Expert Report of Orley Ashenfelter

In Connection with Resident Physicians Antitrust Litigation

Materials designated as confidential have been redacted pursuant to a Confidentiality Order entered by the Court.

Table of Contents

Table of Figures

I. Summary of Qualifications

1) I am Orley C. Ashenfelter, the Joseph Douglas Green 1895 Professor of Economics at Princeton University. I received a Ph.D. in economics from Princeton University in 1970. I teach courses in labor economics (the study of wages, hours, and employment in the work force) and econometrics (the application of statistical methods to economic problems).

2) In more than 30 years of teaching and research in economics, I have conducted extensive quantitative economic investigations and analyses of labor markets. I have published numerous quantitative studies that examine, among other subjects, the impact of particular events on wages, working conditions and the behavior of individuals and firms in the market, such as the impact of government retraining programs on wages, economic returns to education and training, the impact of the end of mandatory retirement rules on the retirement decisions of faculty, the economics of sex discrimination in the workplace, the effect of anti-discrimination programs on wages, and the effect of unionization on wages in the public sector. I am also the editor of numerous leading texts on labor economics, including The Handbook of Labor Economics, Volumes I–III (with Richard Layard and David Card), and The Economics of Training I and II (with Robert LaLonde).

3) From 1985 to 2002, I served as Editor and Co-Editor of the American Economic Review, the peer-reviewed journal of the American Economic Association. I am also currently Co-Editor of The American Law and Economics Review. I have served on the

editorial boards of numerous other journals of economics. I have taught courses in econometrics and statistics for federal judges since 1979 under the auspices of the Federal Judicial Center and the Center for Law and Economics at George Mason University. This year, I received the IZA Prize in Labor Economics awarded by the Institut zur Zukunft der Arbeit in Berlin Germany.

4) A copy of my *curriculum vitae* is attached to this report as Appendix A: Curriculum Vitae of Orley Ashenfelter, while Appendix B: Recent Testimony Experience of Orley Ashenfelter contains a list of my testimony in the last four years.

II. Assignment

5) I have been retained in this litigation as an expert by the Plaintiffs' counsel who have asked me to give my opinion on two questions relevant to the class-certification stage of this litigation. First, can it be shown using common evidence that all or virtually all of the members of the proposed Plaintiffs' class have been harmed as a result of the conspiracy alleged by the Plaintiffs? Second, are there accepted and feasible methods for calculating damages incurred by the Plaintiff class on a class-wide basis?

6) In formulating my opinions, in addition to my expertise in economics, I have considered and relied upon the pleadings in this case, documents and data produced by the Defendants, and various studies and information that are publicly available. Appendix C: Materials Considered contains a list of the materials I have relied on thus far in forming my opinions. My time for this work is billed at my customary rate of $600 per hour.

III. Summary of Allegations

7) The Plaintiffs assert that the resident physician program overseen by the Defendants is controlled in such a way that the market for resident physicians is anti-competitive and violates U.S. anti-trust law. Specifically, the Plaintiffs allege a single conspiracy by which the Defendants "have illegally contracted, combined and conspired among themselves to displace competition in the recruitment, hiring, employment and compensation of resident physicians, and to impose a scheme of restraints which have the purpose and effect of fixing, artificially depressing, standardizing and stabilizing resident physician compensation and other terms of employment."[1] For this litigation, the Plaintiffs propose a Plaintiff class comprised of "All persons employed as resident physicians in ACGME-accredited residency programs (including programs combined of ACGME-accredited programs) since May 7, 1998."[2]

---

[1] Complaint, pp 5–6.

[2] Complaint, p 18. I am informed by counsel that the class includes subspecialty programs commonly referred to as "Fellowships."

IV. Summary of Conclusions

8) Based on my investigation and analyses, information related to this case that was produced by Defendants or was publicly available, and my knowledge of the ways in which labor markets operate, I have arrived at the following conclusions.

- The conspiracy alleged in the complaint would have lowered the salaries of all, or virtually all, of the medical residents who comprise the proposed class.
- There are several feasible methods for calculating damages on a class-wide basis. These methods rely on techniques that are standard in economic research.

9) The following sections discuss the bases for my conclusions. Section V reviews the background of this litigation as it relates to my expert report, including a review of the primary institutions involved and the role of residency programs in both a physician's career path and the teaching hospitals. In Section VI, I explain the bases for my opinion that, assuming the Plaintiffs can prove the allegations they make in their complaint, all or virtually all members of the proposed plaintiffs' class have been harmed by the alleged misconduct. Section VII offers several feasible methods for calculating damages on a class-wide basis.

V. The Organization of the Market, The Match, and Resident Physicians' Role at Teaching Hospitals

10) The Defendants include a number of organizations that for decades have overseen the market for resident physicians. A system to match medical school graduates with residencies (or internships) has been in use since 1952.[3] Though the institutions have evolved, the essential facts remain the same: Most residencies are available only through the NRMP;[4] to become licensed by a state or to become board-certified physicians, medical school graduates have no choice but to participate in or complete a residency, all of which must be accredited by the ACGME[5] and residents remain important health service providers at teaching hospitals.[6,7] In this section, I review the institutions that

---

[3] See http://www.nrmp.org/about_nrmp/, downloaded October 23, 2003, which states, "The National Resident Matching Program (NRMP) is a private, not-for-profit corporation established in 1952 to provide a uniform date of appointment to positions in graduate medical education (GME)."

[4] See Frances H. Miller, JD and Thomas L. Greaney, JD, "The National Resident Matching Program and Antitrust Law," *The Journal of the American Medical Association* 289, no.7 (19 Feb 2003): 913–918. "Although participation in the NRMP is not mandatory, more than 80% of all first-year US house officer positions are now offered exclusively through the program. That percentage will almost certainly increase beginning with the 2004 Match because under a new NRMP policy all institutions wishing to participate must attempt to fill all of their residency positions through the NRMP process as of that year. This means that applicants who choose not to engage in the Match (or who are excluded from it), who already have a sharply reduced number of institutional buyers for their services, will find that number decreasing even further. Nonparticipating hospitals would correspondingly have a smaller number of potential residents from whom to choose."

[5] See "Summary of Fifty States Physician Licensing" prepared by Lockridge, Grindal, Nauen, PLLP.

[6] For example, on its website, the NRMP states that, "To be eligible to offer positions through an SMS Match, as of the rank order list deadline for such SMS Match a program must be either (a) accredited by the Accreditation Council for Graduate Medical Education ("ACGME"), (b) a combined program that is approved or recognized by the American Board of Medical Specialties ("ABMS") or by the respective specialty board that is responsible for board certification of residents who successfully complete the combined program, or (c) as agreed upon by the sponsoring program directors' group and the NRMP. See http://www.nrmp.org/fellow/map_sms.html#pro_eligible, downloaded October 23, 2003.

oversee this market place, the history and purpose of the matching program, and the role residencies play in a physician's career path and in the teaching hospitals.

V.1. The Organization of the Market

11) The residency period of a physician's career generally encompasses three to seven years of work between finishing medical school and becoming a board-eligible physician in the United States.[8] Though the number of years in residency that are required varies depending on the chosen specialty, at least one year of residency is required for basic licensure and completing an accredited residency program is required to be eligible for board certification.[9] Each year in the U.S., more than 20,000 graduates of both U.S. and

---

[7] For example, see http://www.georgetown.edu/hospital/housestaff/#anchor760463, downloaded October 23, 2003 which states, "Programs also ensure that house staff provide safe, effective and high quality patient care with increased responsibility at each post graduate level." In addition, see: Derek DeLia, Joel C. Cantor, and Elaine Duck, "Productivity vs. training in primary care: Analysis of hospitals and health centers in New York City," *Inquiry—Excellus Health Plan* 39, no.3 (Fall 2002): 314–326, which states that, "Resident physicians take on the dual roles of professional trainees who are improving their skills, and of health care providers who are serving the needs of patients."

[8] See http://www.nrmp.org/whythematch.pdf, downloaded October 23, 2003, which states, "Medical education in the United States is divided into two distinct phases, each of which is required to become initially licensed as a practicing physician...The second phase entails a minimum of 3 and as many as 7 years of additional training through graduate medical education (GME) programs sponsored by teaching hospitals or medical schools."

[9] See the USMLE eligibility requirements, at http://www.usmle.org/bulletin/2004/eligibility.htm, downloaded October 23, 2003, which state that, "The US Medical Licensing Examination program recommends that for Step 3 eligibility, licensing authorities require the completion, or near completion, of at least one postgraduate training year in a program of graduate medical education accredited by the Accreditation Council for Graduate Medical Education (ACGME) or the AOA (American Osteopathic Association)." See also "Summary of Fifty States Physician Licensing" prepared by Lockridge, Grindal, Nauen, PLLP.

foreign medical schools begin a residency program.[10] At any given time, there are nearly 100,000 residents in more than 7,700 programs throughout the U.S.[11]

12) The relevant market alleged by the Plaintiffs in their complaint—a single market for resident physicians in the United States—is consistent with my analysis and investigation for this report. Thus, that is the market I adopt for this report. Even if I further explore market definition in the future, I do not expect that anything I might learn would affect my conclusions here. Moreover, even if I learn in the future that there are multiple markets for resident physicians, I expect the analysis of common impact and the damage methodologies I propose would remain the same for resident physicians in each of these markets.

13) Each of the named "organization defendants" in this litigation (the National Resident Matching Program, the Accreditation Council for Graduate Medical Education, the Association of American Medical Colleges, the American Medical Association, the American Hospital Association, the American Board of Medical Specialties, and the Council of Medical Specialty Societies) play an important role in overseeing the market in which medical residents are employed. The National Resident Matching Program (NRMP), which under various names has existed since 1952, operates a program that

---

[10] The NRMP reports that in each year from 1999 through 2003, the NRMP match has filled more than 18,000 positions and offered more than 20,000 positions. See http://www.nrmp.org/res_match/tables/table5_2003.pdf, downloaded October 23, 2003.

[11] The ACGME website tallies the number of positions and programs accredited by the ACGME each year. See http://www.acgme.org/adspublic/reports/accredited_programs_all.asp, downloaded October 23, 2003.

each year matches prospective residents with residency programs. The Plaintiffs allege that this program, often referred to simply as 'the Match,' "eliminates a free and competitive market and substitutes a centralized, anticompetitive allocation system assigning prospective resident physicians ("applicants") to a single, specific and mandatory residency position.... The NRMP matching program has the purpose and effect of depressing, standardizing and stabilizing compensation and other terms of employment."[12] I discuss some details of why the Match was established and how it operates in Section V.2 of this report.

14) The Accreditation Council for Graduate Medical Education (ACGME) is the organization that oversees the accreditation process in nearly every allopathic residency program in the United States. As the ACGME writes on its website,

> The ACGME accredits residency programs in 110 specialty and subspecialty areas of medicine, including all programs leading to primary Board certification by the 24 member boards of the American Board of Medical Specialties, and completion of an ACGME-accredited residency program is a prerequisite for certification in a primary board. Completion of an ACGME-accredited subspecialty program is also required before an individual can sit for board certification in the majority of subspecialties."[13]

---

[12] Complaint, p 26.

[13] http://www.acgme.org/About/roleAcgme.aspdownloaded on October 2, 2003.

15) The accreditation standards for residency programs are determined by one of the 27 specialty-specific Residency Review Committees (RRCs) which are an integral part of the ACGME. These RRCs are also in charge of reviewing and accrediting the residency programs. Approximately half of all residency programs each year undergo some level of review by the RRCs to maintain their accreditation. "Approximately 2,200 of these reviews involve a formal on-site visit to the program; the remaining reviews are based on documents each program provides to the ACGME. On average, each accredited residency program is site visited every 3.7 years."[14]

16) These two organizations, the ACGME and the NRMP, have the same set of five governing sponsors: the Association of American Medical Colleges (AAMC), the American Medical Association (AMA), the American Hospital Association (AHA), the American Board of Medical Specialties (ABMS), and the Council of Medical Specialty Societies (CMSS).[15] These five organizations, along with the ACGME and the NRMP are the seven defendant organizations in the complaint.

17) "The American Board of Medical Specialties (ABMS) is the umbrella organization for the 24 approved medical specialty boards in the United States."[16] These boards correspond to the specialties for residency programs, like Family Practice, Dermatology, or Psychiatry. Within each specialty, the individual boards offer certification in

---

[14] http://www.acgme.org/About/roleAcgme.asp downloaded on October 2, 2003.

[15] See http://www.acgme.org/About/2000AnnRep.pdf, downloaded October 23, 2003 and http://www.nrmp.org/, downloaded October 29, 2003.

[16] See http://www.abms.org/about.asp downloaded on October 23, 2003.

subspecialties. For example, the American Board of Family Practice offers certification in subspecialties such as Sports Medicine or Geriatric Medicine. Each board has its own set of requirements for certification, including examinations or limits in the length of time from residency. But nearly every board requires completing an ACGME accredited residency, a residency combined of two core ACGME accredited residencies, or a residency accredited by an ACGME equivalent.[17]

18) The "CMSS is unique in that its membership is limited to those U.S. medical specialty societies that represent diplomates certified by a Board recognized by the American Board of Medical Specialties (ABMS). CMSS serves to represent the views of specialist physicians in influencing policy, medical education and accreditation from a broad, cross-specialty perspective. CMSS is a non-profit association whose members are 19 national specialty organizations representing more than 412,000 physicians nationwide."[18]

---

[17] There are a small number of "combined" subspecialty programs that consist of training in two or more "core" programs are not accredited by the ACGME, but are instead certified directly by the ABMS. For example, the ACGME does not accredit training in combined programs, such as Internal Medicine-Pediatrics and, or Internal Medicine-Psychiatry. These programs function as "educational tracks" within their ACGME-accredited core residency programs, and the relevant ABMS-member boards have determined that participation in their affiliated and ACGME accredited "core" program makes individuals who have completed a combined program are eligible to sit for the board certification in their specialties. See http://www.acgme.org/About/roleAcgme.asp, accessed October 23, 2003. Some boards may accept residency training in programs certified by other organizations, like Canada's ACGME equivalent, The Royal College of Physicians and Surgeons of Canada, see http://www.abms.org/Downloads/General_Requirements/Table3.PDF

[18] http://www.cmss.org/index.cfm?p=display&detail=About%20CMSS downloaded on October 2, 2003.

