), Spring 2005, <http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1025&context=cmr>
- [3] Kenney, Martin, "The Shifting Value Chain: The Television Industry in North America." In Martin Kenney with Richard Florida (eds.) *Locating Global Advantage* (Stanford University Press), 2003, http://hcd.ucdavis.edu/faculty/webpages/kenney/articles_files/The%20Shifting%20Value%20Chain%20The%20Television%20Industry%20in%20North%20America.pdf
- [4] Deposition of David Allen (Crago Inc.), April 6, 2009, See generally and pp. 13-14, 20-21, 161-162, 173-174, 181, 201, and 233.

Exhibit 1.1 Sources:

- [1] Expert Report of Edward A. Snyder, Ph.D, August 10, 2009, Exhibit 6 - Defendant ledger sales data.
- [2] Avnet Website, "About Us," <http://www.avnet.com/sta/home/>, visited on July 8, 2009; Bell Micro Website, "Our Company," <http://www.bellmicro.com/Company/default.asp>, visited on July 8, 2009; Arrow Electronics Website, "Corporate Overview," http://www.arrow.com/about_arrow/index.html, visited on July 8, 2009.
- [3] TPV Technology Limited Website, "About Us," <http://www.tpvholdings.com/>, visited on July 8, 2009; BenQ Global Website, "BenQ Corporate," <http://www.benq.com/page/?pageId=475>, visited on July 8, 2009; Proview Global Website, "Introduction," <http://www.proview.com/About/Introduction.aspx>, visited on July 8, 2009.
- [4] Quanta Computer Website, "About Quanta - Company Profile," <http://www.quantatw.com/Quanta/english/about/company.aspx>, visited on July 8, 2009; Compal Electronics Website, "Company Profile," http://www.compal.com/index_en.htm, visited on July 8, 2009; ASUS Global Website, "About Asus," http://www.asus.com/ContentPage.aspx?Content_Type=AboutASUS&Content_Id=9, visited on July 8, 2009.
- [5] Dell Website, "About Dell - Company Facts," <http://content.dell.com/us/en/corp/d/corp-comm/Company-Facts.aspx>, visited on July 8, 2009; Lenovo Website, "Company History," <http://www.lenovo.com/lenovo/US/en/history.html>, visited on July 8, 2009; Apple Website, "Store," <http://store.apple.com/us>, visited on July 8, 2009.
- [6] Ingram Micro Website, "About Ingram Micro - Overview," <http://phx.corporate-ir.net/phoenix.zhtml?c=98566&p=irol-aboutIMOverview>, visited on July 8, 2009; Tech Data Website, "About Tech Data," <http://www.techdata.com/content/visitor/abouttd/corpov.aspx>, visited on July 8, 2009; "D&H Distributing," <http://www.dandh.com/v4/view/pageReq=dlmainnms>, visited on July 8, 2009.
- [7] Best Buy Website, "Computers," <http://www.bestbuy.com/site/olspage.jsp?id=abcat050000&type=category>, visited on July 8, 2009; Staples Website, "Computers & PDAs," http://www.staples.com/office/supplies/c21_Computers-PDAs-Technology_10113_Business_Supplies_10912_1_10051, visited on July 8, 2009; SYNAP Corporation Website, "Our Services," <http://www.synap.com/OurServices.html>, visited on July 8, 2009; Channel Web Website, "2009 VAR 500," <http://www.crn.com/var/apps/2009/var500/details.jhtml?jsessionid=3ZSEGGZZKMKZAZQEIGHOSKH4ATMY32JVN>, visited on July 8, 2009.

Exhibit 1.2 Sources:

- [1] Expert Report of Edward A. Snyder, Ph.D, August 10, 2009, Exhibit 6 - Defendant ledger sales data.
- [2] Avnet Website, "About Us," <http://www.avnet.com/sta/home/>, visited on July 8, 2009; Bell Micro Website, "Our Company," <http://www.bellmicro.com/Company/default.asp>, visited on July 8, 2009; Arrow Electronics Website, "Corporate Overview," http://www.arrow.com/about_arrow/index.html, visited on July 8, 2009.
- [3] Quanta Computer Website, "About Quanta - Company Profile," <http://www.quantatw.com/Quanta/english/about/company.aspx>, visited on July 8, 2009; Compal Electronics Website, "Company Profile," http://www.compal.com/index_en.htm, visited on July 8, 2009; ASUS Global Website, "About Asus," http://www.asus.com/ContentPage.aspx?Content_Type=AboutASUS&Content_Id=9, visited on July 8, 2009.
- [4] Dell Website, "About Dell - Company Facts," <http://content.dell.com/us/en/corp/d/corp-comm/Company-Facts.aspx>, visited on July 8, 2009; Apple Website, "Store," <http://store.apple.com/us>, visited on July 8, 2009.
- [5] Ingram Micro Website, "About Ingram Micro - Overview," <http://phx.corporate-ir.net/phoenix.zhtml?c=98566&p=irol-aboutIMOverview>, visited on July 8, 2009; Tech Data Website, "About Tech Data," <http://www.techdata.com/content/visitor/abouttd/corpov.aspx>, visited on July 8, 2009; D&H Distributing Website, <https://www.dandh.com/v4/view/pageReq=dlmainnms>, visited on July 8, 2009.
- [6] Best Buy Website, "Computers," <http://www.bestbuy.com/site/olspage.jsp?id=abcat050000&type=category>, visited on July 8, 2009; Staples Website, "Computers & PDAs," http://www.staples.com/office/supplies/c21_Computers-PDAs-Technology_10113_Business_Supplies_10912_1_10051, visited on July 8, 2009; SYNAP Corporation Website, "Our Services," <http://www.synap.com/OurServices.html>, visited on July 8, 2009; Channel Web Website, "2009 VAR 500," <http://www.crn.com/var/apps/2009/var500/details.jhtml?jsessionid=3ZSEGGZZKMKZAZQEIGHOSKH4ATMY32JVN>, visited on July 8, 2009; Screenetek Website, <http://www.screenetek.com/>, visited on July 8, 2009.

Exhibit 1.3 Sources:

- [1] Expert Report of Edward A. Snyder, Ph.D, August 10, 2009, Exhibit 6 - Defendant ledger sales data.
- [2] Avnet Website, "About Us," <http://www.avnet.com/sta/home/>, visited on July 8, 2009; Arrow Electronics Website, "Corporate Overview," http://www.arrow.com/about_arrow/index.html, visited on July 8, 2009; Future Electronics Website, "About Future Electronics," <http://www.futureelectronics.com/en/company-information/about-future-electronics/Pages/index.aspx>, visited on July 8, 2009.
- [3] TPV Technology Limited Website, "About Us," <http://www.tpvholdings.com/>, visited on July 8, 2009; Jabl Website, "About Jabl," http://www.jabl.com/about_us/, visited on July 8, 2009; Proview Global Website, "Introduction," <http://www.proview.com/About/Introduction.aspx>, visited on July 8, 2009.
- [4] Sony Website, "Sony Corporate Info," <http://www.sony.net/SonyInfo/CorporateInfo/>, visited on July 8, 2009; Panasonic Global Website, "Products & Solutions," <http://www.panasonic.net/products/>, visited on July 8, 2009; Vizio Website, "Products," <http://www.vizio.com/products.aspx>, visited on August 7, 2009.
- [5] Electrogaph Website, "About Us," <http://www.electrogaph.com/AboutUs/>, visited on July 8, 2009; "D&H Distributing," <https://www.dandh.com/v4/view/pageReq=dlmainnms>, visited on July 8, 2009; DBL Website, "About DBL," https://www.distributed.com/index.php?main_page=information_manager&pages_id=7, visited on July 8, 2009.
- [6] Best Buy Website, "TV & Video," <http://www.bestbuy.com/site/olspage.jsp?id=abcat010000&type=category>, visited on July 8, 2009; Circuit City Website, "TV and Home Entertainment," <http://www.circuitcity.com/sectors/television/televisions.asp>, visited on July 8, 2009; Elan Home Systems Website, "About Elan," <http://www.elanhomesystems.com/aboutelana.asp>, visited on July 8, 2009; Creston Website, <http://www.creston.com/>, visited on July 8, 2009.

Appendix A

EDWARD A. SNYDER

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CURRENT POSITION (July 1, 2011 to Present)

Yale School of Management, Yale University

Dean & William S. Beinecke Professor of Economics and Management

Major research interests: Industrial Organization, Antitrust Economics, Law and Economics, Financial Institutions.

Responsibilities: Overall academic, financial, and administrative leadership of the Yale School of Management.

