

## HOW H.R. 4577's "ANY WILLING PHARMACY" PROVISION COULD LEAVE DRUG PRICES UNCHANGED<sup>1</sup>

### I. INTRODUCTION

1. I am an antitrust economist employed by Microeconomic Consulting and Research Associates ("MICRA"), an economics consulting firm located in Washington, D.C. Before entering private practice, the founders and current owners of MICRA, which include me, were previously employed by the United States Department of Justice Antitrust Division. During my career I have been retained to provide expert testimony in numerous matters involving issues of competition in the health care industry. My Curriculum Vitae is attached as Exhibit 1 to this comment.

2. I was retained by the National Community Pharmacists Association ("NCPA") to address that piece of the proposed legislation H.R. 4577 ("Ensuring Seniors Access to Local Pharmacies Act of 2014") to amend title XVIII of the Social Security Act which would open participation in Prescription Drug Plan ("PDP") pharmacy networks to "any willing pharmacy" ("AWPH") located in medically underserved areas.<sup>2</sup> This proposed legislation would require that Medicare Prescription Drug Plans ("PDPs") with one or more pharmacies located in medically underserved areas "extend to any pharmacy located in such area or among such population the option to be an in-network pharmacy with respect to such plan under terms and

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<sup>1</sup> Comment submitted by Dr. David M. Eisenstadt, Principal, Microeconomic Consulting and Research Associates.

<sup>2</sup> H.R 4577 – 113th Congress, at <https://beta.congress.gov/bill/113th-congress/house-bill/4577/text>. A medically underserved area is defined by the legislation as a "health professional shortage area" or HPSA as defined in section 332(a)(1)(A) of the Public Health Service Act; a "medically underserved area" or MUA as defined by section 330(b)(3)(A) of the Public Health Service Act, or among a "medically underserved population" as defined in such section 330(b)(3)(A) of the Public Health Service Act.

conditions ... comparable to those the plan has agreed upon with other in-network pharmacies located in such area or among such population.”<sup>3</sup>

3. Opponents of an AWP rule may cite to law and economics literature that argues any willing provider statutes or rules increase price.<sup>4</sup> The theoretical point made in *this* comment is that as a matter of economic theory price does not have to increase. This comment is offered as rebuttal to any party that claims that such a rule *will* cause Medicare Part D drug prices to rise. Hence, this comment describes circumstances under which prices could remain the same.

4. The remainder of this comment is organized as follows. Section II explains how an AWP rule can leave price to the government unchanged. For ease of exposition, the section assumes that three retail pharmacy firms compete to join a PDP’s Part D network.

5. This comment intentionally contains some text which is identical or similar to that included in the comment I submitted in March 2014 regarding CMS’s proposed price transparency and AWP rules.

## **II. THREE PHARMACIES COMPETE FOR PREFERRED STATUS; AN AWP PROVISION DOES *NOT* INCREASE PRICE**

6. Prior to implementation of an AWP rule, three retail pharmacy firms or individual bargaining units, **L**, **M**, and **H**, each with differing drug acquisition and dispensing costs, compete to become “preferred” in a Part D PDP’s retail pharmacy network.<sup>5</sup> They each

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<sup>3</sup> Ibid, H.R. 4577.

<sup>4</sup> Exhibit 2 explains how prices could increase with an AWP rule.

<sup>5</sup> While it may be tempting to think of independent pharmacies as individual “mom and pop” establishments, many participate in a Pharmacy Services Administration Organization (“PSAO”) that contracts on their behalf for participation in network. Independent pharmacies also include (smaller) regional pharmacy chains. For purposes of this comment, independent pharmacies include both single-owned establishments and smaller regional chains. Parenthetically, GAO reports that 22 different PSAOs representing approximately 20,000-28,000 pharmacies existed in 2011 or 2012 (see GAO Highlights, “Prescription Drugs: The Number Role, and Ownership of Pharmacy

separately negotiate terms and conditions (“T&C”) with the PDP (or PBM retained by the PDP).<sup>6</sup> For ease of presentation, the large number different prescription drugs that exist today are defined by a single drug. Suppose that **L** has lower drug acquisition (and dispensing) costs than **M**, who has lower costs than **H**. In addition, the PDP believes that it needs a minimum of two pharmacy firms to be in-network for it to sell an “attractive” PDP product to Medicare beneficiaries. In the pre-AWPH provision “competitive equilibrium,” **L** and **M** will each (unilaterally) negotiate a price with the PBM that is just below (the PBM’s best information about) **H**’s marginal cost. Since **H** will not offer a price below its own cost, **L** and **M** will “win” the competition and be the PDP’s sole in-network pharmacies.

7. **Figure 1** shows this outcome. The PBM’s demand for drugs sold through a Part D preferred network pharmacy is labeled as  $D_{PBM}$ , and  $MC_L$ ,  $MC_M$ , and  $MC_H$  are the pharmacy firms’ marginal costs of drug acquisition. The profits earned by **L** and **M** are the shaded areas

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Services Administrative Organizations,” January 2013).

In 2013, CVS’s SilverScript “Choice” plan included independents as preferred outlets. These pharmacies contracted through several PSAOs or directly. In the context of this stylized analysis, one of the three firms competing for preferred status could be thought of as a large PSAO comprised of many individually-owned pharmacy firms located across the United States. One could also think of **L**, **M** and **H** as national pharmacy chains such as CVS, Walgreens and Rite-Aid. The precise identity of the pharmacy firms competing for preferred status is not important to the analysis. What *is* important is an explanation for how an AWPH rule might cause prices to remain the same or fall.

<sup>6</sup> The institutional *form* of price competition between pharmacies is not critical to the analysis. I have been informed that formal competitive bidding through submission of an RFP is atypical. In a typical situation, a PBM may approach a retail pharmacy firm (i.e., a chain) which is its first choice and offer terms and conditions which, if accepted, would convey preferred status. If the two cannot agree, the PBM approaches its second-choice firm, etc. Once the pharmacy and PBM agree, other “spots” or “slots” in the network are filled-in with other pharmacy firms. A PBM may also have some initial preference for a firm to fill a “regional” or perhaps second-tier national slot. Each pharmacy firm recognizes to some degree it is competing against one or more other firms for a slot in the PDP’s preferred network. For example, a regional PSAO or regional independent chain *could* be a substitute for a regional grocery chain in a preferred pharmacy network. Or, Rite-Aid plus several grocery store chains and “big-box” retailers could substitute for either or all of CVS, Walgreens, and Walmart. The point of this exercise is not to model the precise mechanics of how “slots” in preferred networks are filled, or the identities of the real-world firms that vie for preferred status, but instead to explain the logic behind the different outcomes possible with an AWPH rule.

colored in red and green, with  $Q_{L+M}$  being the quantity of drugs they sell as the PDP's sole in-network pharmacies.