19) The ABMS and CMSS have distinct similarities and differences regarding their role in resident physician labor. Both organizations are sponsoring institutions of the ACGME and NRMP, and both participate on Residency Review Committees that accredit residency programs.[19] The ABMS is comprised of the 24 specialty boards that set the standards for and award certification to physicians in various specialties, and it focuses its activities on the evaluation and testing of those seeking certification by one of its Member Boards.[20] In contrast, the CMSS is comprised of societies representing physicians certified by the ABMS member boards, where the CMSS societies focus much of their activity on influencing policy.[21]

20) The AHA is an organization that represents "Close to 5,000 hospitals, health care systems, networks, other providers of care and 37,000 individual members.... Through [the AHA's] representation and advocacy activities, AHA ensures that members' perspectives and needs are heard and addressed in national health policy development, legislative and regulatory debates, and judicial matters. Our advocacy efforts include the legislative and executive branches and include the legislative and regulatory arenas."[22]

---

[19] See http://www.apds.org/flynn/sld023.htm, downloaded October 27, 2003, which states that each RRC contains representatives from the ABMS, AMA, and CMSS.

[20] See http://www.abms.org/about.asp, downloaded October 27, 2003, which states that "the mission of the ABMS is to maintain and improve the quality of medical care in the United States by assisting the Member Boards in their efforts to develop and utilize professional and educational standards for the evaluation and certification of physician specialists."

[21] See http://www.cmss.org/index.cfm?p=display&detail=About%20CMSS, downloaded October 27, 2003.

[22] http://www.hospitalconnect.com/aha/about/index.html downloaded on October 2, 2003.

Many teaching hospitals are members of the AHA and, as noted above, the AHA is one of the charter organizations of the NRMP.[23]

21) On their website, the AAMC writes, "As an association of medical schools, teaching hospitals, and academic societies, the AAMC works with its members to set a national agenda for medical education, biomedical research, and health care, and assists its members by providing services at the national level that facilitate the accomplishment of their missions."[24] One of the components of the AAMC is the Council of Teaching Hospitals and Health Systems (COTH). Each year, COTH surveys its member hospitals (about 400) and makes these surveys publicly available.[25] Plaintiffs allege this survey is one of the mechanisms by which the Defendants exchange salary information in order to implement and facilitate the anti-competitive conduct. The COTH survey is discussed later in this report.

22) The AMA is a medical association which does everything from lobbying activities to publishing the Journal of the American Medical Association.[26] The AMA also runs the Fellowship and Residency Electronic Interactive Database ("FREIDA") where residency programs can post detailed information about their programs, including salary

---

[23] For example, the "AHA Annual Survey Database—Fiscal Year 2001" provided by the AHA, bates stamp AHA 000296, identifies 369 COTH-member hospitals, 337 of which are listed as AHA members.

[24] http://www.aamc.org/about/start.htm downloaded on October 2, 2003.

[25] See http://www.aamc.org/hlthcare/coth-hss/start.htm, downloaded October 23, 2003.

[26] For a description of the AMA's activities, see http://www.ama-assn.org/ama1/pub/upload/mm/31/messagestakeholders.pdf, downloaded October 23, 2003 from the 2002 AMA annual report.

information. FREIDA is publicly available to both prospective residents and program directors alike and it is one of the ways in which the Plaintiffs allege that Defendants exchange information to implement and facilitate their anti-competitive conduct.

V.2. The Match

23) In the fall of each year, prospective residents from both U.S. and foreign medical schools begin registering for their participation in the Match. At this time, teaching hospitals participating in the Match begin listing their available residency positions with the NRMP, with many of them choosing to list current details of their programs, like salary and benefits, in the FREIDA database sponsored by the American Medical Association.[27] Prospective resident physicians then apply to and interview with teaching hospitals.

24) Beginning in mid-January, both the hospitals and the prospective resident physicians begin submitting an ordered list of their preferences; that is, prospective residents list the residency programs in the order of their interest and teaching hospitals,[28] for each of their residency programs, list prospective residents in the order of their preferences. Until the end of January, hospitals are allowed to change the number of positions they have available for each residency program. By the end of February, everyone must finalize

---

[27] A sample of an expanded listing on FRIEDA can be found at http://www.ama-assn.org/ama/pub/category/6875.html, downloaded October 27, 2003.

[28] Most of the entities that participate in the Match are teaching hospitals. Others are related entities such as medical schools. For convenience I refer to all of these entities as "teaching hospitals" or "hospitals."

their rank-order lists, and then in mid-March, a computer algorithm matches prospective residents with teaching hospitals.[29]

25) Both prospective residents and hospitals are required, with certain insignificant exemptions, to honor the match they received through the NRMP.[30] Moreover, prior to the match taking place, hospitals participating in the Match are prohibited from offering any of their positions to a graduating US medical school graduate senior (USMG).[31] For a short period immediately after the Match takes place, the unmatched applicants may 'scramble' for the relatively few remaining unmatched residency positions.[32]

26) There are very few similar programs matching employers with employees, and one may wonder why the labor market for residents has such a program but nearly every other labor market does not. The website for the NRMP includes a document entitled,

---

[29] For a schedule of dates and deadlines for NRMP matching, see http://www.nrmp.org/about_nrmp/schedule.html, downloaded October 23, 2003.

[30] For a summary of Match rules, see http://www.savethematch.org/include/popup.aspx?id=000320874005, downloaded October 23, 2003. The actual Match agreements are available through http://www.nrmp.org/res_match/policies/index.html, downloaded on October 27, 2003.

[31] See http://www.nrmp.org/res_match/faq/io_pd_faq.html#12, downloaded October 29, 2003 and Frances H. Miller, JD and Thomas L. Greaney, JD, "The National Resident Matching Program and Antitrust Law," *Journal of the American Medical Association* 289, no.7 (19 Feb 2003): 913–918.

[32] The NRMP web site states, "Beginning at noon eastern time on Tuesday of Match Week, a brief period of time is set aside for those applicants who did not match to give them an opportunity to contact unfilled programs and possibly secure a position before Match Day. This time period is commonly known as the 'Scramble.' " See http://www.nrmp.org//res_match/special_part/ind_app/match_results.html, downloaded October 23, 2003.

"Why the Match?"[33] This document describes "The Chaos of the Pre-Match Era" in the following way:

> Before the Match was established, thousands of medical school graduates scrambled on their own each year, hoping to obtain a firm commitment from a residency program that was "right" for them....Medical students and teaching hospitals were forced to make individual "commitments" to one another before either had had an opportunity to get to know the full range of possibilities from which they might choose. As a consequence, program directors, seeing "a bird in the hand," frequently pressured medical students to sign "binding" agreements on the spot, long before they had had a chance to explore all of their options....The lack of a formal system during the pre-match era was tailor-made for an "old-boy's" network. Students fortunate enough to have the backing of a well-known member of the medical education community had an advantage over other qualified applicants in securing the most coveted positions. Side deals were commonplace, promising careers were arbitrarily impeded, and merit-driven competition was stifled.[34]

27) Within the same paragraph on the NRMP website, a graphic indicates that in 1950, one year before the first trial of a matching process was run, there were 5,553 medical

---

[33] http://www.nrmp.org/whythematch.pdf, downloaded October 30, 2003.

[34] http://www.nrmp.org/whythematch.pdf, downloaded October 30, 2003, page 2.

school graduates available for 9,398 1st year internship positions. Economic theory suggests that if demand exceeds supply in a competitive market, prices will normally rise until supply and demand are in balance. Thus, given these data – employers seeking to fill 9,398 positions with 5,553 available medical school graduates – one might have expected residents' salaries to rise. When prices are not allowed to rise for some reason, another mechanism is needed to allocate the available workers among the potential employers. The Match is an example of this type of allocation mechanism. It provides a means to match prospective residents with employers when wages are not used in the allocation of resources.

28) What's interesting about the NRMP's description of what it calls the "Chaos of the Pre-Match Era" is that it also describes the vast majority of labor markets in the U.S. today and throughout the history of the Match. Millions of high school and college graduates, including the graduates of law schools and business schools, scramble on their own each year, hoping to obtain a firm commitment from an employer that's right for them. (The same can be said for the millions of unemployed, or even employed people who want a new job.) Similarly, people regularly accept employment before they know the full range of possibilities from which they might choose, and employers cannot search indefinitely for the best potential employees. Hardly anyone researches or interviews with every company that could potentially hire them, and employers don't research or interview everyone who is qualified to perform the job. It is quite common for jobseekers and employers alike to accept 'the bird in the hand' rather than to continue

looking for the perfect match, since searching for the perfect match can be a costly process and the threat of delaying a match or not matching at all entails its own costs that both employers and jobseekers understandably avoid. It is also typically true that having the backing of someone whose opinion carries weight in any profession (in other words, getting a good letter of recommendation) can help one secure employment over other qualified candidates.

29) There is nothing in the NRMP's "Why the Match?" that explains why conditions that are generally deemed appropriate in labor markets would be inappropriate in the market for resident physicians. Indeed, the Match doesn't even resolve some of the "chaos" that the NRMP identifies in the document. Prospective residents still interview with teaching hospitals so that each side may gather information about the other, and since this process is costly to both prospective residents and hospitals, it's unlikely that either side knows the full range of possibilities from which they might choose. Moreover, there is no reason to think that the matching process would eliminate the "old-boy's network." To receive a coveted residency, the prospective resident still needs to place highly on the hospital's rank-order list.

V.3. Residents and Teaching Hospitals

30) Participation in a residency program is a required step for medical school graduates to become licensed or to become board-certified physicians.[35] While employed, resident physicians perform health services in teaching hospitals, and so are an important part of the hospitals' staff.

31) Residents play an important role in performing the health services at teaching hospitals, often working extraordinarily long hours.[36] Recently, the ACGME enacted rules that essentially prohibit any resident from being required to work more than 80 hours per week.[37] American Medical News, published by the American Medical Association, reported that "first-year residents across all specialties worked an average of 58 hours a week." Resident physicians in some specialties worked considerably more, with first-year obstetrics and gynecology residents working an average of 78 hours per week, and first-year general surgery residents working 81 hours per week on average.[38]

---

[35] The requirements for general certification by the ABMS member boards are available at http://www.abms.org/Downloads/General_Requirements/Table3.PDF, downloaded October 27, 2003.

[36] See description of residents' long hours and health care services provided by residents in Ofelia Casillas, "Medical residents see tough schedules ease up; Patient safety concerns spur new limits on hours, but some fear training will be compromised," *Chicago Tribune* 6 July 2003, 1.

[37] See "ACGME duty hours standards now in effect for all residency programs," available at http://www.acgme.org/Media/news7_1_03.asp, downloaded October 23, 2003. The ACGME requirements with respect to the number of hours worked per week is available at http://www.acgme.org/DutyHours/dutyHoursLang703.pdf, downloaded October 27, 2003.

[38] The same article reported that "the average number of hours spent by residents in purely educational activities was only 5.6 hours." AMNews, Dec. 6, 1999, available at http://www.ama-assn.org/amednews/1999/pick_99/prfc1206.htm and downloaded October 29, 2003.

32) Residents also play an important role in the financial situation of hospitals. Running residency programs, of course, does impose costs upon the hospitals. In its 15th report, the Council of Graduate Medical Education, an independent committee funded by the Department of Health and Human Services, said that the average per-resident cost of graduate medical education (GME) in 1997, including residents' salaries, was $96,753. There was quite a bit of variation in the estimated costs of GME: In the lowest quartile (that is, the 25% of hospitals with the lowest costs), average costs were $51,863 while in the highest quartile average costs were $163,067.[39] This variation is not driven by variation in salaries paid to residents, which (as I describe below) are remarkably similar across programs, hospital types, and geographic areas. Indeed, the fact that the variation in the costs of GME is not driven by the wages paid to residents is explicitly recognized by the Council of Graduate Medical Education in its report, which says, "Analysis of cost reports beginning in FY1997 indicates the differences in resident salary levels account for a relatively small amount of the variation in direct GME costs.... Most cost variation is attributable to differences in the other direct program costs (including teaching physician compensation) and in allocated overhead costs."[40]

33) Given the long hours worked and the services performed by medical residents, it is not surprising that residents are an important source of revenue for teaching hospitals.

---

[39] Council on Graduate Medical Education, Fifteenth Report, *Financing Graduate Medical Education in a Changing Health Care Environment*, December 2000, p 25.

[40] Council on Graduate Medical Education, Fifteenth Report, *Financing Graduate Medical Education in a Changing Health Care Environment*, December 2000, p 25.