EDUCATION

B.A., Colby College, 1975 (Economics, Government)

M.A., University of Chicago, 1978 (Public Policy)

Ph.D., University of Chicago, 1984 (Economics)

PREVIOUS APPOINTMENTS

University of Chicago, Booth School of Business

Dean (July 1, 2001 to June 30, 2010)

George Shultz Professor of Economics (July 1, 2001 to June 30, 2011)

Responsibilities: Overall academic, financial, and administrative leadership of the school.

Teaching responsibilities: Economic Analysis of Major Policy Issues (co-taught with Gary S. Becker and Kevin M. Murphy).

Editor: Journal of Law & Economics (2002 – 2009)

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Major achievements and initiatives:

- Dramatic increases in the number of endowed faculty professorships, endowed faculty fellowships, and the endowments in research and teaching centers.
- Nine years of 17.1% annual growth of MBA scholarship support.
- Naming of the school with unrestricted funds provided by David Booth – the largest gift (\$300m) to the University of Chicago and the largest gift ever to a business school.
- Increased the school's endowment from approximately \$200m in 2001 to over \$500m, independent of the Booth gift.
- Substantial improvements in the influence, visibility, and recognition of the school, including improved rankings, e.g., BusinessWeek #1 rankings in 2006, 2008, and 2010, and Economist #1 rankings in 2006 and 2009.
- Improvements in the quality and diversity of the MBA classes.
- Large increases in support for PhD students, including dramatic increases in endowments for PhD program.
- Established the Global Advisory Board, with Councils for Asia; the Americas; and Europe, Middle East, and Africa.
- Oversaw the launch of the Initiative on Chicago Price Theory, which became the Becker Center.
- Developed funding for the Fama Miller Center.
- Successfully moved the School's Europe Campus from Barcelona to London.
- Moved into the school's new campus (Harper Center) in Hyde Park on time and on budget.
- Developed first-of-its-kind positioning advertising campaign by a business school.
- Appointments of two women to decanal positions.
- Elimination of debt on three facilities.
- Cumulative operating surpluses of \$100.4m over nine-year period.

Service to the University:

- Member, Academic Leadership Group, July 2001 – June 2010
- Oversight Responsibilities for two University Centers (Stigler Center and Becker Center)
- Member, Provost Ad Hoc Tenure Review Committees, 2002 – 2010
- Member, Board of Directors, Argonne National Laboratories, July 2008 – June 2010
- Member of various Dean and VP Search Committees, 2003 – 2009
- Advisory work on University's globalization efforts, 2007 - 2010
- Member, Social Sciences Deans Group, 2009 – 2010

University of Virginia

Dean and Charles C. Abbott Professor of Business Administration (July 1998 – June 2001)

Responsibilities: Overall academic, financial, and administrative leadership of the Darden School.

Major achievements and initiatives:

- First MBA Program growth in 24 years.
- Increase in nine-year capital campaign from \$98m to \$212m.

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- Established Financial Self-Sufficiency for the Darden School, eliminating reliance on unrestricted state support.
- Initiated Phase II of new Darden Grounds.
- Increased diversity of MBA classes.
- Appointments of two women to decanal positions.
- Appointments of two African-Americans to faculty positions.
- Innovative programs on e-business with global partners.
- Established program partnerships with University of Michigan and University of California at Berkeley.

University of Michigan

Senior Associate Dean, University of Michigan Business School (1995-1998)

Responsibilities: MBA Programs (full-time, evening, global); BBA Program, and Master's of Accounting Program. Managed many of the School's international programs and corporate relationships. Oversight of Admissions & Student Services and the Office of Career Development. Significant responsibility for faculty recruitment and development. Member of School's Executive Committee.

Major achievements and initiatives:

- Global initiatives including International Multi-disciplinary Action Program (IMAP) and Brazil node of Global MBA program.
- Integration of admissions and career development functions.
- Rationalization of real estate curriculum.

Director, Davidson Institute at the University of Michigan Business School (1992-1995)

Responsibilities: Executive and academic leadership to establish a legally-independent Institute focused on business and public policy issues in transition economies and emerging markets.

Major achievements and initiatives:

- Development corporate relationships in China, Central Europe, India, and Russia, and with U.S. firms committed to operating in transition economies.
- Major research initiative on bank privatization in Central Europe and Russia.
- Design and development of in-company projects involving teams of Master's level students working in transition economies.
- Design and delivery of executive education programs for managers from transition economies.
- Progressive increases in outside funding contributing to a \$3m quasi-endowment for the Institute.