8. After adoption of an AWP provision, the lowest-cost pharmacy **L** must decide whether to (1) continue to just undercut **H** (“undercutting”), sharing the PDP’s enrollees’ total prescriptions only with **M**, or (2) bid its “monopoly” price and share total prescriptions with both **M** and **H** (“monopoly pricing”). **L** is assumed to choose the strategy that produces the larger of the two amounts of profit, while **M**’s best strategy will be to always “match” **L**’s price. **Figure 2** compares the profit **L** would earn if it continues to price just under **H**’s marginal cost at  $p^u = p^{\text{pre-AWPH}}$  (the purple plus orange areas) with the profit it would earn if it charged the monopoly price ( $p^{\text{monop}}$ ) and shared monopoly output ( $Q_T^{\text{monop}}$ ) with both **M** and **H** (the blue plus orange areas).

As drawn, the purple area is larger than the blue area, meaning that **L** would earn greater profit if it leaves its price unchanged and continues to undercut **H**. Pharmacies **L** and **M** continue to be the PDP’s sole in-network pharmacies. This example demonstrates that an AWP provision will not necessarily have an adverse effect on the negotiated prices submitted to the government.

9. It is reasonable to inquire whether **L**’s with-AWP profit will be larger if it (a) continues to underprice **H** or (b) chooses to price at the monopoly level. The answer depends on several factors, including (1) the magnitude of **L**’s drug acquisition cost advantage over **H**; (2) **H**’s likely share of the monopoly output if **L** charges its monopoly price; and (3) the difference between the volume of drugs reimbursed by the PBM (and government) at the “undercutting” and monopoly prices.<sup>7</sup> In general, the larger (1) **L**’s cost advantage over **H**, (2) **H**’s likely share

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<sup>7</sup> This third consideration means the result depends partly on the PBM’s derived elasticity of demand for Part D drugs filled by preferred pharmacies in medically underserved areas. The PBM’s own elasticity of demand is derived from the elasticity of “final” (i.e. government-plus-beneficiary) demand for Part-D coverage, and this elasticity is likely to be higher than the elasticity of final demand across all PBMs. Since multiple PBMs compete for selection by a given PDP, an individual PBM that negotiates to “too high” a drug price risks replacement by a different PBM.

of the monopoly output,<sup>8</sup> and (3) the difference between the current and monopoly output, the greater is **L**'s incentive to *maintain* its current price. Exhibit 3 to this comment provides the mathematical conditions under which **L** earns larger profit if it continues to undercut **H** under an AWPB provision. Unless opponents of the rule can necessarily demonstrate without exception that current preferred pharmacies will earn greater profit if they raise price, even though this

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Suppose the overall (i.e. "market") elasticity of demand for Part-D coverage in medically underserved areas is 0.4 (elasticity of demand expressed as an absolute value). If PBMs compete using "quantity" (e.g. pill-days) as their strategic variable when maximizing profit (i.e. they behave as "Cournot" quantity-setting competitors), then the demand elasticity facing an individual PBM would equal 0.4 divided by the PBM's share. See, e.g., Mitchell Polinsky, Steven Shavell (eds.), *Handbook of Law and Economics*, Volume 2, page 1084. Hence, the demand elasticity for participating preferred pharmacies by a PBM with a 15 percent (0.15) share would equal 2.7. Alternatively, if the PBMs compete with one another using "price" as their strategic variable (i.e. they behave as "Bertrand" price-setting competitors and offer somewhat differentiated products) a PBM's individual demand elasticity will equal or exceed 2.7. The less differentiation between PBMs, the larger will be their individual demand elasticity. For estimates of drug (category) elasticity of demand see *inter alia* Amitabh Chandra, Jonathan Gruber, Robin McKnight, "Patient Cost-Sharing, Hospitalization Offsets, and the Design of Optimal Health Insurance for the Elderly," NBER working paper 12972 (March 2007) and Mark Fendrick, Dean G. Smith, Michael E. Chernew, Sonali N. Shah, "A Benefit-Based Copay for Prescription Drugs: Patient Contribution Based on Total Benefits, Not Drug Acquisition Cost" *The American Journal of Managed Care*, vol. 7 No. 9 (September 2001).

The literature typically reports estimates of beneficiaries' drug demand elasticities. Final demand elasticity can be approximated by dividing beneficiary elasticity by the copay percentage. Hence, if beneficiaries' demand elasticity is 0.1 and the copayment percentage is 25%, the implied final demand elasticity equals  $0.1/0.25 = 0.4$ .

<sup>8</sup> **H**'s share of monopoly output is akin to measuring the share of Part D prescriptions in open networks filled by non-preferred pharmacies in restricted networks in medically underserved areas. Since independent pharmacies are typically denied preferred status in restricted pharmacy networks, a relevant statistic is their share of Part D prescriptions in open networks in these areas. I assume in this Comment that the current non-preferred pharmacies serving medically underserved areas would plausibly earn a share of Part D prescriptions under the proposed legislation of at least 20 to 40 percent. The Drug Channels Institute estimates the nationwide share of non-mail-order prescriptions filled by independently-owned pharmacies, defined as standalone or small chains with three or fewer locations, at around 20% in 2013 (See <http://www.drugchannels.net/2013/05/how-pharmacy-industry-ch-ch-changed-in.html>). The 2012 NCPA Pharmacy Digest estimates that independent pharmacies, defined as any pharmacist-owned, privately-owned pharmacy business and which includes some regional chains with four or more stores, numbered 23,106 locations and filled an average of 62,969 prescriptions per location per year, for a total of 1.44 billion prescriptions nationwide, which represents about 40% of the total 3.57 billion prescriptions filled by all non-mail order pharmacies (See [http://www.ncpanet.org/pdf/digest/2012/2012\\_digest\\_inbrief.pdf](http://www.ncpanet.org/pdf/digest/2012/2012_digest_inbrief.pdf)).

This share range is likely to be conservative for two reasons. First, independent pharmacies likely fill a smaller share of prescriptions in tiered networks than they do in open networks because they are often placed in non-preferred tiers. In addition, there may be reason to expect that because chain pharmacies may be less willing to locate in certain medically underserved areas the share of prescriptions in those areas that would be filled by non-participating pharmacies would be even larger.

dilutes their pre-rule volume and share, they have an insufficient basis to claim negotiated drug prices will increase with certainty.<sup>9</sup>

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<sup>9</sup> Several parties I interviewed predicted negotiated prices are likely to *fall* after an AWPB rule is implemented. The argument is based on the observation that at present pharmacy firms do not know each other's drug acquisition costs with certainty. Apparently, current negotiated prices between pharmacy firms and PBMs for preferred status convey some degree of exclusivity formally or informally, notwithstanding that the actual negotiated price between the two could exceed the drug acquisition cost of the PBM's next-best-alternative pharmacy firm. Acquiring this exclusivity is apparently important to large chains because customer traffic into their stores for the purchase of prescription drugs generates sales of more profitable, non-prescription drug products. These individuals believed that even after implementation of an AWPB rule current preferred pharmacy chains would not want to lose this exclusivity. Because under the rule there can be no "contractual" commitments of exclusivity (any willing pharmacy will also be able obtain preferred status if it agrees to match" the terms and conditions agreed to by other preferred pharmacies), the only way to maintain their pre-rule level of exclusivity is to offer a negotiated price that is comfortably below the likely marginal cost of a rival or rivals competing for that preferred slot.