First, teaching hospitals receive funding from Medicare to subsidize the costs of GME. Total funding for GME from Medicare was in excess of $6 billion in 1998.[41] In 2000, Medicare funding averaged more than $73,000 per resident.[42] Additionally, in many states, teaching hospitals also receive subsidies for GME from the Medicaid program. While the amount and process for distributing these funds varies from state to state, one estimate put total State funding of GME through Medicaid at about $2.3 billion.[43] With just under 100,000 residents in the 1999–2000 year,[44] Medicaid funding provides approximately $23,000 per resident on average. Government funding through Medicare and Medicaid, then, could be as much as $96,000 per resident on average.

34) The government, however, is not the only source of revenue coming to hospitals through resident physicians and their services. The residents, through the health services they perform, generate their own fees for hospitals. For example, one study in the Journal of the American Medical Association noted that, "Many private payers implicitly support teaching hospital missions with rates higher than what they pay community hospitals" and "Hospital and faculty physician billings for services provided by residents are

---

[41] Council on Graduate Medical Education, Fifteenth Report, *Financing Graduate Medical Education in a Changing Health Care Environment*, December 2000, p 23.

[42] *Graduate Medical Education and Public Policy, a Primer*, Health Resources and Services Administration, Bureau of Health Professions, December 2000, p 16.

[43] Council on Graduate Medical Education, Fifteenth Report, *Financing Graduate Medical Education in a Changing Health Care Environment*, December 2000, p 34.

[44] *Graduate Medical Education and Public Policy, a Primer*, Health Resources and Services Administration, Bureau of Health Professions, December 2000, p 4.

another source of revenue for some AMCs."[45] In addition, ECG Management Consultants, in an April 2000 presentation, list gifts, grants, contracts, and third-party payments (besides Medicare and Medicaid) as sources of revenue derived from GME.[46]

35) Another way to see the importance of residents in the hospitals' financial positions is to look at how much it would cost hospitals to replace the work done by residents with other qualified personnel if they did not have access to residents. The Health Resources and Services Administration (part of the U.S. Department of Health and Human Services) writes,

> While residents represent a cost to teaching hospitals and their affiliated clinics, the health services that more experienced residents render help defray other costs that an institution would likely incur if they were not present. For example, a second or third year resident may work 80 hours a week at an annual salary of about $40,000. If that position did not exist, the service duties would often be performed by a higher paid, fully certified physician(s), or, at a minimum, a nurse practitioner or physician assistant.

---

[45] Robert Mechanic MBA, Kevin Coleman, and Allen Dobson, PhD, "Teaching Hospital Costs: Implications for Academic Missions in a Competitive Market," *Journal of the American Medical Association* 280, no.11 (16 Sep 1998):1015–1019.

[46] See "Is There a Business Case for GME?,"available at http://www.ecgmc.com/expertise/pdf/0033361.pdf, downloaded October 23, 2003.

> In either case, the hospital would bear a replacement cost in excess of employing the resident.[47]

36) One study done at York Hospital in Pennsylvania, as reported by AMNews, a publication sponsored by the AMA, found that

> At York Hospital, residents receive an average annual salary of $38,500, while Medicare pays York $70,000 per resident in direct GME reimbursement. Two to three nurse practitioners or physician assistants, who earn between $55,000 to $70,000 annually with no Medicare reimbursement, would be required to replace each resident.[48]

37) The study, performed by ECG Management Consultants, found that "the expense to replace one resident or fellow could range from $70,000 to $300,000 per year in salaries and benefits."[49] This figure does not include the loss in government funding from Medicare and Medicaid. The study also found that resident physicians created `excess revenue' for the hospitals. As AMNews summarized,

> Medical education still provides a positive contribution to the bottom line," said Brian Gragnolati, president of York Hospital. York's 110 residents in seven fields are projected

---

[47] *Graduate Medical Education and Public Policy, a Primer*, Health Resources and Services Administration, Bureau of Health Professions, December 2000, p 6.

[48] http://www.ama-assn.org/amednews/2000/04/24/prsc0424.htm, downloaded October 29, 2003.

[49] http://www.ama-assn.org/amednews/2000/04/24/prsc0424.htm, downloaded October 29, 2003.

> to contribute an estimated $2.1 million in excess revenue to the hospital in fiscal year 2000–01. In fiscal 1997–98, before the Balanced Budget Act of 1997 slashed GME reimbursement, that number was $3.76 million, Gragnolati said.

38) For York Hospital, then, medical residents represented a net gain in revenue for the hospital and the cost of replacing the low-paid residents was estimated to be very high.

39) It is clear from this that medical residents, while channeled into these positions in order to continue through their career paths, are also an important source of funding for hospitals.

VI. Analysis of Labor Market Structure and Wage Data

40) I have analyzed two kinds of evidence that bear on the question of whether the alleged anti-competitive behavior would have affected the members of the proposed plaintiff class: First, I have analyzed the structure of the market in which the plaintiff class is employed and this review suggests that any anti-competitive conduct, if it exists, would have depressed salaries for all, or almost all, members of the proposed plaintiff class. Second, I have conducted an extensive empirical analysis of wage data from the market itself and this analysis shows that the salaries of resident physicians (members of the class the Plaintiffs propose) reacted in predictable ways to basic market forces. Each of these analyses supports the conclusion that all or virtually all medical residents would have been adversely affected by the conspiracy the Plaintiffs allege.

41) In the next two sub-sections, I look at each type of evidence in turn.

VI.1. Information on Labor Market Structure

42) In an economic analysis of whether a suspected conspiracy has depressed wages (or alternatively, raised prices), there are a number of factors that can be relevant to demonstrating harm on a class-wide basis. First, the sellers (in this case, residents) need to be able to sell their services to multiple buyers (teaching hospitals) who are members of the suspected conspiracy. This serves to show that there is overlap among the various buyers. Second, the buyers (in this case the hospitals, including the Defendants here) must have "market power." Generally speaking, market power is defined as "[t]he ability

to price profitably above the competitive level ..."[50] In the context of this case, where the concern is market power among employers (the buyers in the labor market), market power means the ability to profitably pay compensation lower than the competitive level. Thus, market power is relevant to whether the defendants could effectively carry out the anti-competitive conduct alleged by the Plaintiffs here. Without market power, a conspiracy cannot profitably depress wages below their competitive level. Third, there need to be barriers to entry that control entrants to that market who would not be part of the conspiracy. If entry were easy into the market, then new entrants would be able to undermine the market power of the conspiracy, and prospective medical residents, therefore, would have potential employers to turn to in order to avoid the impact of the alleged conspiracy. Fourth, there need to be mechanisms in place that, as a matter of logistics, allow the conspiracy to depress wages.

VI.1.1. Labor Market Overlap

43) When prospective residents finish medical school, they can apply to thousands of residency programs throughout the country. Graduates can apply equally to the various specialty programs, and indeed, I understand that some graduates do in fact list programs in more than one specialty on their rank order lists in the Match.[51] Similarly, within a

---

[50] Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization*, Second Edition (1994), p. 8.

[51] [redacted]

single specialty, residents can and do apply to residency programs around the country. Consequently, in a competitive market environment, the teaching hospitals in one area of the country need to compete for resident physicians with hospitals throughout the country. Medical school graduates likewise compete for positions with other graduates from around the country, and indeed, from around the world since each year there are thousands of foreign medical school graduates who apply for resident physician jobs in the U.S. This overlap across specialties and geographic regions suggests that the teaching hospitals and residents are operating in a single market.

VI.1.2. Market Power

44) It is virtually impossible for a prospective resident physician to be licensed or to become a board-certified physician in an allopathic specialty without being subject to at least some of the alleged anti-competitive conduct of the Defendants. The Plaintiffs make a number of allegations which, combined, would mean that the Defendants control significant aspects of the market for resident physicians. In their complaint, the Plaintiffs write, "In 2000, 80% of all first-year postgraduate residency positions were offered exclusively through the NRMP matching program."[52] This figure is confirmed by a study in the Journal of the American Medical Association which noted, "Although participation in the NRMP is not mandatory, more than 80% of all first-year US house officer

[52] Complaint at paragraph 71.

positions are now offered exclusively through the program."[53] Moreover, the NRMP requires that for a program to participate in the Match, the program must be ACGME accredited, be a combined program recognized by the ABMS boards, or else receive a special allowance from the NRMP.[54] Presumably, the number of allowances is relatively small, and thus the overwhelming number of programs in the NRMP are accredited by the ACGME or recognized by the ABMS boards.[55] According to the ACGME's institutional requirements, "In selecting from among qualified applicants, it is strongly suggested that the Sponsoring Institution and all of its ACGME-accredited programs participate in an organized matching program, such as the National Resident Matching Program (NRMP), where such is available."[56] Thus, in one way or another, most residency programs come under the rubric of the NRMP and the ACGME.[57] While it is true that the NRMP and the ACGME are not themselves buyers of resident physicians'

---

[53] See Frances H. Miller, JD and Thomas L. Greaney, JD, "The National Resident Matching Program and Antitrust Law," *The Journal of the American Medical Association* 289, no.7 (19 Feb 2003): 913–918.

[54] On its website, the NRMP states that, "To be eligible to offer positions through an SMS Match, as of the rank order list deadline for such SMS Match a program must be either (a) accredited by the Accreditation Council for Graduate Medical Education ("ACGME"), (b) a combined program that is approved or recognized by the American Board of Medical Specialties ("ABMS") or by the respective specialty board that is responsible for board certification of residents who successfully complete the combined program, or (c) as agreed upon by the sponsoring program directors' group and the NRMP. See http://www.nrmp.org/fellow/map_sms.html#pro_eligible, downloaded October 23, 2003.

[55] One report suggested, "Each year the results of the National Resident Matching Program (NRMP) are published in the June issue of the journal Academic Medicine. These results show that 20,598 PGY-1 positions were offered through the 2000 Match.... The number of residency positions available outside the NRMP is not known but may be more than 3,000 and includes some federal uniformed services positions." See http://www.ecfmg.org/reporter/library/2001/iss1.html, downloaded October 30, 2003.

[56] ACGME Institutional Requirements, approved 11 February 2003, effective 1 July 2003.

[57] Of course, programs that do not go through the NRMP may still be accredited by the ACGME.

services, if the Plaintiffs' allegations are correct, then these organizations serve to coordinate the actions of the teaching hospitals that are the direct employers of resident physicians. This would represent a very high degree of power in the market for resident physicians.

45) On the other side of the labor market, prospective resident physicians have very few options outside of those offered through the NRMP and the ACGME. I am informed that every state requires at least one year of medical residency in an accredited program as a prerequisite to licensure as a physician.[58] The boards that certify physicians into specialties essentially require participation in an ACGME accredited residency program. Most residency positions are available only through the NRMP, and most of the residency programs that aren't offered through the NRMP are offered through other matching programs like the one for military residency positions. With essentially no options that substitute for residency employment (and with employment other than as a physician so relatively costly), resident physicians would have very little market power against the coordinated actions of the teaching hospitals.

46) Because the alleged conspiracy stretches across nearly all residency programs, its effects would be similarly stretched across nearly all residents. Therefore, the market power held by the alleged conspiracy could be exercised similarly across all members of the proposed plaintiff class. Moreover, any evidence that demonstrates that the

---

[58] See "Summary of Fifty States Physician Licensing" prepared by Lockridge, Grindal, Nauen, PLLP..

Defendants exercised this market power to depress wages would be applicable to all members of the proposed plaintiff class.

VI.1.3. Barriers to Entry

47) To become certified by an allopathic specialty board, with few exceptions physicians must have completed a residency program that is accredited by the ACGME.[59] While a hospital could theoretically start a residency program without the sanction of the ACGME, the demand for such a program would be small, since anyone who finished the program would still be ineligible for full certification in the United States. Thus, as a practical matter, the ACGME has full control over whether hospitals will be allowed to establish new residency programs. Consequently, the ACGME, one of the Defendants in this litigation, controls a specific barrier-to-entry into the market for resident physicians.[60]

48) Generally speaking, barriers to entry are required for any cartel to fix wages below (or prices above) their competitive levels. Without any barriers, new entrants to the market could profitably attract employees away from the members of the cartel by offering higher wages. The ACGME, as the gate-keeper for new residency programs, has the ability to control entry into the market for resident physicians in a way that could

---

[59] See http://www.abms.org/Downloads/General_Requirements/Table3.PDF, downloaded October 29, 2003; http://www.ama-assn.org/ama/pub/category/2320.html, downloaded October 29, 2003, and http://www.acgme.org/About/roleAcgme.asp, downloaded October 29, 2003.

[60] Also, to participate in the Match, a program must be accredited by the ACGME, recognized by the ABMS member boards, or receive a dispensation from the NRMP. See http://www.nrmp.org/fellow/map_sms.html#pro_eligible

sustain the anti-competitive goals of the alleged conspiracy. I do not know if the ACGME has in fact used its power in this way and it is my understanding that this is not the stage of the litigation when this factual issue is resolved. But if it in fact does, then it would affect all members of the proposed plaintiff class in a similar way.

VI.1.4. Information Exchanges

49) One logistical problem faced by a price or wage conspiracy is that the various members of the conspiracy need some way to communicate what the fixed wage specifically is.

50) In the market for resident physicians, there is a significant amount of information exchanged between the defendants about their employment practices for resident physicians. Many programs choose to list specific information, including salary information, with the FREIDA database sponsored by the AMA. This database is intended to be a tool for residents to find detailed information about residency programs, but the database is equally available to all directors of residency programs.[61] Thus, the directors of residency programs can view what any number of other residency programs will pay their prospective residents and can adjust their own salaries according to this information.

---

[61] The data in FREIDA come primarily from GME Track, see http://www.ama-assn.org/ama/pub/category/5339.html, downloaded October 30, 2003. GME Track contains information which is not available to FREIDA. At this point in my investigation, I do not know whether hospitals have access to data in GME Track from other hospitals that is not reported in FREIDA. FREIDA is freely available to the public through the Internet. See http://www.ama-assn.org/ama/pub/category/2997.html.