Chair, Business Economics and Public Policy (1992-1995)

Responsibilities: Curriculum and staffing of BBA and MBA courses. Faculty development of group of 11 faculty members specializing in business economics.

Faculty Member (1982-1994)

Responsibilities: MBA Core course coordinator of *Applied Microeconomics* (four years). Design and development of *Competitive Tactics*, a course analyzing competition and

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cooperation among firms; marketing and distribution of products; and related antitrust issues.

Member, Board of Directors, Davidson Institute (focusing on transition economies and emerging markets) (1995-1998)

Member, Executive Committee, Tauber Manufacturing Institute, University of Michigan (1996-1998)

Member, Executive Committee, Erb Institute (focusing on environmental management), University of Michigan (1996-1998)

Research Consultant, Federal Home Loan Bank Bd. / U.S. Sen. Comm. on Banking, 1989.

Consultant, Antitrust Division, U.S. Department of Justice (1982-1985)

University of Chicago

John M. Olin Visiting Associate Professor, Center for the Study of the Economy and the State (1991-1992)

Antitrust Division, U.S. Department of Justice

Economist (1978-1982)

Staff Economist, National Commission to Review Antitrust Laws and Procedures (1978-1979)

PUBLICATIONS

Articles in Journals:

“Proof of Common Impact in Antitrust Litigation: The Value of Regression Analysis”, (Co-authors: Pierre Cremieux and Ian Simmons), *The George Mason Law Review*, Summer 2010, pp. 939-967.

“Bank Privatization in Transitional Economics: A General Framework with Application to Hungary’s Magyar Kulkereskedelmi Bank Transaction”, (Co-authors: Karen Schnatterly, Roger C. Kormendi and Christopher Jereb), *The Financier*, vol. 5, No. 2 & 3 (1998), pp. 6-23.

“Allocation of Litigation Costs--American and English Rules,” (Co-author: James W. Hughes) in *The New Palgrave Dictionary of Economics and the Law*, ed. Peter Newman, Macmillan Publishers Ltd, vol. 51 (1998), pp. 51-56.

“Transactional Structures of Bank Privatizations in Central Europe and Russia,” (Co-author Anna Meyendorff), *Journal of Comparative Economics*, (August 1997), pp. 5-30.

“Privatization and Performance of the Czech Republic’s Komerční Banka,” (Co-author: Roger C. Kormendi), *Journal of Comparative Economics*, (August 1997), pp. 97-128.

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- “Litigation and Settlement under the English and American Rules: Theory and Evidence,” (Co-author: James W. Hughes), Journal of Law & Economics, vol. 38 (April 1995), pp. 225-250.
- “*United States v. United Shoe Machine Corporation*: On the Merits,” (Co-author: Scott E. Masten), Journal of Law & Economics, vol. 36 (April 1993), pp. 33-70.
Reprinted in Transaction Cost Economics, vol. 2, O. Williamson and S. Masten, eds., (Edward Elgar Publishing, Ltd., London), 1995, pp. 588-625.
Reprinted in Case Studies in Contracting and Organization, S. Masten, ed., (Oxford University Press), 1996, pp. 224-254.
Reprinted in Journal of Reprints for Antitrust Law and Economics, issue on Landmark Antitrust Decisions Revisited, 26, 1997, pp. 643-680.
Reprinted in Pricing Tactics, Strategies, and Outcomes, (M. Waldman & J. Johnson, ed.), Cheltenham, UK: Edward Elgar Publishing. 2007
- “Misuse of the Antitrust Laws: The Competitor Plaintiff,” (Co-author: Thomas E. Kauper), Michigan Law Review, vol. 90, (December 1991), pp. 551-603.
Reprinted in The Journal of Reprints for Antitrust Law and Economics, vol. 25, no. 2, (1995), pp. 657-709.
- “The Costs of Organization,” (Co-authors: Scott E. Masten and James W. Meehan, Jr.), Journal of Law, Economics, and Organization, vol. 7, (Spring 1991), pp. 1-25.
Reprinted in Transaction Cost Economics, vol. 2, O. Williamson and S. Masten, eds., (Edward Elgar Publishing, Ltd., London), 1995, pp. 119-143.
- “The Effect of Higher Criminal Penalties on Antitrust Enforcement,” Journal of Law & Economics, vol. 33, (October 1990), pp. 439-462.
- “The English Rule for Allocating Legal Costs: Evidence Confronts Theory,” (Co-author: James W. Hughes) Journal of Law, Economics, and Organization, vol. 6, (Fall 1990), pp. 345-380.
- “The Design and Duration of Contracts: Strategic and Efficiency Considerations,” (Co-author: Scott E. Masten) Law and Contemporary Problems, vol. 52 (Winter 1989), pp. 63-85.
- “The Origins and Resolution of the Thrift Crisis,” (Co-authors: Roger C. Kormendi, Victor L. Bernard, S. Craig Pirrong) Journal of Applied Corporate Finance, vol. 2 (Fall 1989), pp. 85-100.
- “Vertical Integration in the U.S. Auto Industry: A Note on the Influence of Transactions Specific Assets,” (Co-authors: Scott E. Masten, James W. Meehan, Jr.) Journal of Economic Behavior and Organization, vol. 12 (October 1989), pp. 265-73.
- “New Insights into the Decline of Antitrust Enforcement,” Contemporary Policy Issues, vol. 7 (October 1989), pp. 1-18.
- “Policy Analysis of Medical Malpractice Reforms: What Can We Learn from Claims Data?” (Co-author: James W. Hughes) Journal of Business & Economic Statistics, vol. 7, (October 1989), pp. 423-431.
- “Evaluating Medical Malpractice Reforms,” (Co-author: James W. Hughes) Contemporary Policy Issues, vol. 7, (April 1989), pp. 83-98.