# **EXHIBIT 1**

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**CURRICULUM VITAE**

**Education**

1979 Ph.D., Economics, University of Illinois (Urbana-Champaign)

1975 M.S., Economics, University of Illinois (Urbana-Champaign)

1973 B.S., Economics, University of Maryland

**Experience**

Dr. Eisenstadt joined Microeconomic Consulting and Research Associates, Inc. as a founder and Principal in 1991. His experience includes antitrust work in health care, pharmaceuticals, real estate brokerage services, tobacco products, telecommunications, soft drink, food manufacture and distribution, toy distribution, and energy industries, as well as the computation of damages in private antitrust and other commercial litigation.

Prior to joining MicRA, Dr. Eisenstadt was a Senior Vice President of ICF Consulting Associates. From 1984-1986, Dr. Eisenstadt was a Senior Economist at the consulting firm of Cornell, Pelcovits & Brenner Economists Inc., and prior to that was a Senior Economist at the U.S. Department of Justice, Antitrust Division in Washington, D.C.

Dr. Eisenstadt has been retained to provide economic advice and competitive analysis to numerous hospitals, physicians, and/or managed care plans engaged in business arrangements that raise issues which are alleged to impact competition. Dr. Eisenstadt has also made numerous presentations to and/or appearances at the U.S. Department of Justice and/or the Federal Trade Commission regarding proposed mergers and or alleged exclusionary conduct. A partial listing (excludes current or confidential matters in which Dr. Eisenstadt's name has not yet been disclosed) of Dr. Eisenstadt's experience as an antitrust economist includes:

- Economic Expert in Allan et al. v. Realcomp II et al.
- Consulting economist to the National Community Pharmacists' Association
- Consulting economist to Cottage Health System
- Consulting economist to Advocate Health Care and NorthShore University Health System
- Economic expert in Jim Evans Academy of Professional Umpiring, Inc. vs. National Association of Professional Baseball Leagues, Inc.
- Economic Expert in Hynes et al. v. Health First et al.
- Economic Expert in Federal Trade commission v. Phoebe Putney Health System Inc. et al. FTC Docket Number 9348.
- Economic expert in UnitedHealth Group, Inc. v. Columbia Casualty Company, et al.
- Economic expert in Perinatal Medical Group et al. v. Children's Hospital Central California, et al.
- Consulting economist to University of Wisconsin Medical Foundation.
- Consulting economist to WellPoint, Inc.
- Consulting economist to Geisinger Health System in its proposed acquisition of Community Medical Center.
- Consulting economist to MCS Services Inc. in the matter of MCS Services, Inc. v. William T. Jones and Oce North America, Inc.
- Consulting economist to Lahey Health System in its proposed acquisition of Northeast Hospital Corporation.
- Economic expert in Oce North America v. MCS Services Inc., et al.,
- Consulting economist to National Association Chain Drugs Stores and National Community Pharmacists Association regarding the proposed merger of Medco and Express Scripts Inc.
- Economic expert in Illinois Department of Public Health, Project 10-089.
- Consulting economist to Central DuPage Hospital and Delnor Community Hospital.
- Consulting economist to Atlantic Health and Newton Memorial Hospital.

- Economic expert in Home Quarters v. MiRealSource and Realcomp II Ltd.
- Economic expert in Grand River Enterprises Six Nations, Ltd. v. Pryor, et al.
- Economic expert in Grand River Six Nations Ltd, Claimants v. United States of America.
- Economic expert in Wood v. Archbold Medical Center et al.
- Consulting economist to Meridian Health System and Southern Ocean County Hospital.
- Consulting economist to Meridian Health System and Bayshore Community Hospital.
- Economic expert in Wuesthoff Health System v. Health First Inc., et al., Case No. 05-2007-CA-029391, Eighteenth Judicial Circuit, Brevard County, Florida.
- Consulting economist to Maine Health in its proposed merger with Penobscot Bay Medical Center.
- Consulting economist to Maine Health in its merger with Southern Maine Medical Center.
- Consulting economist to Froedtert and Community Memorial Hospital (F&CH) and Synergy Health in the merger of F&CH and Synergy Health – West Bend Clinic.
- Consulting economist to Rush North Shore Medical Center and Evanston Northwestern Healthcare.
- Consulting economist to St. Mary’s Medical Center and Baptist Health System, Knoxville, TN.
- Consulting economist to Robert Wood Johnson, New Brunswick, N.J.
- Economic expert in Federal Trade Commission v. Realcomp II Ltd., FTC Docket Number 9320.
- Economic expert in JBS Technologies v. Matsushita Electric Corporation of America.
- Economic expert in Wuesthoff Memorial Hospital v. Agency for Health Care Administration, DOAH Case No. 06-0571 CON, CON No. 9881.
- Economic expert in Four Corners Nephrology Associates et al. v. Mercy Medical Center of Durango.
- Economic expert in Wuesthoff Health System v. Health First Inc. et al.
- Economic and consulting expert for Highmark Blue Cross Blue Shield of Western Pennsylvania (numerous matters).

- Consulting expert for Froedtert and Community Memorial Hospital and Columbia and St. Mary's Health System, Milwaukee, WI.
- Deposition testimony in HCBCG v. Hawaii Pacific Health, et al.
- Consulting economist to HealthNow New York, Inc. (Blue Cross-Blue Shield of Western New York).
- Consulting economist to Coventry Health Care.
- Economic expert on behalf of Madison Hospital in Alabama CON hearing, Huntsville, Alabama.
- Consulting economist to McLaren Health System.
- Consulting economist to New York State Attorney General in GHI-HIP.
- Consulting economist to Northeast Medical Center and Carolinas Health System.
- Economic expert and Med-Alert v. Atlantic Health System, et al.
- Deposition and hearing testimony in Holmes Regional Medical Center (HRMC) v. State of Florida.
- Economic expert in Federal Trade Commission v. Piedmont Health Alliance.
- Economic expert in Baptist Health System v. Covenant Health Inc. (Arbitration).
- Economic expert in Quanex Corporation and Affiliated Subsidiaries v. Commissioner of Internal Revenue.
- Economic expert in Kochert v. Greater Lafayette Health Services.
- Economic expert in Abraham v. Intermountain Health Care.
- Economic expert on behalf of Vista Health.
- Economic expert in Rome Ambulatory Surgery Center v. Rome Memorial Hospital.
- Economic expert in Goodstein v. Queens Physician Associates (American Arbitration Association).
- Economic expert in American Health Lawyers Association Alternative Dispute Resolution Service In the Matter of Healthnow New York, Inc. and Catholic IPA, LLC.
- Economic expert in Adventist Health System/Sunbelt, Inc., d/b/a/ Florida Hospital v.

Florida Agency For Health Care Administration.