51) Moreover, the AAMC and COTH conduct a survey of COTH member hospitals annually and publish salary and benefit information on residents. [redacted] In any event, the COTH data are organized and reported in a way that makes it easy for users to make comparisons of resident physician salaries in a systematic manner.

52) If the defendants are in fact engaging in anti-competitive, illegal practices that depress wages, this large amount of information exchange would facilitate the anti-competitive goals in two ways. First, since so much information is exchanged between the hospitals about residents' salaries, if one hospital were to offer a higher wage than other comparable hospitals, then the other hospitals would be aware of this fact. Second, the specific and detailed information that is exchanged through FREIDA and the COTH surveys creates a forum that solves the logistical problem of communicating, albeit implicitly, what the fixed wage is.

53) The information in FREIDA and the COTH surveys is supplied by a large proportion of teaching hospitals throughout the country and across specialties.[63] Even if a teaching hospital does not post information to FREIDA or participate in the COTH survey, it still

---

62 [redacted]

63 [redacted]

has access to all of the information for the hospitals that do participate in these programs. If this exchange of information does in fact facilitate the alleged anti-competitive behavior, then one may assume that all members of the proposed class would be affected by the exchange. In other words, since information is being exchanged throughout the country and across specialties, the effect of this exchange would similarly reach residents throughout the country and across the specialties.

54) In short, my analysis of the economic characteristics of the labor market supports the conclusion that a conspiracy among the Defendants to suppress wages, such as that alleged by the Plaintiffs, would have lowered wages for all or virtually all residents. The Defendants collectively would have sufficient market power to effectively implement a wage-fixing conspiracy. There are barriers to entry that prevent the emergence of competitive employers. The information exchanges provide a means of communication. Therefore, in combination, the defendants could exercise market power.

VI.2. Analysis of Wage Data

55) In this section, I analyze data on salaries for resident physicians. The goal of this analysis is to determine whether these data are consistent with the idea that forces designed to depress wages would affect the members of the proposed class in a common, systematic way. If salaries for resident physicians react to common influences in predictable ways, this would provide evidence for the view that the impact of a suppression of wages would be predictable and generalized.

56) My analysis of wage data contains three parts. In the first, I investigate the movement of resident physician salaries over time. In this part of the investigation, I was interested in determining whether the movements showed consistency or unexplained inconsistency in movement. What I found is that (even where there were some differences in the particular levels of wages) the wages moved very similarly over time. This suggests that wages were responding in a common and systematic way to changes in basic market forces. In the second section, I investigate the extent of salary variation within teaching hospitals. The goal is to analyze whether the use of average salaries obscures individual variation in salaries. I find that salaries among residents in the same PGY at a given hospital are strikingly uniform. Finally I analyze a third dimension of resident physicians' salaries: movements over time in real (that is, inflation adjusted) salaries. My data indicate that resident physician salaries have remained essentially constant. All of these findings imply that all or virtually all members of the proposed class would have been adversely affected by the alleged conspiracy.

57) All of the analyses in this section use data provided by the Defendants through discovery. In particular, the data on resident physicians' salaries come from GME Track, provided by the AMA.[64]

---

[64] Much of the information contained in this data set was readily apparent and understandable. However, since the data set did not come with full documentation, I needed to make reasonable assumptions about the interpretation of some items. I understand that the Plaintiffs' counsel are seeking more documentation from the Defendants about the data sets. If that documentation is produced, I will endeavor to confirm my assumptions. As the continuing investigation requires, I may supplement this Report.

VI.2.1. Information about Resident Salaries

58) Figure 1 through Figure 4 provide basic information about resident physician salaries, broken down in several ways. (The precise data for each chart is reported in Appendix D: Technical Appendix.)

Figure 1:
Annual Weighted Average Resident Salaries for PGY1 to PGY8

Confidential Materials
Redacted

59) Figure 1 compares average resident salaries by the year of residency (PGY) for each year from 1997 to 2002.[65] [redacted] As this figure shows, from 1997 to 2002, average resident salaries were highly correlated between PGYs. The average salaries for each PGY increased similarly from year to year, and the differences between average PGY salaries remained about the same throughout the period. In other words, changes in average salary for each PGY are quite uniform from year to year. This is also demonstrated by the high correlation of salaries between PGY groups over time shown in Figure 1A.[67]

---

[65] Only the first eight PGY years are reported, which represents more than 98% of the data observations in the analysis.

[66] The specific numbers that are behind Figure 1 through Figure 4 are included as Appendix D to this report.

[67] Figure 1A shows the correlation matrix for the data in Figure 1. The correlation between two data series is a measure of the extent to which changes in one data series reveal information about changes in another data series. If the correlation between data series is positive, it means, loosely speaking, that when one series increases (or decreases), so do the other series. If two data series are perfectly (positively) correlated, the correlation would be 1, and knowing the change in one data series would reveal the exact change in the other data series. As shown in Figure 1A, all the correlations between PGY salaries were above .985. PGY salaries, then, are highly correlated, which verifies what one sees visually in Figure 1: The salaries for each PGY change quite uniformly from year to year.

Figure 1A:
Correlation Matrix of Annual Weighted Average Resident Salaries

	PGY 1	PGY 2	PGY 3	PGY 4	PGY 5	PGY 6	PGY 7	PGY 8
PGY 1	—	1.0000	0.9999	0.9995	0.9989	0.9992	0.9950	0.9863
PGY 2		—	1.0000	0.9997	0.9992	0.9995	0.9958	0.9873
PGY 3			—	0.9998	0.9995	0.9994	0.9962	0.9876
PGY 4				—	0.9996	0.9995	0.9975	0.9891
PGY 5					—	0.9987	0.9966	0.9864
PGY 6						—	0.9975	0.9890
PGY 7							—	0.9942
PGY 8								—

Figure 2:
Annual Weighted Average Resident Salaries
for the Largest Cities and Regions, PGY 1

Confidential Materials
Redacted

Source: Resident salary data from "Graduate Medical Education Data," 1997 through 2002, provided by the AMA, bates stamps AMA 003517–23. CBSA definitions are obtained from Bureau of the Census.

60) In Figure 2 I compare average PGY-1 salaries in six of the largest cities and regions in the data.[68] As the figure indicates, there are some regional differences in resident

[68] The list of metropolitan areas is based on the cities included in the 1984 COTH report. Metropolitan areas are defined using the Census Bureau's "Core Based Statistical Areas" and regions are as defined in GME Track. The regions include and only include programs that are not otherwise contained within a metropolitan area. Programs are assigned to CBSAs and regions by the zip codes for Program Directors. CBSA codes and descriptions can be found at http://www.census.gov/population/www/estimates/metrodef.html, downloaded October 23, 2003.

physician salaries. However, there is also great similarity in the movement of these wages over time, across geographic areas. [redacted] From Figure 2 we see that average salaries between these major geographic regions also move similarly from year to year.[69]

[69] [redacted]

Figure 3:
Annual Weighted Average Resident Salaries
by Ownership Type, PGY1

Confidential Materials
Redacted

61) Figure 3 compares average resident salaries in PGY-1 from 1997 to 2002 by the ownership type of the hospital that sponsors the residency. There are four major ownership types identified by COTH, church, government, non-profit, and private.[70] Using information from the GME Track database, I classified each teaching hospital into

[70] 

one of these ownership types. The differences in average salary by ownership type are very small. [redacted] Again, while there are differences in the level of wages, they move similarly over time.[71]

[71] [redacted]

Figure 4:
Annual PGY1 Weighted Average Resident Salaries
for Five Most Common Specialties

Confidential Materials
Redacted

62) In Figure 4 I present the average PGY-1 salary for the five largest resident specialties.[72] As the figure indicates, there are only small differences by specialty. There is also great similarity in the movement of these wages over time across specialty.

[72] The number of accredited programs and filled positions in each specialty are available at http://www.acgme.org/adspublic/reports/accredited_programs_all.asp.

[redacted] It is apparent from Figure 4 that average salaries for these specialties move over time in a very similar manner.

VI.2.2. Variance of Resident Salaries

63) In the previous section I showed that, while the average salaries of resident physicians varied by factors such as PGY, geographic region and medical specialty, changes over time were consistent in all these groups. In this section, I examine the question of whether the previous analysis, by focusing on averages, obscures individual variation in salaries. I find that it does not. Indeed, there is a notable uniformity in salaries for residents in a given PGY within the same hospital.

64) One striking aspect of residents' salaries is that within PGYs of a given institution, for the most part all residents earn the same salary. I understand that the ACGME requires all residency programs to provide a written agreement on the terms and conditions of employment.[73] The AMA provides guidelines for what it thinks these contracts should include. In these guidelines, the AMA has written, "While residents at the same level in different programs in the institution should, to the extent possible, be paid the same salary, a differential can be paid for senior residents."[74] These guidelines continue, "(Note: court decisions may in the near future establish that ACGME cannot

---

[73] See http://www.ama-assn.org/ama/pub/category/196.html, downloaded October 28, 2003.

[74] See http://www.ama-assn.org/ama/pub/category/7137.html, downloaded October 28, 2003.

require that all residents at the same level be paid the same amount.)"[75] Indeed, the ACGME previously required that all residents of the same level at an institution be paid the same salary. In the Graduate Medical Education Directory for 1996, published by the AMA, the ACGME's Institutional Requirements, included, "All residents at similar levels of experience and training in all of an institution's programs should receive a comparable level of financial support. Exceptions must be justified to the institution's Graduate Medical Education Committee."[76] From this, it appears that not only is there organizational support for a policy of having institutions pay the same salaries to all residents in a given PGY, but also that this policy may have been required by the ACGME.[77]

65) To confirm whether these guidelines on resident salaries were followed by institutions that employ resident physicians, I looked at both the explicit policies at some teaching hospitals as well as data available in GME Track. I found a number of instances where institutions noted that their salaries were the same within a PGY. For example, Emory University states, "Stipend amounts are based on post graduate year level, are

---

[75] See http://www.ama-assn.org/ama/pub/category/7137.html, downloaded October 28, 2003.

[76] *Graduate Medical Education Directory. 1996–1997, American Medical Association, Chicago, IL. P 27.*

[77] The current institutional guidelines from the ACGME, as given at http://www.acgme.org/IRC/Ircpr900.asp, downloaded October 28, 2003, do not state that all residents of the same level at an institution must be paid the same salary.

identical for all programs...."[78] [redacted] Of those who responded to this question, 275 out of 293 (or 94%) indicated that the base stipend was the same across all specialties.[80]

66) I also used the data from GME Track (the same data source for the analysis in the previous section) to determine the extent to which hospitals were paying the same salary to their resident physicians in a given PGY. I find that of the institutions I analyze, nearly all pay the same salary to at least 50% of the residents in the same PGY. I also find that nearly all programs pay the same salaries as other programs in the same institution.[81]

67) In Figure 5, I present a summary of the results of my first analysis of the extent to which hospitals pay residents the same salary. This analysis focuses on residents in PGY-1 in 2002 at hospitals with two or more programs. For each of these hospitals I

---

[78] See http://www.emory.edu/WHSC/MED/GME/section5.html, downloaded October 23, 2003. In fact, the data in the technical appendix to this report indicate that 100% of Residents receive the same salary at Emory.

[79] [redacted]

[80] There were 15 survey respondents who did not answer this question.

[81] Any measurement error in these data is likely to lead me to understate the degree of similarity in salaries since random errors are far more likely to indicate variability in salaries than similarity. See Orley Ashenfelter and Alan Krueger, "Estimates of the Economic Return to Schooling From A New Sample of Twins," *American Economic Review*, vol. 84, no. 5, (December 1994).

calculated the 25th percentile salary and the 75th percentile salary.[82] I then counted the institutions at which the 25th and the 75th percentile salaries are identical. Figure 5 tabulates these counts. I find that of the 323 institutions with at least one program, 241 of them (75%) had equal 25th and 75th percentile salaries. For these 241 institutions, then, at least half of their residents in PGY-1 were receiving the same salary.

Figure 5:
Summary of Institutions that Provide the Same 2002 PGY1 Salaries to the 25th and 75 Percentile of Employed Residents for All Institutions with Two or More Programs

Figure 5 redacted pursuant to Confidentiality Order entered by the Court.

68) Figure 6 looks at the number of programs at each institution that paid their PGY-1 residents the same salary in 2002. (Once again among institutions with two or more programs.) For example, Stanford University Hospital sponsors nine programs (whose salary data are reported in GME Track). Seven of these programs, or 78%, pay their PGY-1 residents the same salary. For each institution, I counted the number of programs that did and did not pay their residents the same salaries. Figure 6 presents a tabulation

[82] The 25th percentile salary is the salary that is higher than the lowest 25% of salaries. Likewise, the 75th percentile salary is the salary that is higher than the lowest 75% of salaries. Figure 5/Figure 6-D in Appendix D presents a list of the institutions in this analysis and lists each institution's 25th percentile, median, and 75th percentile salaries.

of these counts. [redacted]

Figure 6:
Summary Statistics for 2002 PGY1 Salaries, All Institutions with Two or More Programs

Figure 6 redacted pursuant to Confidentiality Order entered by the Court

69) The ACGME previously required that all residents of the same level at an institution receive the same salary regardless of specialty. The AMA apparently still supports this policy. And in fact, my data indicate that many teaching hospitals do seem to follow these guidelines. These results reinforce my confidence in my analysis of movements over time in residents' salaries.