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“An Inquiry into the Efficiency of Private Antitrust Enforcement,” (Co-Author: Thomas E. Kauper), Georgetown Law Journal, vol. 74, (April 1986), pp. 401-469.

“Efficient Assignment of Rights to Sue for Antitrust Damages,” Journal of Law & Economics, vol. 28, (May 1985), pp. 469-482. Reprinted in The Journal of Reprints for Antitrust Law and Economics, vol. 25, no. 2, (1995), pp. 969-982.

Books/Articles in Books:

Report to the President and the Attorney General of the National Commission for the Review of Antitrust Laws and Procedures, January 1979, co-authored Chapter 11 on Insurance.

“Minimizing Waste Water Treatment Costs at the Plant Level,” (Co-Author: Dan Yaron) in Environmental Policy, vol. II, ed. George Tolley, et al., Ballinger Publishing Co., 1983, pp. 115-136.

“Private Antitrust Cases That Follow on Government Cases,” (Co-Author: Thomas E. Kauper) in Private Antitrust Enforcement: New Evidence, New Learning, ed. Lawrence J. White, M.I.T. Press, 1988, pp. 329-370.

Crisis Resolution in the Thrift Industry, (Co-authors: Roger C. Kormendi, Victor L. Bernard, S. Craig Pirrong), Kluwer Academic Press, 1989.

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Globalization of Management Education: Changing International Structures, Adaptive Strategies, and the Impact on Institutions, (Co-authors: Chair of AACSB Taskforce Robert F. Bruner, et al.), Emerald Group Publishing, 2011.

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“Napsterizing Pharmaceuticals: Access, Innovation, and Welfare.” (Co-authors: James W. Hughes and Michael J. Moore). January 2011. (under review)

“Napsterizing Pharmaceuticals: Access, Innovation, and Consumer Welfare.” (Co-authors: James W. Hughes and Michael J. Moore). National Bureau of Economic Research Working Paper. July 2002.

“Global Antitrust Enforcement.” (Co-author: Pierre Cremieux). Stigler Center Working Paper, #223, June 2010.

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Impact Evaluations of Federal Trade Commission Vertical Restraints Cases, ed. Robert H. Lande, et al., (Federal Trade Commission, 1984), Journal of Economic Literature, vol. 24 (December 1986), pp. 47-48.

Concentration and Price, ed. Leonard W. Weiss, (M.I.T. Press, 1989), Journal of Economic Literature, vol. 30 (September 1991) pp. 1205-1207.

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“The Future of §2 Enforcement and the Analysis of Dominant Firms,” 2010 Antitrust Section Symposium: New York State Bar Association, pp. 12-23.

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Brief for Group of Industrial Organization Economists as Amici Curiae Supporting Petitioners, Weyerhaeuser Co. v. Ross-Simmons Hardwood Lumber Co., 549 U.S. 312 (2007)(05-381).