- Economic expert in Gateway Contracting Services v. Sagamore Health Network, Inc. et al.
- Economic expert in Highmark et al. v. UPMC Health System.
- Economic expert in Coventry Health Care of Kansas Inc. v. Via Christi Health System, Inc. et al.
- Economic expert in West Penn Allegheny Health System et al. v. UPMC Health System.
- Economic expert in Welborn Clinic v. St. Mary's Medical Center of Evansville, Indiana.
- Economic expert in Health America v. Susquehanna Health System.
- Economic expert in Cardiac Institute General Partnership v. Banner Health System, et. al.
- Economic expert in the Application of Wellmont Washington County Hospital, CON Number CN0007-59, Before the Tennessee Health Facilities Commission.
- Economic expert in Snyder v. Microchip Technology United States District Court for the Southern District of Ohio Eastern Division, Civil Action No. C2-98-416.
- Economic expert in Holmes Regional Medical Center v. Agency For Health Care Administration and Wuesthoff Memorial Hospital.
- Economic expert in Babb vs. Penn State Geisinger Health System.
- Economic expert in State of New York et al. v. Toys "R" Us.
- Economic expert in the matter of New York Telephone Company's Proposal to Discontinue Offering Information Services.
- Economic Expert in Temple University, Inc., v. Mercy Health Plan, et al.
- Economic Expert in Wuesthoff Health Systems v. Health First, Inc., et al.
- Economic expert in Marshall v. Planz et al.
- Economic expert in Hylton v. St. Vincent Hospital, et al.
- Economic expert in HTI Health Services, Inc. v. Quorum Health Group Inc., et al.
- Economic expert in Federal Trade Commission v. Butterworth Health Corporation et al., Grand Rapids, MI.

- Economic expert in Albani, et al. v. Southern Arizona Anesthesia Services, Tucson, AZ.
- Economic expert in The Care Group v. Creef, et al., Baltimore, MD.
- Economic expert in Sokol v. Akron General Hospital.
- Consulting economist to Harrowston, Inc.
- Consulting economist to Health America and Coventry Health Care.
- Consulting economist to Vanderbilt University Hospital.
- Consulting economist to Coventry Health System and Health America.
- Consulting economist to St. Mary's Medical Center, Evansville, IN.
- Consulting economist in the matter of Anthony D. Viazis, D.D.S., v. American Association of Orthodontists, Southwestern Society of Orthodontists, and Greater Dallas Association of Orthodontists.
- Consulting economist to Chesapeake Hospital, Chesapeake, VA.
- Consulting economist to Sisters of Mercy, Northwest IN.
- Consulting economist to Woman's Clinic Inc., Springfield, MO.
- Consulting economist to Educators Mutual Life Insurance Company and Central Penn Healthcare.
- Consulting economist to Methodist-Jackson Hospital and Methodist Healthcare Systems, Memphis, TN, and Jackson, TN.
- Consulting economist to Sisters of St. Francis, Mishawaka, Indiana.
- Consulting economist to Cape Fear Valley Health System and Columbia Highsmith-Rainey Hospital, Fayetteville, NC.
- Consulting economist to Grace Hospital and the Charlotte-Mecklenburg Hospital Authority.
- Consulting economist to Long Island Health Network.
- Consulting economist to Merced Community Medical Center, Merced, CA.
- Consulting economist to North Oakland Medical Center, Pontiac, MI.

- Consulting economist to Michigan Affiliated Health System and McLaren Regional Medical Center, Lansing and Flint, MI.
- Consulting economist to Adventist HealthCare, Inc.
- Consulting economist to Fallon Health System, Worcester, MA.
- Consulting economist to Allentown Osteopathic Hospital and Sacred Heart Hospital, Allentown, PA.
- Consulting economist to Hallmark Health.
- Consulting economist to the University of Maryland Medical System.
- Consulting economist to Highmark Blue Cross and Blue Shield.
- Consulting economist to Baptist Hospital in Montgomery, AL.
- Consulting economist to Alliant Health System, Louisville, KY.
- Consulting economist to Duke University Medical System.
- Consulting economist to St. Vincent Hospital, Indianapolis, IN.
- Consulting economist to Winthrop-South Nassau and Catholic Hospitals of Long Island.
- Consulting economist to St. Elizabeth's and Lafayette Home Hospitals, Lafayette, IN.
- Consulting economist to the Connecticut Attorney General in its review of University of Connecticut Hospital System's consolidation with Hartford Hospital.
- Consulting economist to Respironics and Healthydyne Technologies.
- Consulting economist to Kingston, Northern Dutchess and Benedictine Hospitals, Kingston, NY.
- Consulting economist to Suffolk Healthcare Coalition, Long Island, NY.
- Consulting economist to Kent General and Milford Memorial Hospital, Dover, DE.
- Consulting economist to New York Hospital.
- Consulting economist to Duke University Medical Center and Durham Regional Hospitals, Durham, NC.
- Consulting economist to Mainline-Jefferson Health System, Philadelphia, PA.

- Consulting economist to South Jersey Health System and Newcomb Medical Center, Vineland, NJ.
- Consulting economist to the Cleveland Clinic, Cleveland, OH.
- Consulting economist to Capital Health Network, Albany, NY.
- Consulting economist to Chester County and Brandywine Hospitals, W. Chester, PA.
- Consulting economist to Wesley Long and Moses Cone Hospitals in Greensboro, NC.
- Consulting economist to Kenosha Memorial and St. Catherine's Hospitals, Kenosha, WI.
- Consulting economist to Berkshire Health System, Pittsfield, MA.
- Consulting economist to Mary Black and St. Francis Hospitals, Greenville, SC.
- Consulting economist to St. Vincent's, St. Francis, and Community Hospitals, Indianapolis, IN.
- Consulting economist to St. Vincent-Community Health Network, Indianapolis, IN.
- Consulting economist to Woman's Hospital, Baton Rouge, LA.
- Consulting economist to St. Luke's and Quakertown Hospitals, Bethlehem, PA.
- Consulting economist to Floyd Medical Center, Gordon Hospital and Hamilton Medical Center, N.W. GA.
- Consulting economist to Hudson Health Network, Jersey City, NJ.
- Consulting economist to Providence Memorial and Sierra Medical Center, El Paso, TX.
- Consulting economist to HSI-Qualmed Plans of Pennsylvania.
- Consulting economist to the Missouri Department of Insurance.
- Consulting economist to Shands-U. of FL. Hospital and Alachua General Hospital, Gainesville, FL.
- Economic expert in Howerton, et al. v. Grace Hospital, et al., Morganton, NC.
- Economic expert in Healow v. St. Vincent's Hospital, Billings, MT.
- Economic expert in Hylton v. St. Vincent's Hospital, Billings, MT.