VI.2.3. Changes in Real Salaries over Time

70) In this section, I present an analysis of a third dimension of movements in residents' salaries: changes in real, inflation adjusted, salaries. This analysis finds that from 1997 through 2002 average salaries (by specialty) moved only slightly in real terms.

---

[83] The details of these calculations are also provided in Figure 5/Figure 6-D. Figure 5/Figure 6-D also presents an analysis of the same question that weights programs by the number of residents. [redacted]

71) To illustrate how striking it is to find constant real salaries for such a large group of workers over such a long period of time, I also compare changes in residents' real salaries to changes in real salaries of assistant professor physicians at teaching hospitals.[84] ("Assistant Professor" is the first title that a physician would receive for a permanent position at a teaching hospital, so they provide an interesting benchmark.[85]) My analysis indicates that, in contrast to residents' salaries, the salaries of assistant professors have risen in real terms over this period.

---

[84] My data on faculty physicians' salaries were also provided by the Defendants in the course of discovery. They come from the Faculty Salary Survey provided by the AAMC. Once again, the Defendants did not provide documentation for these data. As a result, while the meanings of many relevant portions of this database were straightforward to infer, I was forced to make reasonable assumptions about the interpretation of other items. I understand that counsel for the Plaintiffs is seeking documentation for these data also. If this documentation is forthcoming, I may need to supplement this report.

[85] Indeed, many hospitals indicate that residents take part in teaching less experienced residents. For example, the description of the residency program in Cardiothoracic Surgery at Yale-New Haven Hospital states, "Senior residents are appointed as Instructors on the faculty and play a vital role with the faculty in the instruction of Yale medical students and residents in clinical surgery on the patient care divisions of the teaching hospitals." See http://yalesurgery.med.yale.edu/surgery/sections/cardiothoracic/cardio_restr.htm, downloaded October 23, 2003.

Figure 7:
Salary Comparison for the Five Most Popular Faculty Departments Versus All Resident PGY, in 2002 Dollars

Confidential Materials
Redacted

72) In Figure 7, I give the inflation adjusted average salary for residents, by PGY, for the six years included in the GME Track data. I also give the inflation adjusted average assistant professor salary for five faculty physician specialties. This figure shows that, adjusting for inflation, assistant professor salaries in each of the five specialty categories increased over the available data range.

[redacted]

[86] Note that these data also show that resident salaries, across PGY, have become increasingly compressed.

Figure 8:
Anesthesiology Salary Comparison of Assistant Professor Faculty with Terminal-Year Residents, in 2002 Dollars

Confidential Materials
Redacted

Figure 9:
Family Practice Salary Comparison of Assistant Professor Faculty with Terminal-Year Residents, in 2002 Dollars

Confidential Materials
Redacted

Figure 10:
General Surgery Salary Comparison of Assistant Professor Faculty with Terminal-Year Residents, in 2002 Dollars

Confidential Materials
Redacted

Figure 11:
Average Yearly Changes in the Real Annual Salaries
of Residents in the Final Year of Residency and of Assistant Professors
Selected Specialties

Confidential Materials
Redacted

73) In Figure 8 through Figure 10, I look at assistant professor average inflation adjusted salaries in the three specialties for which data were available from 1998 to 2002. These figures also show the average inflation adjusted salaries for residents in the same set of specialties in the PGY that is typically the final year of their residency. For example, an anesthesiology residency typically lasts four years, so in Figure 8 I show the average

salary for a PGY-4 anesthesiology resident. [redacted]

74) Figure 11 graphs the average year-to-year salary increase (adjusted for inflation) for assistant professors in the five specialties identified in Figure 7 as well as the residents in these same specialties. This graph again indicates that, in each of the identified specialties, assistant professors salaries were increasing while resident physician salary increases remained nearly constant.

75) [redacted]

VII. Feasible Class-Wide Damage Methodologies

76) The damage sustained by members of the plaintiff class is the difference between the salaries resident physicians actually received and the salaries they would have received if not for the alleged anti-competitive conduct by the Defendants. What residents were actually paid for their services should be available from the Defendants, and I expect that this information will be available to the Plaintiffs through discovery requests. An important part of a damage methodology, then, is estimating the salaries residents would have received if not for the anti-competitive conduct. This counter-factual salary is often called the "but-for" salary in litigation. Since we cannot directly observe the "but-for" wages, we need a method that allows us to estimate "but-for" wages from data that are observable. This inquiry is not unique to this case, but rather is similar to issues that economists study in other contexts.

77) In estimating the "but-for" salary for use in a class action suit, I understand that one must be able to use a methodology that is both feasible (that is, the needed information is available and the analysis can be performed), and accepted by the economics discipline and the courts. Moreover, although not all members of the class need to be assessed the same damages, the methodology itself must be applicable to all members of the class. It is my opinion that there are several feasible damage methodologies that could be used on a class-wide basis.

78) There are several possible methodologies, adapted from standard economic analysis to estimate "but-for" wages (that is, prices) in a case like this. First, one could establish a benchmark from labor markets that are similar to the market for residents but operate without the anti-competitive conduct alleged against the Defendants. For example, the markets for physician assistants, nurse practitioners, entry-level faculty physicians, or entry-level physicians are all possible labor markets that could be used. Second, one could look at another labor market in which residents themselves offer their services, but which is free of the alleged competitive restraints. Here, many residents moonlight (that is, work-for-hire that is not part of the residency program) and the wage they receive while moonlighting could be used to estimate a more competitive wage for the residency itself. Third, earnings profiles over the life cycle tend to be fairly smooth, where large increases or decreases are relatively uncommon. So one could use a regression analysis using the wages that physicians receive to estimate what wages would be for residents in a more competitive environment.

VII.1. Using Other Medical Professionals as Benchmarks

79) One method that is often used in anti-trust litigation to estimate a "but-for" price or wage is to use a similar market that is free of the anti-competitive conduct and so can be used as a benchmark for the "but-for" price or wage.[87]

---

[87] American Bar Association, "Proving Antitrust Damages: Legal and Economic Issues," *American Bar Association* 1996, 37–38.

80) If residents were not available, the work they perform in teaching hospitals (and the facilities associated with a teaching hospital) could be and would be performed by some combination of physician assistants, nurse practitioners, and physicians, such as entry level faculty physicians at the hospitals. As reported in an article from AMNews that I quoted earlier, a study of one hospital found that two to three physician assistants or nurse practitioners would be needed to replace one resident. I also quoted earlier the government report that said, "If that [resident physician] position did not exist, the service duties would often be performed by a higher paid, fully certified physician(s), or, at a minimum, a nurse practitioner or physician assistant."[88] Some of the work performed by residents would need to be performed by fully licensed physicians. So residents do perform work that overlaps very substantially with the duties of these other fields.

81) Obviously, a benchmark analysis of this type would not be as simple as "residents should earn the same salary as physician assistants or entry-level faculty." There are differences between physician assistants or entry level faculty and resident physicians for which a damage methodology would need to account. Such differences can be controlled for by regression analysis, a commonly used economic tool in both academic and litigation settings. Thus, using appropriate benchmarks from other, relevant labor markets (but which are free from anticompetitive constraint) in conjunction with a

---

[88] *Graduate Medical Education and Public Policy, a Primer*, Health Resources and Services Administration, Bureau of Health Professions, December 2000, p 6.

regression analysis to account for relevant differences, one can estimate the salaries residents would have received in the absence of the alleged anti-competitive conduct.

82) On the basis of my investigation so far, I am satisfied that the data are available, either through publicly available sources or through discovery, that would make this damage methodology feasible to perform.[89]

VII.2. Using Moonlighting Wage as a Benchmark

83) Another possible damage methodology to estimate "but-for" wages would use a benchmark derived from wages earned by residents performing work-for-hire outside of their residency programs. Though moonlighting is prohibited by some residency programs, it is relatively common for residents to earn extra income by moonlighting.[90] Residents are both free to accept or reject moonlighting opportunities and can moonlight at a number of different hospitals or clinics. The wage paid to residents for moonlighting

---

[89] There are publicly available sources for information on physician or physician assistant compensation, like the Physician Compensation and Production Survey published by the MGMA. At the present time, I have access to a number of datasets provided by Defendants through discovery that, as I understand them, should provide useful data for performing this damage methodology. These data sets include GME Track data, which I believe provides information on residents, teaching hospital institutions, and resident programs, and also an AAMC Faculty Database, which I believe contains compensation information at a large number of medical institutions.

[90] See 2002 COTH report, pg. 53, which identifies that 79 percent of survey respondents allow moonlighting, available online at http://www.aamc.org/hlthcare/coth-hss/hss_2002_report.pdf, AMC 004227. For example, "Moonlighting for Charity," available at http://www.ama-assn.org/ama/pub/printcat/9794.html, downloaded October 23, 2003 states that, "In the late 70s, more than 40 percent of all residents in a national survey reported that they had moonlighted. While that percentage has decreased slightly, a significant number of residents, especially in certain specialties such as emergency medicine and family practice, engage in the practice of moonlighting." In addition, this article states that, "A 2002 survey of 1,909 residents in 20 different specialties found that about 16 percent of the residents reported moonlighting an average of 23 hours per month."

is based on the market value of the services residents are able to provide to hospitals and clinics. Thus, the moonlighting wage could be used as a benchmark to estimate the wage that residents would receive in a competitive environment.

84) As with benchmarks such as physician assistants or entry-level faculty, there are differences between the work performed by medical residents who are moonlighting and the work performed in hospitals by residents that will require adjustment in order to use the moonlighting wage as an appropriate benchmark.[91] Again, multiple regression analysis can be used to control for these differences.

85) As with the earlier possible damage methods using benchmarks from related fields, the methodology using the moonlighting wage as a benchmark would not estimate the same damages for each resident, but it would use the same methodology for all residents in the class. While the regression analysis used in conjunction with the moonlighting benchmark would estimate different "but-for" wages depending on the factors relevant to determining the moonlighting wage, it would still be the same methodology for all residents in the class. Thus, this methodology could also be employed on a class-wide basis.

---

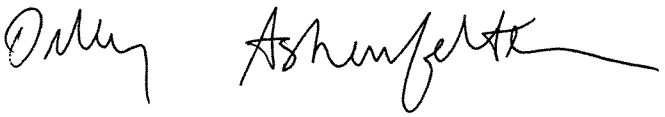
[91] The wage that residents receive moonlighting is perhaps best considered an overtime wage since the decision to moonlight requires one to work additional hours beyond what the residency program requires. In other words, if a resident's employment requires that he work 60 hours per week, then the moonlighting wage would need to be sufficiently high for him to decide to work the 61st hour. To estimate a "but-for" wage, one would actually want to know the wage for the first 60 hours, not the wage for the 61st hour. This is an issue that labor economists have studied at length, and there are accepted methods for converting an overtime wage into the appropriate standard-time wage. Thus, even though the moonlighting wage is perhaps best considered an overtime wage, it can still be used to estimate a standard-time wage.

VII.3. Measure Damages with Regression Techniques

86) In general, labor economists have found that workers' earnings over time follow fairly regular patterns. Salary tends to increase over time, but the rate of increase falls as the worker acquires experience.

87) This well-understood fact about labor markets provides a basis for estimating a "but-for" wage for resident physicians. A physician's wage will depend on a number of factors, perhaps including specialty, education, geographic location, or type of employer. But a physician's wage will also depend on experience, and this would allow one to estimate a "but-for" wage for residents. A regression analysis that examines the wages of physicians, accounting for the various factors relevant in determining a physician's salary, would find some relationship between salary and experience. Since physician wages are not subject to the alleged anti-competitive conduct, one could use the relationship between salary and experience to project backward to what residents' salary would be if not for the alleged anti-competitive behavior. This relationship would allow one to project backward from the salary for an entry-level faculty physician, for example, to estimate what a resident physician's salary would have been in a competitive market.

Prepared and signed by:



October 31, 2003

Orley Ashenfelter

VIII. Appendices

VIII.1. Appendix A: Curriculum Vitae of Orley Ashenfelter

NAME:	Orley C. Ashenfelter
HOME ADDRESS:	30 Mercer Street, Princeton, New Jersey 08540
BUSINESS ADDRESS:	Industrial Relations Section Firestone Library Princeton University, Princeton, New Jersey 08544
BUSINESS PHONE:	609-258-4041
FAX NUMBER:	609-258-2907
DATE OF BIRTH:	October 18, 1942
PLACE OF BIRTH:	San Francisco, California
MARITAL STATUS:	Married
CURRENT POSITION:	Joseph Douglas Green 1895 Professor of EconomicsEditor, *American Law and Economics Review*
	Section Editor, Economics, *International Encyclopedia of the Social and Behavior Sciences*
	Editorial Board, *Journal of Cultural Economics*
	President, *Society of Labor Economics*
PREVIOUS POSITIONS:	Co-editor, American Economic Review, 2001–2002.
	Editor, American Economic Review, 1985–2001.
	Director, Industrial Relations Section, Princeton University
	Meyer Visiting Research Professor, New York University School of Law, 1990.
	Meeker Visiting Professor, University of Bristol, 1980–81.

Guggenheim Fellow, 1976–77.

Director, Office of Evaluation, U.S. Department of Labor, 1972–73.

Lecturer, Assistant Professor, and Associate Professor of Economics, Princeton University, 1968–72.