Brief for Group of Industrial Organization Economists as Amici Curiae Supporting Petitioners, Bell Atl.Corp. v. Twombly, 550 U.S. 544 (2007) (No. 05-1126).

“Bank Privatizations in Central Europe and Russia,” Davidson Institute Report to the U.S. Department of Treasury, March 1996.

“Transitions in Expertise,” The Journal of the International Institute, Winter 1994, pp. 6-8.

“Director's View,” The Davidson Window, vol.1, Winter 1994, pp. 1-2; vol.1, Summer 1994, pp. 1-2; vol. 1, Spring 1995, pp. 1-2.

Crisis Resolution in the Thrift Industry: Beyond the December Deals. (Co-authors: Roger C. Kormendi, Victor L. Bernard, S. Craig Pirrong) Report of the Mid America Institute, March 1989.

Popular Press:

“Student ≠ Customer,” *Nytimes.com Room for Debate*, January 4, 2010.

“2016 Olympics,” *Chicago Tribune*, September 17, 2009.

“The Party’s Over: The Coming Business School Shake-out,” *BusinessWeek.com*

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April 2, 2009.

“Global Learning for a Truly Integrated MBA,” *Financial Times*, February 19, 2009.

“Driven Mad by Traffic Congestion,” *Business Week Chicago*, April 2008.

“The Market’s Place,” *Chicago Tribune*, August 12, 2007.

“Advocating a Carbon Tax,” CNBC Europe, February 19, 2007.

“Are B-Schools Slacking Off?” *Business Week*, February 11, 2007.

“Dean’s Column: The Toughest and the Best Advice,” *Financial Times*, May 15, 2006.

“Are Business Schools Becoming Global,” *India Times*, August 2005.

“Global Challenge,” *The Guardian*, London, August 4, 2005.

“On MBAs,” *Financial World*, London, September 2005.

“Vigorous Competition Better than any Oath,” *Handelsblatt.com*, September 4, 2003.

“Playing the Game the American Way,” *Budapest Business Journal*, July 9, 1993.

“An English Reform of American Law,” *Wall Street Journal*, August 9, 1991.

Business School Cases and Class Materials:

“Alternative Tools to Influence Market and Non-Market Behavior.”

“W.R. Grace Co.’s Zonolite Licensee Program: How to Exploit Two Related Monopolies and Improve Economic Efficiency.”

“Job Risk.”

“Pricing Decisions: Custom Limousines.”

“The Choice of Technologies.”

“Mimicking the S&P 500.”

“Human Capital, Work, and Leisure.” Co-author: Scott E. Masten.

“Sugar Quotas.” Co-author: Edward J. Mitchell.

GRANTS AND FELLOWSHIPS

Appendix A

Grants from Aventis Pharmaceuticals, University of Chicago Graduate School of Business, University of Virginia Darden School, and Bates College 2000-01. Resulted in "Napsterizing Pharmaceuticals: Access, Innovation, and Consumer Welfare," NBER Working Paper (October 2002).

Grants from University of Virginia Darden School's Batten Institute and University of Chicago Booth School of Business for major extension of previous research, 2009-10. Resulted in "Napsterizing Pharmaceuticals: Access, Innovation, and Welfare" (January 2011).

BT Grant of funds and equipment to the University of Michigan Business School to deliver educational modules using new technologies. November 1995,

U.S. Department of Treasury Grant to the Davidson Institute study bank privatizations in Central Europe and Russia. Co-investigator: Roger C. Kormendi. June 15, 1995 – December 31, 1995.

Robert Wood Johnson Foundation Grant to study the effects of tort reforms on medical malpractice litigation. Co-investigator: James W. Hughes. June 1, 1987 - December 31, 1988.

Earhart Foundation Grant to study the effects of the Supreme Court's *Brunswick* decision on private antitrust litigation. Summer 1986.

University of Michigan Business School Summer Research Grants to study private and public antitrust enforcement and other law and economics issues. 1984, 1985, 1989, 1990, 1992, and 1993.

University of Michigan Office for the Study of Public and Private Institutions Research Grant to study contract mechanisms to protect non-patentable innovations. Co-investigator: Scott E. Masten. Summer 1989.

Bradley Foundation Grant to study contract mechanisms to protect non-patentable innovations. Co-investigator: Scott E. Masten. July 1, 1989 - June 30, 1990.