- Economic expert in Ertag, et al. v. Naples Community Hospital, Naples, FL.
- Economic expert in J. Michael Becker, D.C., et al. v. Blue Shield of Southwestern Virginia, et al.
- Economic expert in Major v. U.S.
- Consulting economist to Promina Healthcare Systems, Atlanta, GA.
- Consulting economist to Northwest Georgia Health Systems, Piedmont and Gwinnett Hospitals, Atlanta, GA.
- Consulting economist to Maine Medical Center and Brighton Medical Center, Portland, ME.
- Consulting economist to Freeman and Oak Hill Hospitals, Joplin, MO.
- Consulting economist to Rochester General and the Genessee Hospital, Rochester, NY.
- Consulting economist to St. Joseph's and Memorial Mission Hospitals, Asheville, NC.
- Consulting economist to Multicare Health Systems, Tacoma, WA, and Swedish Medical Center, Seattle, WA.
- Consulting economist to Winchester Medical Center, Winchester, VA.
- Consulting economist to INOVA Health System, Springfield, VA.
- Consulting economist to St. Joseph Medical Center and Lutheran Hospital of Indiana, Fort Wayne, IN.
- Consulting economist to Waukesha Memorial Hospital, Waukesha, WI.
- Consulting economist to Medical Center at Bowling Green, KY.
- Consulting economist to Asbury-Salina Regional Medical Center and St. John's Regional Health Center, Salina, KS.
- Consulting economist to Medical Center of Central Massachusetts and Saint Vincent Hospital, Worcester, MA.
- Consulting economist to Morristown Memorial Hospital, Overlook Hospital and Mountainside Hospital, Northern NJ.
- Consulting economist to Multicare Health System and Tacoma General Hospital, Tacoma, WA.

- Consulting economist to St. Mary's Hospital and Howard Young Medical Center, Rhinelander, WI.
- Consulting economist to Mercy and St. Luke's Hospitals in Davenport, IA.
- Consulting economist to St. Elizabeth's Hospital and Mercy Medical Center, Fox River Valley, WI.
- Consulting economist to Ingham Medical Center and Lansing General Hospital, Lansing, MI.
- Consulting economist to Mercy and Holyoke Hospitals, Springfield, MA.
- Consulting economist to University of Wisconsin Clinical Practice Plan, University of Wisconsin Medical Foundation, and Physicians Plus Medical Group.
- Consulting economist to St. Joseph's and St. Francis Medical Centers, Wichita, KS.
- Consulting economist to St. Clare's Hospital and Dover General Hospital, Dover, NJ.
- Consulting economist to Main Line Health, Inc., Radnor, PA.
- Consulting economist to Iowa Lutheran and Methodist Hospitals, Des Moines, IA.
- Consulting economist to Lahey Clinic, Boston, MA.
- Consulting economist to Women and Infants and Kent County Hospitals, Providence, RI.
- Economic expert in EGH, Inc., doing business as Eastmoreland Hospital v. Blue Cross and Blue Shield of Oregon, et al., Portland, OR.
- Economic expert in Advanced Health-Care Services, Inc. v. Giles Memorial Hospital, et al., Giles County, VA.
- Consulting economist to Jefferson Health System, Philadelphia, PA.
- Economic expert in Stiteler, et al. v. Lutheran Hospitals and Homes Society of America, Spearfish, ND.
- Consulting economist to Defendants in American Health Systems v. Liberty Health Systems, et al., Delaware County, PA.
- Consulting economist to Visiting Nurse Association of Philadelphia in the matter of AHS v. VNA, et al., Philadelphia, PA.
- Consulting economist to Mercy Health Corporation in Philadelphia, PA.

- Consulting economist to McLaren and LaPeer Regional Medical Centers, Flint-LaPeer, MI.
- Consulting economist to Radiation Medicine Associates of Scranton, PA.
- Consulting economist to Washington Managed Imaging, Seattle, WA.
- Economic expert in Rourke v. Lowell General Hospital, Lowell, MA.
- Consulting economist to St. Joseph Hospital and University Hospital, Augusta, GA.
- Consulting economist to Franciscan and United Medical Centers, Moline-Rock Island, IL.
- Consulting economist to Baptist and Memorial Hospitals, Jacksonville, FL.
- Consulting economist to Abbott Labs and Fresenius.
- Economic expert in U.S. Healthcare, Inc., et al. v. Healthsource, Inc., et al., Concord, NH.
- Economic expert in Bellavia, et al. v. Hackensack Medical Center, et al., Hackensack, NJ.
- Economic expert in Wei v. Bodner, et al., Hackettstown, NJ.
- Economic expert in Williamson, et al. v. Sacred Heart Hospital, et al., Pensacola, FL.
- Consulting economist in the matter of Sentara Health Systems' acquisition of Humana Bayside Hospital, Virginia Beach, VA.
- Consulting economist to Dominican Hospital, Santa Cruz, CA.
- Consulting economist to Pennsylvania Blue Shield and Independence Blue Cross in the joint venture of Keystone and Delaware Valley HMOs, Philadelphia, PA.
- Consulting economist to CIGNA and Equicor in CIGNA's acquisition of Equicor.
- Consulting economist in the matter of Sentara Health Systems proposed acquisition of Chesapeake Hospital.
- Consulting economist to Swedish Medical Center and Ballard Hospital in Seattle, WA.
- Economic expert in M&M v. Pleasant Valley Hospital, Point Pleasant, WV.
- Consulting economist in Fort Sanders Regional Medical Center's acquisition of HCA Park West Hospital in Knoxville, TN.
- Consulting economist to St. Mary's and St. Luke's Hospitals in Racine, WI.

- Economic expert in Shah v. Danville Memorial Hospital, Danville, VA.
- Consulting economist to St. Ansgar Hospital, Moorhead, MN.
- Economic expert in Cypress Recreation Center Ltd. v. Pepsi-Cola Bottling Company, et al.
- Economic expert in U.S. v. Carilion Health System, Roanoke, VA.
- Consulting economist to St. Elizabeth's and Lakeview Hospitals, Danville, IL.
- Consulting economist to Community General Hospital and The Reading Hospital and Medical Center, Reading, PA.
- Consulting economist to Community Medical Insurance Company in CMIC v. Blue Cross Association, Cincinnati, OH.
- Economic expert in NBA v. BCBS of Alabama.
- Economic expert in Snyder Distributing v. Ohio Bell.
- Plaintiff's damage study in Gressman v. People's Service Drug Stores.
- Assisted in the preparation of a report that analyzed the effect of a Federal Home Loan Bank Board Rule governing direct investments of FSLIC insured Savings and Loans.
- Assisted in the preparation of an analysis that explained the relationship between concentration and profitability in the elevator industry.
- Assisted in the preparation of a report to DOT regarding the competitive effects of airline ownership of computerized reservation systems.
- Assisted in the preparation of a defendant's damage study in a major class action suit against a large pharmaceutical company.
- Economic expert in White v. Rockingham Memorial Hospital.
- Economic expert in Driscoll v. Medical Center Hospital.
- Oral and written presentation of a report to U.S. Department of Justice and Virginia Attorney General regarding the competitive effects of a merger between two Blue Cross plans.
- Coauthored a report assessing the competitive benefits of continued regulation of a petroleum products pipeline.

- Assisted in the analysis of a merger between General Electric and CGR, computerized tomography manufacturers.