EDUCATION: Claremont McKenna College, B.A. 1964

Princeton University, Ph.D. 1970

Books:

- *The Collected Essays of Orley C. Ashenfelter, Volumes I–III*, (edited by Kevin Hallock), Cheltenham England: Edward Elgar Publishing Limited, 1997.
    - Volume I—Employment, Labor Unions, and Wages
    - Volume II—Education, Training, and Discrimination
    - Volume III—Economic Institutions and the Demand and Supply of Labor

Public Lectures:

- Wei Lun Lecture, December 14, 2000, The Chinese University of Hong Kong, "How Large Is the Economic Payoff to Education"
- Paul Hartman Memorial Lecture, November 1, 1995, University of Illinois at Champaign-Urbana, "How Credible is the Evidence Linking Education and Income?"
- Jerome Levy Economics Institute Lecture, November 21, 1995, Bard College, "How Credible Are Estimates of the Economic Returns to Schooling?"
- Ida Cordelia Beam Lecture, November 10, 1994, University of Iowa, "Does a College Degree Pay Off? Evidence from Data on Identical Twins."
- 42nd Joseph Fisher Lecture, October 12, 1993, Adelaide University, Adelaide, Australia, "How Convincing is the Evidence Linking Education and Income?"
- Lecture to honor Gregg Lewis, October 29, 1992, Duke University, "The Economic Returns to Schooling from a New Sample of Twins."

- George Seltzer Distinguished Lecture, October 6, 1991, Industrial Relations Center, University of Minnesota, "How Convincing Is The Evidence Linking Education and Income?"

- University of Bristol, Bristol, England, December 6, 1990, "The Market for Fine Wine: Is It Economically Efficient or Is There a Sucker Born Every Minute"

Publications:

- (with David Ashmore and Olivier Deschênes) "Do Unemployment Insurance Recipients Actively Seek Work? Evidence From Randomized Trials in Four U.S. States," *Journal of Econometrics,* forthcoming.

- (with Michael Greenstone) "Using Mandated Speed Limits to Measure the Value of a Statistical Life," *Journal of Political Economy*, forthcoming.

- (with David Ashmore and Robert LaLonde) "Qualite Des Millesimes Et Conditions Meteorologiques: Les Cas Bordelais," *Une Nouvelle Approche au Vin: l'Oenométrie*, forthcoming.

- (with Kathryn Graddy) "Auctions and the Price of Art," *Journal of Economic Literature,* forthcoming September 2003.

- "Art Auctions," in *Handbook of Cultural Economics,* edited by Ruth Towse (Edward Elgar Publishers: Cheltenham, UK) May 2003.

- (with David Card) "Did the Elimination of Mandatory Retirement Affect Faculty Retirement Flows?" *American Economic Review*, September 2002.

- "Comment on the Age Discrimination Example," *Jurimetrics Journal*, 42, Spring 2002.

- "Economics Overview," in *International Encyclopedia of Economics,* (Oxford, UK:Elsevier Science Ltd.), December 2001.

- (with Dean Hyslop) "Measuring the Effect of Arbitration on Wage Levels: The Case of Police Officers," *Industrial and Labor Relations Review,* Volume 54, Number 2, January 2001.

- (with Phillip B. Levine) "Unemployment Insurance Appeals in the State of Wisconsin: Who Fights and Who Wins?" *Research in Employment Policy,* Vol 2,

2000; *Long-Term Unemployment and Reemployment Policies, Volume 2*, eds. Laurie J. Bassi and Stephen A. Woodbury, (Stamford, CT: JAI Press).

- "Liquid Assets," *Optimus: The Magazine for the Private Investor*, vol. 2, 2000.

- (with Gregory Jones) "The Demand for Expert Opinion: Bordeaux Wine," *Cahier Scientifique de 'Observatoire des Conjonctures Vincioles Euorpeenenes,* No. 3, Mars 2000.

- "Orley Ashenfelter," in *Exemplary Economists Volume 1,* eds. Roger E. Backhouse and Roger Middleton, (Cheltenham, United Kingdom: Edward Elgar Publishing, Ltd., 2000).

- (with Cecilia Rouse) "Schooling, Intelligence, and Income in America: Cracks in the Bell Curve," *Meritocracy and Inequality*, Kenneth Arrow, Steven Durlauf, and Samuel Bowles, editors, (Princeton, NJ: Princeton University Press), 2000.

- (with Colm Harmon and Hessel Oosterbeek) "A Review of Estimates of the Schooling/Earnings Relationship, with Tests for Publication Bias," *Labour Economics,* Vol. 6, 1999 .

- "Paul Samuelson Teaching Federal Judges," *Journal of Economic Education*, vol. 30, no. 4, (Fall 1999).

- (with Richard E. Quandt) "Analyzing A Wine Tasting Statistically (Wherein we rigorously analyze the famous 1976 Paris tasteoff!)," *Chance*, vol. 12, no. 3, (Summer 1999).

- "Arbitration," in *The New Palgrave Dictionary of Economics and the Law*, Peter Newman, editor, (London, United Kingdom: Macmillian Reference Ltd., 1998).

- (with Cecilia Rouse) "Income, Schooling and Ability: Evidence From A New Sample of Identical Twins," *The Quarterly Journal of Economics*, vol. 113, no. 1, (February 1998), reprinted in *Income Distribution,* Michael Sattinger, editor, (Cheltenham, England: Edward Elgar Publishing Ltd.), forthcoming.

- (with David Ashmore and Randall Filer) "Contract Form and Procurement Costs: The Impact of Compulsory Multiple Contractor Laws in Construction," *Rand Journal of Economics*, vol. 28, no. 0, (1997): S5–S16.

- (with David J. Zimmerman) "Estimates of the Returns to Schooling From Sibling Data: Fathers, Sons, Brothers," *The Review of Economics and Statistics*, volume 79 (1), (February 1997).

- (with Robert LaLonde) "The Economics of Training," in *The Human Resource Management Handbook*, eds. David Lewin, Daniel Mitchell, and Mahmood Zaidi, (JAI Press, 1997).

- (with Kevin Hallock) "Bibliography," in *Labor Market Discrimination, Labor Mobility, and Compensating Wage Differentials: Labor Economics, Volume IV*, Edward Elgar Publishing Limited, Cheltenham, England, (1995).

- (with David Ashmore and Robert LaLonde) "Wine Vintage Quality and the Weather: Bordeaux," *Chance*, (Fall 1995).

- (with Theodore Eisenberg and Stewart Schwab) "Politics and the Judiciary: The Influence of Judicial Background on Case Outcomes," *Journal of Legal Studies*, volume 24 (2), (June 1995).

- (with Ray Byron) "Predicting the Quality of an Unborn Grange," *The Economic Record*, Australia, vol. 71, no. 212, (March 1995): 40–53.

- (with Alan Krueger) "Estimates of the Economic Return to Schooling From A New Sample of Twins," *American Economic Review*, vol. 84, no. 5, (December 1994).

- "Have We Underinvested in Education?" *The Changing Distribution of Income in an Open U.S. Economy*, eds. Jeffrey Bergstrand, Thomas Cosimano, John Houck and Richard Sheehan (North-Holland Publishing, 1994).

- "How Convincing is the Evidence Linking Education and Income?" *Labour Economics and Productivity*, vol. 6, (1994): 1–12. In *Australia's Economy in its International Context, Volume 2 1950–2001*, ed. Kym Anderson (Adelaide, Australia: Centre for International Economic Studies, 2001) 366–374.

- (with Janet Currie, Henry S. Farber and Matthew Spiegel) "An Experimental Comparison of Dispute Rates in Alternative Arbitration Systems," *Econometrica*, vol. 60, no. 6 (November 1992): 1407–1433.

- (with David Genesove) "Testing For Price Anomalies in Real Estate Auctions," *American Economic Review*, vol. 82, no. 2 (May 1992): 501–505.

- (with Ronald L. Oaxaca) "Labor Market Discrimination and Economic Development," in *Unfair Advantage Labor Market Discrimination in Developing Countries*, ed. Nancy Birdsall and Richard Sabot (Washington, D.C.: The World Bank, 1991): 35–53.

- (with Janet Currie) "Negotiator Behavior and the Occurrence of Disputes," *American Economic Review*, vol. 80, no. 2 (May 1990): 416–20.

- "Albert Rees: Teacher, Scholar, Public Servant," *Journal of Labor Economics*, vol. 8, no. 2, Part 2 (January 1990): pp. S1–S3.

- (with Mark W. Plant) "Non-Parametric Estimates of the Labor Supply Effects of Negative Income Tax Programs," *Journal of Labor Economics*, vol. 8, no. 1, Part 2 (January 1990).

- "Evidence on U.S. Experiences with Dispute Resolution Systems" in *Organized Labor at the Crossroads*, ed. Wei-Chiao Huang (Kalamazoo, Michigan: W.E. Upjohn Institute, 1989).

- "How Auctions Work for Wine and Art," *Journal of Economic Perspectives*, vol. 3, no. 3 (Summer 1989): 23–36.

- (with Ronald Oaxaca) "The Economics of Discrimination: Economists Enter the Courtroom," *American Economic Review*, vol. 77, no. 2 (May 1987): 321–25.

- "The Case for Evaluating Training Programs with Randomized Trials," *Economics of Education Review*, vol. 6, no. 4 (1987): 333–38.

- "Arbitration and the Negotiation Process," *American Economic Review*, Vol. 77, no. 2 (May 1987): 342–46.

- (with D. Sullivan) "Nonparametric Tests of Market Structure: An Application to the Cigarette Industry," *Journal of Industrial Economics*, vol. 35, no. 4 (June 1987): 483–98.

- (with T. Hannan) "Sex Discrimination and Market Concentration: The Case of the Banking Industry," *Quarterly Journal of Economics*, vol. C1, Issue 1 (February 1986): 149–73.

- (with J. Brown) "Testing the Efficiency of Employment Contracts," *Journal of Political Economy*, vol. 94, no. 3 (1986): S40–S87.

- (with D. Card) "Why Have Unemployment Rates in Canada and the United States Diverged?" *Economica*, vol. 53 (1986): S171–S195.

- (with D. Card) "Using the Longitudinal Structure of Earnings to Estimate the Effect of Training Programs," *Review of Economics and Statistics*, vol. 67, no. 4 (1985): 648–60.

- "Macroeconomic Analyses and Microeconomic Analyses of Labor Supply," *Carnegie-Rochester Conference Series on Public Policy*, vol. 21 (1984): 117–56.

- (with D. Bloom) "Models of Arbitrator Behavior: Theory and Evidence," *American Economic Review*, vol. 74, no. 1 (March 1984): 111–24.

- (with D. Bloom) "The Pitfalls in Judging Arbitrator Impartiality by Win-Loss Tallies Under Final Offer Arbitration," *Labor Law Journal*, vol. 34, no. 8 (August 1983): 534–39; reprinted in *Proceedings of the 1983 Spring Meeting of the Industrial Relations Research Association.*

- "Determining Participation in Income-Tested Social Programs," *Journal of The American Statistical Association*, vol. 78, no. 383 (September 1983): 517–25, reprinted in L. Aiken and B. Kehrer, *Evaluation Studies Review Annual*, vol. 10, 1985.

- (with J. Abowd), "Compensating Wage and Earnings Differentials for Employer Determined Hours of Work," (August, 1983).

- (with R. Layard) "Incomes Policy and Wage Differentials," *Economica*, vol. 50 (May 1983): 127–43.

- "The Withering Away of a Full Employment Goal," *Canadian Public Policy*, vol. 9, no. 1 (March 1983): 114–25.

- (with D. Card) "Time-Series Representation of Economic Variables and Alternative Models of the Labor Market," *Review of Economic Studies*, vol. 49 (Special Issue, 1982): 761–81; reprinted in *Foundations of Probability, Econometrics and Economic Games*, edited by Omar F. Hamouda and J.C. Rowley.

- (with G. Solon) "Employment Statistics: The Interaction of Economics and Policy," *The American Economic Review*, vol. 77, no. 2 (May 1982): 233–36.

- (with G. Solon) "Longitudinal Labor Market Data: Sources, Uses and Limitations," in *What's Happening to American Labor Force and Productivity Measurements?* National Council on Employment Policy, Washington, D.C. (1982); Revised as Industrial Relations Section Working Paper No. 155 (September 1982).

- "The Economic Impact of an Older Population: A Brief Survey," in *Aging: A Challenge to Science and Society*, vol. 2 of *Medicine and Social Science* (Oxford: Oxford University Press, 1981): 333–40.

- (with John Abowd) "Anticipated Unemployment, Temporary Layoffs, and Compensating Wage Differentials," in *Studies in Labor Markets*, ed. Sherwin Rosen (Chicago: University of Chicago Press for the National Bureau of Economic Research, 1981): 141–70.

- (with D. Card), "Using Longitudinal Data to Estimate Reemployment Effects of the Minimum Wage," Draft, (May, 1981).

- (with J. Altonji) "Wage Movements and the Labour Market Equilibrium Hypothesis," *Economica*, vol. 47, no. 187 (August 1980): 217–45.

- "Commentary on Firm Size, Market Structure and Worker Satisfaction," in *The Economics of Firm Size, Market Structure and Social Performance* ed. J. Siegfried (1980).

- "Unemployment as Disequilibrium in a Model of Aggregate Labor Supply, *Econometrica*, vol. 48, no. 3 (April 1980): 217–45.

- "Estimating the Effect of Training Programs on Earnings," *Review of Economics and Statistics*, vol. 60, no. 1 (February 1978): 47–57; reprinted in *Evaluating Manpower Training Programs*, ed. F. Bloch (1979); and in *Evaluation Studies Review Annual*, vol. 5, eds. Stromsdorfer and Farkus (1980).

- (with John Ham) "Education, Unemployment and Earnings," *Journal of Political Economy*, vol. 87, no. 5 (October 1979): S99–S116.