RGK Foundation Grant to study contract mechanisms to protect non-patentable innovations. Co-investigator: Scott E. Masten. July 1, 1989 - June 30, 1990.

University of Chicago, Committee on Public Policy Studies Fellowship, 1978.

INVITED PAPERS, CONFERENCE PRESENTATIONS, TESTIMONY*

* In this section I include information regarding my testimony and briefings in public settings. Please refer to edwardasnyder.com for information regarding my consulting testimony in various litigations.

"Economics and Government Policy." Panel Discussion with Edward P. Lazear, Randall S. Kroszner, and Lawrence H. Summers, Honoring Gary S. Becker: A Conference, Chicago, IL, February 11, 2011.

"The Management Education Industry." AACSB Annual Deans Conference Plenary Session with Deans Christine Poon, Joseph Thomas, and Andrew Policano), Phoenix, Arizona, February 20, 2011.

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- “U.S. Business Schools and the MBA: A Long Perspective.” EFMD Annual Meeting of Deans and Directors, Lyon, France, January 25, 2011.
- “Digging Out of the Deficit.” Executive Roundtable Panel Discussion with Governors Tim Pawlenty (MN), Donald Carcieri (RI), Mark Sanford (SC), Robert McDonnell (VA), and John Kasich, Candidate for Governor (OH), Cincinnati, Ohio, September 20, 2010.
- “Corporate Governance.” Inside Counsel’s 10th Annual Super Conference, invited panel. Chicago, IL, May 25, 2010.
- “Proof of Common Impact in Antitrust Litigation: The Value of Regression Analysis.” George Mason 13th Annual Symposium on Antitrust Law, February 4, 2010; Analysis Group Seminar, New York, NY, October 20, 2010.
- “The Future of §2 Enforcement.” Antitrust Section of the New York State Bar Association, Annual Meeting, January 28, 2010.
- “Global Antitrust Enforcement.” Center for Public Studies (Santiago, Chile), September 2009.
- “Globalization of Management Education.” Plenary Speaker at AACSB Annual Deans Conference, San Francisco, CA, February 5, 2009.
- “The Role of Economic Experts in Class Certification in the United States.” The American Bar Association Section of Antitrust Law Trial Practice Committee, June 17, 2008.
- “Are Business Schools Becoming Truly Global?” with Dean Santiago Iñiguez. AACSB Dean’s Conference, San Diego, CA, February 6, 2006.
- “Strategic Choices in a Global Environment.” Presentation with Dean Santiago Iñiguez. European Foundation for Management Development Deans’ Conference, Rotterdam School of Management, The Netherlands, January 26, 2006.
- “How to Use Economics.” Distinguished Alumni Presentation, Colby College, October 2005.
- “Hatch-Waxman and Public Policy Toward Pharmaceuticals.” Presentation at Summer 2002 Conference for Western Attorneys General.
- Congressional Briefing, “Hatch-Waxman Reconsidered: How Best to Promote Prescription Drug Innovation and Affordability,” sponsored by the Alliance for Health Reform and supported by the National Institute of Health Care Management, June 13, 2002.
- Combined Federal Trade Commission and Department of Justice Hearings on Competition and Intellectual Property Policy. Presentation of testimony on Hatch-Waxman and Public Policy Toward Pharmaceuticals, March 2002.
- Graduate Business Conference, Johnson Graduate School of Management, Cornell University, invited panel, The Future of Management Education, March 2001.

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New York State Bar Association, invited panel on Indirect Purchaser Litigation in Antitrust, New York, NY, January 2001.

University of Virginia, E-Summit's Plenary Session, November 1999.

European Association of Comparative Economics, Annual Conference, invited panel, Bank Privatization, Granola, France, September 1996.

University of Chicago, Conference on Tort Reform, Commentator for Steven Shavell, June 1996.

U.S. Department of Treasury, Davidson Institute, "Banks in Transition: Investment Opportunities in Central Europe and Russia," New York City, May 1996.

U.S. Department of Treasury, Davidson Institute, "Bank Privatization in Central Europe and Russia," Budapest, April 1996.

American Law and Economics Association, invited paper (with Greg Niehaus), "Damage Schedules in the Products Liability System and the Efficiency of Consumption Choices," May 1994.

American Economics Association, invited paper (with James W. Hughes), "Litigation under the English and American Rules: Theory and Evidence," January 1994.