From 1979-1984, Dr. Eisenstadt was employed by the Department of Justice, Antitrust Division, as an Economist in the Economic Policy Office. Some of his experience in the Antitrust Division included:

- Affidavit testimony in U.S. v. Beverly Enterprises.
- Competitive analysis of several other nursing home acquisitions or hospital mergers.
- Competitive analysis of possible physician domination of third parties in several Departmental investigations of Blue Shield plans, physician-sponsored IPAs, and PPOs.
- Member of a Department of Justice Task Force assessing relief options in U.S. v. IBM.
- Competitive analysis of matters involving vertical restraints including resale price maintenance, tying arrangements, and exclusive dealing.

## Testimony

### June 2010 – June 2014

- Deposition testimony and expert report in Jim Evans Academy of Professional Umpiring, Inc. v. National Association of Professional Baseball Leagues et al., Case No. 2012-CA-013001-O.
- Expert report and deposition testimony in Allan et al. v. Realcomp II Ltd. et al., 2:10-cv-14046, United States District Court for the Eastern District of Michigan.
- Expert report and deposition testimony in Oce North America, Inc. v. MCS Services, Inc. et al. Case No. WMN-10-0984, United States District Court District of Maryland.
- Expert report and deposition testimony in UnitedHealth Group v. Columbia Casualty Corporation et al., No. 05-CV-1289, United States District Court for the District of Minnesota.
- Expert report and hearing testimony in Illinois Department of Health Project 10-089.
- Expert report and deposition testimony in the matters of Wuesthoff Health Systems, Inc. v. Health First, Inc. et al. 05-2007-CA-019391 and Hynes et al. v. Health First, Inc. et al., No. 05-2007-CA-19182, Eighteenth Judicial Circuit, Brevard County, Florida.
- Expert report and deposition testimony in Home Quarters Real Estate Group, LLC v. MiRealSource and Realcomp II, Ltd., Case No. 07-12090. United States District Court, Eastern district of Michigan.

## Teaching Experience

- Graduate Teaching Assistant in Microeconomics and Business Statistics at the University of Illinois, Urbana-Champaign.
- Assistant Professor, Department of Economics at the University of Missouri. Courses taught included Antitrust Economics, Industrial Organization, Intermediate Microeconomics, Medical Economics and Intermediate Econometrics.

## Selected Publications and Presentations

Robert Masson, David Eisenstadt and Serdar Dalkir, "A Note on Complementary Goods Mergers Between Oligopolists with Market Power: Cournot Effects, Bundling and Antitrust" *Review of Law & Economics*, forthcoming.

David Eisenstadt and James Langenfeld, "The Role of Rule of Reason in Truncated Rule of Reason Analysis," *Antitrust*, forthcoming.

Speaker Joint Department of Justice and Federal Trade Commission Hearings on Health Care and Competition Law and Policy, Spring 2003

Eisenstadt, D., "Hospital Competition and Costs: The *Carilion* Case (1989)," *The Antitrust Revolution: The Role of Economics, 2nd Edition*, John Kwoka and Lawrence J. White, Editors, 1994.

Eisenstadt, D., "Product Market Definition in Health Antitrust Cases: Concept and Application," Speech before the National Health Lawyers Association, February 1994.

Eisenstadt, D., "Health Care Antitrust Analysis: Thinking Through the Issues," Speech and paper presented at Trends in Antitrust Health Care Conference sponsored by the American Bar Association, October 1990.

Eisenstadt, D. and R.T. Masson, "Price Effects from Recent Non-Profit Hospital Mergers," Paper presented at the American Public Health Association Meetings, October 23, 1989.

Eisenstadt, D., "Type and Form of Economic Evidence Important to Analysis of Hospital Mergers: Case Studies of Roanoke and Rockford District Court Decisions," *Hospital Mergers: An Executive's Guide Through the Antitrust Thicket*, American Hospital Association, September 1989.

Eisenstadt, D., "Economic Testimony in U.S. v. Carilion Health Systems: Some Thoughts From the Defendants' Economist," Speech before the National Health Lawyers Association, January 26, 1989.

Eisenstadt, D., "Geographic Market Definition in the Nursing Home and Hospital Industries," Paper presented at the American Bar Association Meetings, August 1984.

Eisenstadt, D., "An Antitrust Economist's View of Licensure," Speech before the National Clearinghouse on Licensure, Enforcement and Regulation, August 1983.

Eisenstadt, D. and T. Kennedy, "Physician Controlled Health Insurance Plans and the Coverage of M.D. -Substitutes," Paper presented at the Eastern Economic Association Meetings, March 1983.

Schwartz, M. and D. Eisenstadt, "Vertical Restraints," *Economic Policy Office Working Paper #82-8*, December 1982.

Arnould, R. and D. Eisenstadt, "The Effects of Medical Society Control of Blue Shield on Fees in the Physicians' Services Market: Some Preliminary Evidence," *Quarterly Review of Economics and Business*, Spring 1982.

Arnould, R. and D. Eisenstadt, "The Effects of Provider-Controlled Blue Shield Plans: Regulatory Options," *A New Approach to the Economics of Health Care*, Mancur Olson, ed., American Enterprise Institute, 1981.

Eisenstadt, D. and T. Kennedy, "Control and Behavior of Non-Profit Firms: The Case of Blue Shield," *Southern Economic Journal*, July 1981.

#### **Awards and Affiliations**

Outstanding Performance Rating, U.S. Department of Justice, 1983, 1984

Special Achievement Award, U.S. Department of Justice, 1980

Member, American Hospital Association Task Force Analyzing Hospital Mergers, 1988-1989

Member, American Bar Association Task Force studying ancillary activities by hospitals

# **EXHIBIT 2**

## EXHIBIT 2

### EXPLANATION FOR HOW AN AWPB PROVISION COULD RAISE PRICE

1. This scenario describes how an AWPB provision *could* raise price. The scenario assumes that prior to implementation of the rule two retail pharmacy firms or individual bargaining units with identical drug acquisition and dispensing costs, **A** and **B**, compete to become “preferred” in a Part D PDP’s retail pharmacy network. An additional assumption is that each pharmacy firm has information about the other’s marginal cost of acquiring and dispensing prescription drugs. From the perspective of the PDP or PBM tasked with negotiating prices with the two pharmacies, each firm is perceived as equivalent in terms of cost and access (the number and location of its individual pharmacy outlets). Additionally, each has sufficient capacity (number of similarly situated access points) to accommodate all of the PDP’s likely Part D preferred network enrollees. As noted in the main text of this comment, for ease of presentation, the multitude of different prescription drugs that exist today are defined by a single drug.

2. The PBM is assumed to communicate (alternatively, **A** and **B** individually deduce) it may contract with one or both pharmacies depending on the prices (terms and conditions) each offers. **A** and **B** conclude either *could* be excluded from the PDP’s preferred network if it offers “too high” a price. In fact, any price offered by **A** that exceeds **B**’s marginal cost creates a risk for **A** that **B** will offer the PBM a slightly lower price which is still above its own cost and allows it to obtain sole-preferred status. When **B** is contemplating what price to charge, it undertakes the same thought process as **A**. This leads both to offer an “equilibrium” price that equals their respective marginal costs,  $MC_A = MC_B$ . In this competitive outcome, the two firms are selected as preferred pharmacies, and by assumption they split or share the PDP’s Part D business.