- (with M. Abbott) "Labour Supply, Commodity Demand, and the Allocation of Time: Correction" *Review of Economics Studies*, vol. 46 (July 1979) : 576–79.

- (with R. Smith) "Compliance with the Minimum Wage Law," *Journal of Political Economy,* vol. 87, no. 21 (April 1979): 333–50.

- "What Do Teenage Unemployment Statistics Measure?" *Supplementary Papers from the Conference on Youth Unemployment: Its Measurement and Meaning* (Washington, D.C.: U.S. Government Printing Office, October 1978): 37–55.

- "Current European Manpower Policies, July 1978," and "Some Highlights of Papers from the Conference on European Manpower Policies," in *European Labor Market Policies*, National Commission for Manpower Policy, Special Report No. 27 (September 1978): 5–26.

- "What is Involuntary Unemployment?" in *Proceedings of the American Philosophical Society*, vol. 122, no. 3 (June 1978): 135–38.

- "Union Relative Wage Effects: New Evidence and a Survey of Their Implications for Wage Inflation," in *Econometric Contributions to Public Policy*, eds. R. Stone and W. Peterson, (New York: St. Martins Press, 1978): 31–63.

- "Evaluating the Effects of the Employment Tax Credit," in *Conference Report on Evaluating the 1977 Economic Stimulus Package* (Washington, D.C.: U.S. Government Printing Office, 1978).

- "The Labor Supply Response of Wage Earners," in *North Carolina-Iowa Income Maintenance Experiment*, eds. J. Palmer and J. *Welfare in Rural Areas: The Pechman*, (Boston: Brookings Institution, 1978): 109–48.

- "Unemployment as a Constraint on Labor Market Behavior," in *Contemporary Economic Analysis*, eds. M.J. Artis and A.R. Nobay, (London: Croon Helm for the Association of University Teachers of Economics, 1978): 149–81.

- "Demand and Supply Functions for State and Local Employment: Implications for Public Employment Programs," in *Essays in Labor Market Analysis. In Memory of Yochanan Peter Comay*, eds. O. Ashenfelter and W. Oates (New York: John Wiley & Sons, 1978): 1–16.

- "Will the Real Conventional Theory of Income Distribution Please Stand Up?" *Social Science Quarterly*, vol. 58, no. 1 (June 1977): 147–50.

- "Comments on `Black/White Male Earnings and Employment'" in *The Distribution of Economic Well-Being*, ed. F.T. Juster (Cambridge, Mass.: Ballinger Publishing Co. for the National Bureau of Economic Research, 1977): 296–98.

- (with M. Abbott) "Labour Supply, Commodity Demand, and the Allocation of Time," *Review of Economic Studies*, vol. 43 (October 1976): 389–411.

- Comment on "Does the Contract Compliance Program Work?" in *Industrial and Labor Relations Review*, Vol. 29, No. 4 (July 1976): 577–80.

- (with J. Pencavel) "A Note on Measuring the Relationship Between Changes in Earnings and Changes in Wage Rates," *British Journal of Industrial Relations*, vol. 14, no. 1 (March 1976): 70–76.

- "Notes on the Interpretation of Urban Density Functions," *The Journal of Urban Economics*, Vol. 3 (January 1976): 82–87.

- (with J. Heckman), "Measuring the Effect of an Antidiscrimination Program," in *Evaluating the Labor Market Effects of Social Programs*, eds. O. Ashenfelter and J. Blum (Princeton, NJ: Princeton University Press, 1976): 46–89.

- (with J. Pencavel) "Estimating the Effects on Cost and Price of the Elimination of Sex Discrimination: The Case of Telephone Rates," in *Some New Perspectives on Equal Employment Opportunity: The A.T.& T. Case*, ed. Phyllis Wallace (Cambridge, MA: MIT Press, 1976): 111–22.

- (with S. Kelley) "Determinants of Participation in Presidential Elections," *Journal of Law and Economics*, vol. 18, no. 3 (December 1975): 695–733.

- (with J. Pencavel) "Wage Changes and the Frequency of Wage Settlements," *Economica* (May 1975): 162–70.

- "The Effect of Manpower Training on Earnings: Preliminary Results," *Proceedings of the 27th Annual Meeting of the Industrial Relations Research Association* (1974); reprinted in *Monthly Labor Review* (April 1975).

- (with R. Ehrenberg) "The Demand for Labor in the Public Sector," in *Labor in the Public and Nonprofit Sectors*, ed. D. Hamermesh, (Princeton, NJ:Princeton University Press, 1975): 55–84; condensed and reprinted in *Public Sector Labor Relations: Analysis and Readings*, ed. David Lewin, et al. (Glen Ridge, NJ: Thomas Horton and Daughters, 1977): 30–36.

- "Blacks and Trade Unionism," *Integrateducation* (May-June 1975): 53–59; from a transcript of Hearings before the New York Commission on Human Rights, May, 1974.

- "Comments on `Labor Market Discrimination: Analysis, Findings, and Problems,'" in Vol. 2 of *Frontiers of Quantitative Economics*, eds. M. Intriligator and D. Kendrick (Amsterdam: North Holland Press, 1974): 556–59.

- (with J. Heckman) "The Estimation of Income and Substitution Effects in a Model of Family Labor Supply," *Econometrica*, vol. 42, no. 1 (January 1974): 73–85.

- "Comment on `Child Quality and the Demand for Children,'" *Journal of Political Economy*, vol. 81, no. 2 (March-April 1973): S96–S98; reprinted in *Economics of the Family*, ed. T.W. Schultz (1974).

- "Discrimination and Trade Unions," in *Discrimination in Labor Markets*, eds. O. Ashenfelter and A. Rees (Princeton, NJ: Princeton University Press, 1973): 88–112; reprinted in *Readings in Labor Economics and Labor Relations*, eds. Reynolds, Masters, and Moser (1974): 432–443.

- (with J. Heckman) "Estimating Labor Supply Functions," in *Income Maintenance and Labor Supply*, eds. G. Cain and H. Watts (Madison, WI.:Univ. of Wisconsin Institute on Poverty Research, 1973): 265–78.

- (with J. Pencavel) "American Trade Union Growth, 1900–1960: A Rejoiner," *Quarterly Journal of Economics*, vol. 86, no. 4 (November 1972) : 691–2.

- (with G.E. Johnson) "Unionism, Relative Wages, and Labor Quality in U.S. Manufacturing Industries," *International Economic Review*, vol. 13, no. 3 (October 1972): 488–508.

- "Racial Discrimination and Trade Unionism," *Journal of Political Economy*, vol. 8, no. 3 (May–June 1972): 435–64.

- (with G.E. Johnson and J.H. Pencavel) "Trade Unions and the Rate of Change of Money Wages in U.S. Manufacturing," *The Review of Economic Studies*, vol. 39, no. 1 (January 1972): 27–54.

- (with Lamond Godwin) "Some Evidence on the Effect of Unionism on the Average Wage of Black Workers Relative to White Workers, 1900–1967," *Proceedings of the 24th Annual Winter Meeting of the Industrial Relations Research Association* (1971): 217–24.

- (with M.K. Taussig) "Discrimination and Income Differentials: Comment," *American Economic Review*, vol. 61, no. 4 (September 1971): 746–50.

- "The Effect of Unionization on Wages in the Public Sector: The Case of Fire Fighters," *Industrial and Labor Relations Review*, vol. 24, no. 2 (January 1971): 191–202.

- "Changes in Labor Market Discrimination Over Time," *The Journal of Human Resources*, vol. 5, no. 4 (Fall 1970): 403–30.

- (with J.H. Pencavel) "American Trade Union Growth," *Quarterly Journal of Economics*, vol. 83 (August 1969): 434–48.

- (with G.E. Johnson) "Bargaining Theory, Trade Union, and Industrial Strike Activity," *American Economic Review*, vol. 59, no. 1 (March 1969): 35–49, reprinted in Bobbs-Merril Reprint Series in Economics.

- "Some Statistical Difficulties in Using Dummy Dependent Variables," Appendix A in *The Economics of Labor Force Participation*, eds. W.G. Bowen and T.A. Finegan (Princeton, NJ: Princeton University Press, 1969): 644–48.

- (with J.D. Mooney) "Some Evidence on the Private Returns to Graduate Education," *Southern Economic Journal*, vol. 35, no. 3 (January 1968): 247–56, reprinted in *Human Capital Formation and Manpower Development*, ed. R. Wykstra (1971).

- (with J.D. Mooney) "Graduate Education, Ability and Earnings," *Review of Economics and Statistics*, vol. 50, no. 1 (February 1968): 78–86.

- (with Wm. Pierce) "Industrial Conflict: the Power of Prediction," *Industrial and Labor Relations Review*, vol. 20 (October 1966): 92–95.

Books Edited:

- *Handbook of Labor Economics, Volumes I–III,* (with David Card), Elsevier Science, North Holland, 1999.

- *Worth Series in Outstanding Contributions Labor Economics*, Worth Publishing Inc., New York, NY, 1999.

- *The Economics of Training I and II*, (with Robert LaLonde), Edward Elgar Publishing Limited, Cheltenham England, 1996.

- *Labor Economics, Volumes I–IV*, (with Kevin Hallock), Edward Elgar Publishing Limited, Cheltenham England, 1995.

  - Volume I—Labor Supply and Demand
  - Volume II—Employment, Wages, and Education
  - Volume III—Unemployment, Trade Unions, and Dispute Resolution
  - Volume IV—Labor Market Discrimination, Labor Mobility, and Compensating Wage Differentials

- "Discussion," in *Lessons From the Income Maintenance Experiments*, A.H. Munnel, ed. (Federal Reserve Bank of Washington and Brookings Institution, 1986.

- (with L.J. Bassi) "The Effect of Direct Job Creation and Training Programs on Low Skilled Workers," in *Fighting Poverty: What Works and What Doesn't*, eds. S. H. Danzinger and D. H. Weinberg (Cambridge, MA: Harvard University Press, 1986): 133–51.

- (with R. Layard) *Handbook of Labor Economics*. 2 vols. Amsterdam: North Holland Press, 1986. Translated to Spanish.

- (with W. Oates) *Essays in Labor Market Analysis. In Memory of Yochanan Peter Comay*. New York: John Wiley & Sons for Halsted Press, 1978.

- (with L. Hausman, B. Rustin, R. Schubert, and D. Slaiman) *Equal Rights and Industrial Relations*. Industrial Relations Research Association, 1977.

- (with J. Blum) *Evaluating the Labor Market Effects of Social Programs*. Princeton, NJ: Princeton University Industrial Relations Section, 1976.

- (with W.G. Bowen) *Labor and the National Economy*. Rev. ed. New York: W.W. Norton, 1975.

- (with A. Rees) *Discrimination in Labor Markets*. Princeton, NJ:Princeton University Press, 1973.

Books Reviewed:

- James Conaway, *The Far Side of Eden (2003) in Barron's (New York)* May 11, 2003.

- Robert B. Reich, *The Future of Success* (2001), in *Financial Times (London),* February 27, 2001.

- R. Hollister, et al., *The National Supported Work Demonstration* (1984), in *Journal of Economic Literature*, vol. 24 (September 1986): 1268–70.

- L. Thurow, *Dangerous Currents* (1984), in *National Review* (April 6, 1984): 53–55.

- R. Haveman and J.L. Palmer, *Jobs for Disadvantaged Workers: The Economics of Employment Subsidies* (1982), in *Journal of Economic Literature*, vol. 21, no. 3 (September 1983): 1039–41.

- T.A. Kochan, *Collective Bargaining and Industrial Relations* (1980), in *Industrial Relations*, vol. 21, no. 1 (Winter 1982): 73–78.

- R. Ehrenberg, *The Regulatory Process and Labor Earnings* (1979), in *Journal of Political Economy*, vol. 89, no. 3 (June 1981): 601–03.

- G.S. Bain and F. Elsheikh, *Union Growth and the Business Cycle* (1976), in *Economica*, vol. 45, no. 179 (August 1978): 319–320.

- H.O. Stekler, *Economic Forecasting* (1970), in *Journal of Finance*, vol. 26, no. 3 (June 1971): 816–17.

- Sar Levitan, et. al., *Still a Dream: The Changing Status of Blacks Since 1960* (1975), in *Monthly Labor Review*, vol. 98 (December 1975): 66–67.

- G. von Furstenburg, et. al., *Patterns of Racial Discrimination* (1974), in *Journal of Economic Literature* (December 1975): 1372–74.

Unpublished Papers:

- (with Jonathan Baker, David Ashmore and Daniel Hosken), *Econometric Methods in Staples,* forthcoming ABA Antitrust Section.

- (with Karl Storchmann) "The Quality of Vineyard Sites in the Mosel Valley of Germany," June, 2001.

- (with Gordon Dahl) "Are the Final Offers Formulated as the Theory Predicts?" February, 2001.