University of Michigan Presidential Forum on *Constituting International Expertise: Who, What, Where Why, How?*, "Transitions in Expertise," October 1993.

American Law and Economics Association, invited paper (with James W. Hughes), "Litigation under the English and American Rules: Theory and Evidence," May 1992.

Western Economic Association, 100 Years of the Sherman Act, invited paper (with Thomas E. Kauper), "Misuse of the Antitrust Laws," June 1990.

Western Economic Association, Applied Microeconomics, invited paper, "Aftermath of the *Sealy* Antitrust Litigation," June 1990.

Law and Society Association, invited paper (with James W. Hughes), "The English Rule for Allocating Legal Costs: Evidence Confronts Theory," June 1989.

Duke University, Conference on the Law and Economics of Contracting, invited paper (with Scott E. Masten), "The Design and Duration of Contracts: Strategic and Efficiency Considerations," April 1988.

U.S. Senate Banking Committee, testimony based on research paper ("The Origins and Resolution of the Thrift Crisis"), February 1988.

Georgetown University, Conference on Private Antitrust Enforcement, invited paper (with Thomas E. Kauper), "An Inquiry into the Efficiency of Private Antitrust Enforcement," November 1985.

Hoover Institution, Conference on Antitrust and Economic Efficiency, invited paper, "Efficient Assignment of Rights to Sue for Antitrust Damages," August 1984.

Appendix A

SEMINARS AND OTHER PRESENTATIONS

University of Chicago

Applied Price Theory Workshop (4/84, 10/84, 10/02).

Economics and Legal Organization Workshop (10/90, 1/92, and 5/92).

U.S Treasury, (2/96).

Davidson Institute Research Seminar Series, (4/95).

University of Michigan, Center for Chinese Studies, (10/94).

Young Presidents Organization, Asia Region Meetings, (2/94).

Confederation of Indian Industries, CEO Forum, (2/94).

Harvard University Law School, Law and Economics Seminar, (4/93).

George Mason University Law School, Law and Economics Seminar, (10/92).

University of Illinois, Industrial Organization Workshop, (4/92).

Georgetown University Law School, Law and Economics Workshop, (11/91).

Cornell University Law School (4/91).

University of Southern California, Applied Micro Workshop (10/90).

University of California at Los Angeles, Industrial Organization Workshop (10/90).

Virginia Polytechnic Institute, Economics Department Seminar (11/89).

Federal Trade Commission (10/88, 10/92).

Western Economic Association (7/87, 7/88, 6/90, and 7/96).

Duke University, Center for the Study of Business Regulation (11/86 and 12/92).

Ohio State University, Industrial Organization Seminar (5/88), Microeconomic Theory Workshop (10/86).

Colby College (5/85, 2/92, 3/96).

U.S. Department of Justice, Antitrust Division (5/85, 5/86, 5/87, 11/89, and 5/91).

Washington University, Industrial Organization Workshop (3/85).

University of Michigan,

Industrial Organization Workshop (2/84, 4/85, 9/86, 1/88, and 3/88).

Law and Economics Seminar (10/89, 4/90, and 1/92).

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University of Virginia, e-Summit (11/99).

“How to Use Economics.” Illinois Agricultural Leadership Seminar. Chicago, IL.
August 2006.

PH.D THESIS COMMITTEE SUPERVISION

Alowin M. Th. L. Moses, “A Model of Voucher Privatization” (University of Michigan, 1996).

Vijay Singal, “Efficiency Versus Market Power in Mergers: Evidence from the Airline Industry” (University of Michigan, 1992).

David E. Weinstein, “Essays on Japan's Trade and Industrial Structure” (University of Michigan, 1991).

Debra J. Holt, “Understanding Strategic Choice: The Statistical Analysis of Experimental Games” (University of Michigan, 1990).

David J. Denis, “Asymmetric Information and the Market for Seasoned Equity Offerings: Theory and Evidence” (University of Michigan, 1988).

Amy J. Broman, “The Impact of Federal Income Tax Policy on the Charitable Contributions Behavior of Households” (University of Michigan, 1987).

James W. Hughes, “Tort Reforms and Medical Malpractice Litigation” (University of Michigan, 1986).

Barton L. Lipman, “Delaying or Deterring Entry: A Game-Theoretic Analysis” (University of Michigan, 1985).

OTHER

Trustee, Colby College

Referee for the Journal of Law & Economics