3. This pre-AWPH “competitive equilibrium” is presented in **Figure 3** where the PBM’s demand for drugs sold through a Part D preferred network pharmacy is labeled as  $D_{\text{PBM}}$ .  $MC_{\text{A}}$  and  $MC_{\text{B}}$  are the two firms’ marginal costs of drug acquisition,  $Q_{\text{T}}$  is the total drug volume purchased by the PBM (and the government), and  $\frac{1}{2} Q_{\text{T}} = Q_{\text{A}} = Q_{\text{B}}$  is the prescription drug volume sold by each pharmacy firm.

4. When the two pharmacy firms have identical costs, implementation of an AWPH rule is likely to raise price. The rule guarantees preferred status to **A** and **B** if each agrees to accept the preferred price offered by the other. Because each can choose to “match” the other’s preferred price, and neither would choose a price below the other’s cost as that would also require pricing below its *own* cost, the rule eliminates the risk either will be excluded. Thus, each would find it profitable to unilaterally bid the monopoly price and share monopoly profit and output. The monopoly outcome that occurs after adoption of an AWPH rule is presented in **Figure 4**. The shaded red and green areas are **A**’s and **B**’s individual post-rule profits, with the sum of the two areas comprising total monopoly profit. Each firm clearly earns more profit by monopoly pricing under an AWPH rule than it would earn under competitive bidding or competitive pricing pre-rule.

# **EXHIBIT 3**

**EXHIBIT 3: MATHEMATICAL CONDITIONS UNDER WHICH A LOW-COST PHARMACY FIRM WILL “UNDERCUT” RATHER THAN CHOOSE THE “MONOPOLY” PRICE UNDER AN AWPB RULE**

If the low-cost retail pharmacy competitor **L** chooses to “underprice” its highest-cost retail pharmacy competitor **H**, it will choose a price equal to (or very slightly below) Pharmacy **H**’s marginal cost  $mc_H$ . **L** and **M** would then “share” the PDP’s total Part D prescriptions as its sole in-network pharmacies. Letting  $Q(p)$  denote total derived demand for prescription drugs facing all pharmacy firms (labeled  $D_{PBM}$  in Figures 1 through 4) and  $1 > s_L^u > 0$  denote Pharmacy **L**’s share of the PDP’s total prescriptions, Pharmacy **L**’s profits with “underpricing” equal

$$(1) \quad \pi_L^u = (mc_H - mc_L) \cdot Q(mc_H) \cdot s_L^u .$$

Assuming the monopoly price Pharmacy **L** would choose is greater than  $mc_H$ , let  $1 > s_{M+H}^{monop} > 0$  equal the share of sales that Pharmacies **M** and **H** (e.g., where **H** signifies the competitor pharmacies currently excluded from the PDP’s network) *would* earn under monopoly pricing. If under the AWPB rule the low-cost firm pharmacy **L** chooses the monopoly price instead of underpricing, it earns a margin equal to  $p^{monop} - mc_L$ , a share of monopoly output of  $1 - s_{M+H}^{monop}$ , and total profit equal to

$$(2) \quad \pi_L^{monop} = (p^{monop} - mc_L) \cdot Q(p^{monop}) \cdot (1 - s_{M+H}^{monop}) .$$

Pharmacy **L** will earn more profit by underpricing its high-cost rival **H** if:

$$(3) \quad (mc_H - mc_L) > (p^{monop} - mc_L) \cdot \frac{Q(p^{monop})}{Q(mc_H)} \cdot \frac{(1 - s_{M+H}^{monop})}{s_L^u}$$

Dividing equation (3) through by  $mc_L$  expresses the required marginal cost difference in terms of the percentage difference in the highest- and lowest-cost pharmacy firms’ marginal costs:

$$(4) \quad \frac{(mc_H - mc_L)}{mc_L} > \frac{(p^{monop} - mc_L)}{mc_L} \cdot \frac{Q(p^{monop})}{Q(mc_H)} \cdot \frac{(1 - s_{M+H}^{monop})}{s_L^u}$$

Let  $\eta$  denote the absolute value of the elasticity of derived demand facing the two pharmacy firms at the monopoly price. The following Lerner condition defines the relationship between the elasticity of derived demand and the gross margin that the low-cost pharmacy firm **L** would earn at the monopoly price:

$$(5) \quad \frac{(p^{monop} - mc_L)}{p^{monop}} = \frac{1}{\eta}, \quad \eta > 1$$

This Lerner condition (expression (5)) can be used to write the low-cost Pharmacy **L**'s margin over cost in terms of the elasticity of demand facing the PDP:

$$(6) \quad \frac{(p^{monop} - mc_L)}{mc_L} = \frac{1}{\eta - 1}.$$

Substituting expression (6) into expression (4) gives

$$(7) \quad \frac{(mc_H - mc_L)}{mc_L} > \frac{(1 - s_{M+H}^{monop})}{s_L^u(\eta - 1)} \cdot \frac{Q(p^{monop})}{Q(mc_H)},$$

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<sup>1</sup> The low-cost pharmacy **L**'s margin over cost in terms of the derived demand elasticity  $\eta$  can be derived from the Lerner condition:

$$\begin{aligned} \frac{(p^{monop} - mc_L)}{p^{monop}} &= \frac{1}{\eta} = 1 - \frac{mc_L}{p^{monop}} \\ \Rightarrow \frac{mc_L}{p^{monop}} &= 1 - \frac{1}{\eta} \end{aligned}$$

Taking the inverse of  $mc_L/p^{monop}$  gives Pharmacy **L**'s price-to-cost ratio under an AWP rule at the monopoly price:

$$\frac{p^{monop}}{mc_L} = \frac{\eta}{\eta - 1}$$

Pharmacy **L**'s margin over cost equals this ratio minus 1:

$$\frac{(p^{monop} - mc_L)}{mc_L} = \frac{p^{monop}}{mc_L} - 1 = \frac{\eta}{\eta - 1} - 1 = \frac{1}{\eta - 1}$$

The ratio of total quantities  $Q(p^{monop})/Q(mc_H)$  can also be written in terms of the elasticity of derived demand facing all pharmacy firms,  $\eta$ , and other observables by assuming that  $\eta$  equals the “arc” elasticity between pharmacy output under “underpricing” and pharmacy output under monopoly pricing. The arc elasticity between these two points equals

$$(8) \quad \eta^{arc} = \left| \frac{\left( \frac{Q(p^{monop}) - Q(mc_H)}{Q(p^{monop})} \right)}{\left( \frac{p^{monop} - mc_H}{p^{monop}} \right)} \right|$$

Rearranging in terms of the ratio of quantities:

$$(9) \quad \eta^{arc} = \left| \frac{\left( \frac{Q(p^{monop}) - Q(mc_H)}{Q(p^{monop})} \right)}{\left( \frac{p^{monop} - mc_H}{p^{monop}} \right)} \right| = - \frac{\left( 1 - \frac{Q(mc_H)}{Q(p^{monop})} \right)}{\left( \frac{p^{monop} - mc_H}{p^{monop}} \right)}$$