- (with Alessandro Corsi) "Wine Quality: Experts' Ratings and Weather Determinants," February 2001.
- (with Kathryn Graddy and Margaret Stevens) "A Study of Sale Rates and Prices in Impresionist and Contemporary Art Auctions," October, 2000.
- (with Štěphán Jurajda) "Cross-Country Comparisons of Wage Rates: The Big Mac Index," August 2000.
- (with Cecilia Rouse) "The Payoff to Education," August, 1999.
- (with Norman Thurston) "Mink Markets: Price Determination, Pre-Sale Valuation and Seller-Specific Effects," Instituto y Universidad Torcuato Di Tella Seminar, September, 1998.
- (with Phillip B. Levine and Susan Skeath) "Practicing Safe Game Theory: An Empirical Test of a Prisoners' Dilemma in Unemployment Insurance Disputes," July, 1998.
- (with David Ashmore, Jonathan B. Baker and Signe-Mary McKernan) "Identifying The Firm-Specific Cost Pass-Through Rate," Federal Trade Commission, Bureau of Economics, Working Paper No. 217.
- (with Andreas Papandreou and Nico Papandreou) "Weather and the Quality of the Vintage for Greek Red Wines," October, 1997.
- "The Hedonic Approach to Vineyard Site Selection," September, 1997.
- (with Kathryn Graddy) "An Empirical Study of Sale Rates and Prices in Impressionist and Contemporary Art Auctions," August, 1997.
- (with James Dow, Daniel Gallagher and Dean Hyslop) "Arbitrator and Negotiator Behavior Under an Appellate System," August, 1997.
- (with Cecilia Rouse) "How Convincing Is The Evidence Linking Education and Income?" October, 1995.
- (with Alan Beggs and Kathryn Graddy) "The Afternoon Effect and Heterogeneity: Evidence from Art Auctions," July, 1995.

- (with Joel Waldfogel) "Bargaining in the Shadow of the Judge: Empirical Tests," Prepared for the American Association of the Advancement of Science, Boston, February 11–16, 1993.

- (with David Bloom) "Lawyers as Agents of the Devil in a Prisoner's Dilemma Game," September 1990, Princeton University Industrial Relations Section Working Paper #270, NBER Working Paper No. 4447, September, 1993.

- (with John Abowd) "Art Auctions: Price Indexes and Sale Rates for Impressionist Paintings," January, 1988.

- "Minority Employment Patterns" 1966, Prepared for the U.S. Equal Employment Opportunity Commission and OMPER of the Department of Labor.

Testimony Before Congress:

- Hearings before the Committee on the Budget, House of Representatives, "Outlook and Budget Levels for FY 1979–80," 96th Congress: 645–659.

Other Activities:

- Chairman, *Frisch Medal* Selection Committee, 2003.

- President, The Society of Labor Economists, 2003.

- Advisory Committee of the Center for Arts and Cultural Policy Studies, Princeton University, 2002 –

- First Vice President, The Society of Labor Economists, 2002.

- *Doctor Honoris Causa,* University of Brussels, 2002.

- Member, Executive and Supervisory Committee, CERGE/EI, Charles University, Prague, Czech Republic, 2001–

- Advisor, Job Opportunity Index National Advisory Board, 2001 –

- Second Vice President, The Society of Labor Economists, 2001.

- Member, Editorial Board, *Contemporary Economic Policy,* 2000–

- Chairman of the Board, American Foundation for the Center for Graduate Education /Economics Institute of the Charles University, Prague, Czech Republic, 1999–
- Member, Board of Editors, Australian Economic Review, 1997–
- Member, Board of Trustees, Center for Advanced Study in the Behavioral Sciences, Stanford University, 1994–2000.
- Member, Committee on Fellowships and Special Projects, Center for Advanced Study In the Behavioral Sciences, Stanford University, 1994–
- Member, Board of Directors, American Law and Economics Association, 1994–
- Fellow, American Academy of Arts & Sciences, 1993–
- Fellow, Center for Advanced Studies in the Behavioral Sciences, Stanford, California, 1989.
- Faculty Member, Law and Economics Center, George Mason University, Advanced Course for Federal Judges on Statistics, Econometrics, and Financial Data, 1979–
- Faculty Member, Law and Economics Center, George Mason University, Economics Institute for Federal Judges, 1982–
- Faculty Member, "Statistics and Expert Testimony," The Federal Judicial Center, 1985.
- Faculty Member, "Economics and Expert Testimony," The Federal Judicial Center, 1984.
- Benjamin Meeker Visiting Professor, University of Bristol, 1981.
- Visiting Scholar, Federal Reserve Bank of Philadelphia, 1979–80.
- Recipient of the Ragnar Frisch Prize of the Econometric Society, 1984.
- Fellow, Econometric Society, 1977.
- Guggenheim Fellowship, 1976–77.

- Member, Board of Editors, *Journal of Labor Economics*, 1983–
- Member, Board of Editors, *Pakistan Development Review*, 1981–
- Member, Board of Editors, *Journal of Labor Research*, 1980–1989.
- Member, Board of Editors, *Journal of Urban Economics*, 1974–
- Member, Advisory Board, *Ricerche Economiche: An International Review of Economics,* 1992–
- Member, Advisory Board, *Labour Economics: An International Journal*, 1992–
- Member, Advisory Council of the Cornell Institute for Labor Market Policies, 1991–
- Member, Advisory Board, Center for Economic Policy Research, Stanford University, 1984–
- Member, Executive Committee, Conference on Research in Income and Wealth, National Bureau of Economic Research, 1982–1989.
- Member, Macro Advisory Panel, National Commission for Employment Policy, 1980–81

VIII.2. Appendix B: Recent Testimony Experience of Orley Ashenfelter

Compensation of Managerial, Professional and Technical Employees Antitrust Litigation

Testimony: Analysis of class certification issues in connection with claims of improper exchanges of salary information

Jurisdiction: USDC: District of New Jersey, Trenton Vicinage

Caption: 02-cv-2924 (AET)

Retained by: Defendant Oil Companies

Deposition: Apr-03

Trial: No

U.S. Information Systems, Inc. et al. v. International Brotherhood of Electrical Workers Local Union Number 3 et al.

Testimony: Analysis of alleged monopoly tying

Jurisdiction: USDC: Southern District of New York

Caption: 00 cv 4763

Retained by: Defendant Electrical Contractors

Deposition: Dec-02

Trial: No

R. J. Reynolds Tobacco Company v. Philip Morris, Incorporated

Testimony: Analysis of plaintiffs' estimates of lost sales

Jurisdiction: USDC: Middle District of North Carolina

Caption: Civil Action No. 1:99CV185

Retained by: Philip Morris

Deposition: Aug-01

Trial: No

Olstad v. Microsoft Corp.

Testimony:	Analysis of Class Certification in an antitrust action brought by indirect purchasers.
Jurisdiction:	State of Wisconsin, Circuit Court, Civil Division, Milwaukee County
Caption:	00-CV-003042
Retained by:	Microsoft
Deposition:	Mar-01
Trial:	No

Federal Trade Commission v. Swedish Match North America, Inc.

Testimony:	Statistical analysis of the elasticity of demand for chewing tobacco
Jurisdiction:	USDC: District of Columbia
Caption:	CV-01501 TFH
Retained by:	FTC
Deposition:	Aug-00
Trial:	Sep-00

Visa Check/Master Money Antitrust Litigation

Testimony:	Damages arising from an allegedly illegal product tying arrangement
Jurisdiction:	USDC: Eastern District of New York
Caption:	CV-96-5238
Retained by:	Visa
Deposition:	May-00
Trial:	No

United States of America v. American Society of Composers, Authors and Publishers; in the Matter of the Application of Turner Broadcasting System, Inc., etc.

Testimony: Analysis of Levels of Music Use on Television

Jurisdiction: USDC: Southern District of New York

Caption: Civ. No. 13-95 (WCC)

Retained by: ASCAP

Deposition: Aug-99

Trial: No

U. S. Department of Labor Office of Federal Contract Compliance v. Interstate Brands Corp.

Testimony: Analysis of statistical evidence of race discrimination

Jurisdiction: U. S. DOL Office of Administrative Law

Caption: 97-OFC-6

Retained by: US DoL

Deposition: Mar-99

Trial: Mar-00

VIII.3. Appendix C: Materials Considered

Web Sites

- Accreditation Council for Graduate Medical Education, http://www.acgme.org
- American Board of Medical Specialties, http://www.abms.org
- American Medical Association, http://www.ama-assn.org
- Association of American Medical Colleges, http://www.aamc.org
- Association of Program Directors in Surgery, http://www.apds.org
- Council of Medical Specialty Societies, http://www.cmss.org
- ECG Management Consultants, http://www.ecgmc.com
- Education Commission for Foreign Medical Graduates, http://www.ecfmg.org
- Emory University, http://www.emory.edu
- Georgetown University, http://www.georgetown.edu
- Hospital Connect, http://www.hospitalconnect.com
- Michigan State University College of Osteopathic Medicine, http://www.com.msu.edu/
- National Resident Matching Program, http://www.nrmp.org
- Save The Match, http://www.savethematch.org
- Surgery at Yale School of Medicine, http://yalesurgery.med.yale.edu
- United States Bureau of the Census, http://www.census.gov
- United States Medical Licensing Exam, http://www.usmle.org

Publicly Available Sources

- ACGME Institutional Requirements

- American Bar Association, "Proving Antitrust Damages: Legal and Economic Issues," *American Bar Association* 1996, 37–38.
- American Medical Association, Graduate Medical Education Directory 1996–1997, Chicago: American Medical Association.
- Council on Graduate Medical Education, Fifteenth Report, *Financing Graduate Medical Education in a Changing Health Care Environment*, December 2000.
- Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization*, Second Edition (1994).
- Derek DeLia, Joel C. Cantor, and Elaine Duck, "Productivity vs. training in primary care: Analysis of hospitals and health centers in New York City," *Inquiry – Excellus Health Plan* 39, no.3 (Fall 2002): 314–326.
- Frances H. Miller, JD and Thomas L. Greaney, JD, "The National Resident Matching Program and Antitrust Law," *The Journal of the American Medical Association* 289, no.7 (19 Feb 2003): 913–918.
- *Graduate Medical Education and Public Policy, a Primer*, Health Resources and Services Administration, Bureau of Health Professions, December 2000.
- Ofelia Casillas, "Medical residents see tough schedules ease up; Patient safety concerns spur new limits on hours, but some fear training will be compromised," *Chicago Tribune* 6 July 2003, 1.
- Orley Ashenfelter and Alan Krueger, "Estimates of the Economic Return to Schooling From A New Sample of Twins," American Economic Review, vol. 84, no. 5, (December 1994).
- Robert Mechanic MBA, Kevin Coleman, and Allen Dobson, PhD, "Teaching Hospital Costs: Implications for Academic Missions in a Competitive Market," *Journal of the American Medical Association* 280, no.11 (16 Sep 1998): 1015–1019.
- 1984 COTH Survey of Housestaff Stipends, Benefits, and Funding.

Bates-Stamped Documents

- AHA000296: "AHA Annual Survey Database—Fiscal Year 2001"

- NRM0000431 to 0000518: "National Resident Matching Program, Results and Data 2001 Match, April 2001"
- AMC-004080 to 004142: "Council of Teaching Hospitals: Survey of Housestaff Stipends Benefits and Funding 1990"
- AMC-003990 to 004079: "Council of Teaching Hospitals: Survey of Housestaff Stipends Benefits and Funding 1991"
- AMC-004255 to 004342: "Council of Teaching Hospitals: Survey of Housestaff Stipends Benefits and Funding 1992"
- AMC-003879 to 003989: "Council of Teaching Hospitals: Survey of Housestaff Stipends Benefits and Funding 1993"
- AMC-003750 to 003878: "Council of Teaching Hospitals: Survey of Housestaff Stipends Benefits and Funding 1994"
- AMC-003666 to 003749: "Council of Teaching Hospitals: Survey of Housestaff Stipends Benefits and Funding 1995"
- AMC-003523 to 003665: "Council of Teaching Hospitals and Health Systems: Survey of Housestaff Stipends Benefits and Funding 1996"
- AMC-003437 to 003522: "Council of Teaching Hospitals and Health Systems: Survey of Housestaff Stipends Benefits and Funding 1997"
- AMC-003317 to 003436: "Council of Teaching Hospitals and Health Systems: Survey of Housestaff Stipends Benefits and Funding 1998"
- AMC-004236 to 004254: "2001 AAMC Survey of Housestaff Stipends, Benefits and Funding"
- AMC-004175 to 004235: "2001 AAMC Survey of Housestaff Stipends, Benefits and Funding"

Data Produced During Discovery

- AHA 000296: AHA Annual Survey Database—Fiscal Year 2001
- AMA 003517: Graduate Medical Education Data 1997

- AMA 003518: Graduate Medical Education Data 1998
- AMA 003519: Graduate Medical Education Data 1999
- AMA 003520: Graduate Medical Education Data 2000
- AMA 003521: Graduate Medical Education Data 2001
- AMA 003522: Graduate Medical Education Data 2002 (1/2)
- AMA 003523: MERI DATABASE (2/2)
- AMC 0011077: AAMC FSS DATA FILE FY 1998
- AMC 0011078: AAMC FSS DATA FILE FY 1999
- AMC 0011079: AAMC FSS DATA FILE FY 2000
- AMC 0011080: AAMC FSS DATA FILE FY 2001
- AMC 0011081: AAMC FSS DEPARTMENT CODES
- AMC 0011082: AAMC FSS RANK CODES
- AMC 0011083: AAMC FSS DATA FILE FY 2002

Publicly Available Data

- Core Based Statistical Areas (CBSAs) definitions, available from the US Census Bureau website, http://www.census.gov
- US Department of Labor, Bureau of Labor Statistics, CPI series CUUR0000SA0
- United States Post Office, "2000 Census Gazetteer Program," purchased from an outside data source, see htttp://www.cryptnet.net/fsp/zipdy/.

Other

- Paul Jung, M.D., et al. v. Association of American Medical Colleges, et al. Complaint. In the United States District Court for the District of Columbia. Case number 1:02CV00873.

- "Summary of Fifty States Physician Licensing" prepared by Lockridge, Grindal, Nauen, PLLP.

VIII.4. Appendix D: Technical Appendix

Consisting of Figures 1-D through 11-D is redacted pursuant to Confidentiality Order entered by the Court.