Condition (9) implies that the ratio of “undercutting” quantity to “monopoly” quantity  $Q(mc_H)/Q(p^{monop})$  must equal:

$$(10) \quad \frac{Q(mc_H)}{Q(p^{monop})} - 1 = \eta^{arc} \cdot \left( \frac{p^{monop} - mc_H}{p^{monop}} \right) \Rightarrow \frac{Q(mc_H)}{Q(p^{monop})} = 1 + \eta^{arc} \cdot \left( \frac{p^{monop} - mc_H}{p^{monop}} \right)$$

Taking the inverse to obtain  $Q(p^{monop})/Q(mc_H)$ :

$$(11) \quad \frac{Q(p^{monop})}{Q(mc_H)} = \frac{1}{\left( 1 + \eta^{arc} \cdot \left( \frac{p^{monop} - mc_H}{p^{monop}} \right) \right)}$$

Note that the expression  $(p^{monop} - mc_H)/p^{monop}$  can be re-written in terms of the percentage cost-differential  $(mc_H - mc_L)/mc_L$  using the Lerner condition (expression (6)):

$$(12) \quad \frac{(p^{monop} - mc_L)}{p^{monop}} = \frac{1}{\eta} \Rightarrow p^{monop} = mc_L \cdot \left( \frac{\eta}{\eta-1} \right)$$

Substituting expression (12) for  $p^{monop}$  in  $(p^{monop} - mc_H)/p^{monop}$  gives

$$(13) \quad \frac{p^{monop} - mc_H}{p^{monop}} = \frac{\left( mc_L \cdot \left( \frac{\eta}{\eta-1} \right) - mc_H \right)}{mc_L \cdot \left( \frac{\eta}{\eta-1} \right)} = \left( \frac{\eta-1}{\eta} \right) \cdot \left( \frac{mc_H - mc_L}{mc_L} \right) + \frac{1}{\eta}$$

Substituting expression (13) into expression (11), the ratio of “monopoly” to “underpricing” quantities equals

$$(14) \quad \frac{Q(p^{monop})}{Q(mc_B)} = \frac{1}{\left( 1 + \eta^{arc} \cdot \left( \left( \frac{\eta-1}{\eta} \right) \cdot \left( \frac{mc_H - mc_L}{mc_L} \right) + \frac{1}{\eta} \right) \right)}$$

Substituting this expression for the ratio of quantities from (14) into (7) and letting  $\eta^{arc} = \eta$ , we obtain<sup>2</sup>

$$(15) \quad \frac{(mc_H - mc_L)}{mc_L} > \frac{(1 - s_{M+H}^{monop})}{s_L^u (\eta-1)} \cdot \frac{Q(p^{monop})}{Q(mc_H)}$$

$$= \frac{(1 - s_{M+H}^{monop})}{s_L^u (\eta-1) \cdot \left( 1 + \eta^{arc} \cdot \left( \left( \frac{\eta-1}{\eta} \right) \cdot \left( \frac{mc_H - mc_L}{mc_L} \right) + \frac{1}{\eta} \right) \right)}$$

<sup>2</sup> The assumption that  $\eta$  equals  $\eta^{arc}$  amounts to assuming that the derived elasticity of demand for Part D prescriptions through a PDP as measured under the current prices approximately equals the derived demand elasticity that would prevail at the monopoly price. Depending on the specific mathematical form of the derived demand curve, the arc elasticity of derived demand may be significantly lower than the current-price estimate of derived demand elasticity (e.g., if derived demand is better approximated by linear demand than by constant elasticity demand). In this case, substituting the current-prices elasticity estimate for the arc elasticity tends to understate the necessary cost differential between the high- and low-cost competitors that is necessary to preserve the incentive for underpricing with an AWP provision.

$$\approx \frac{(1 - s_{M+H}^{monop})}{s_L^u (\eta - 1) \cdot \left( 1 + \left( (\eta - 1) \cdot \left( \frac{mc_H - mc_L}{mc_L} \right) + 1 \right) \right)}$$

Simplifying expression (15) further by solving for the percentage cost differential

$(mc_H - mc_L)/mc_L$  we obtain

$$(16) \quad \frac{(mc_H - mc_L)}{mc_L} > \frac{1}{\eta - 1} - \frac{\sqrt{1 - (1 - s_{M+H}^{monop})/s_L^u}}{\eta - 1}, \quad s_L^u > 1 - s_{M+H}^{monop}.$$

The quantity  $(1 - s_{M+H}^{monop})/s_L^u$  equals the ratio of Pharmacy **L**'s share of the PDP's total Part D prescriptions when it chooses the monopoly price to its share with "underpricing". This ratio is smaller when **L** loses a lot of share to competitor pharmacies when they become in-network under monopoly pricing. Logically, the necessary percentage cost difference between the low-cost pharmacy and the lowest-cost excluded pharmacy necessary to preserve **L**'s incentive to underprice **H** under an AWP rule *falls* as this lost share increases. As previously-excluded competitors earn a larger share of the market, **L** must cede a larger percentage of output to them should it raise price to the monopoly level. This reduces **L**'s profit from setting the monopoly price and increases the likelihood that it will earn more profit by underpricing its competitors even when its cost-advantage over **H** is relatively "small."

Assume in addition that the original in-network pharmacies, **L** and **M**, will obtain the same *relative* shares if **L** chose the monopoly price, **L**'s share of the monopoly output equals  $1 - s_{M+H}^{monop} = s_L^u \cdot (1 - s_H^{monop})$ , where  $s_H^{monop}$  equals the share of monopoly output that Pharmacy **H** (currently-excluded high-cost pharmacy firms) would earn.<sup>3</sup> Expression (16) can be additionally simplified to the following:

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<sup>3</sup> By way of example, suppose that pre-AWP provision the lowest-cost in-network pharmacies have on average a 50% share of Medicare Part D PDP's prescription volume. If they expect that marginally-excluded high-cost pharmacies will earn 40% of prescription volume if they become in-network at the monopoly price, the "same relative share" assumption implies that the lowest cost pharmacy will be left with 50% of the other 60% of prescription volume, or 30%.

Since in-network pharmacies' shares are ultimately determined by the preferences of the Part D PDP's enrolled beneficiaries, the "same relative share" assumption is reasonable as long as this pool of enrollees and their

$$(17) \quad \frac{(mc_H - mc_L)}{mc_L} > \frac{(1 - \sqrt{s_H^{monop}})}{\eta - 1}$$

The larger the share of Part D prescriptions that previously-excluded high-cost pharmacies would earn if in-network at the monopoly price, the lower the percentage cost difference needed for low-cost pharmacies to continue “underpricing” under an AWP provision.

Finally, the necessary percentage cost difference between **L** and **H** declines as the elasticity of the PBM’s derived demand facing all pharmacy firms competing for preferred status,  $\eta$ , increases. A higher demand elasticity means that the PDP’s total volume of Part D prescriptions decreases by more when pharmacy prices increase to the monopoly level, which reduces **L**’s volume should it choose to charge the monopoly price, regardless of the share of monopoly output that **L**’s marginally-excluded competitors would achieve.

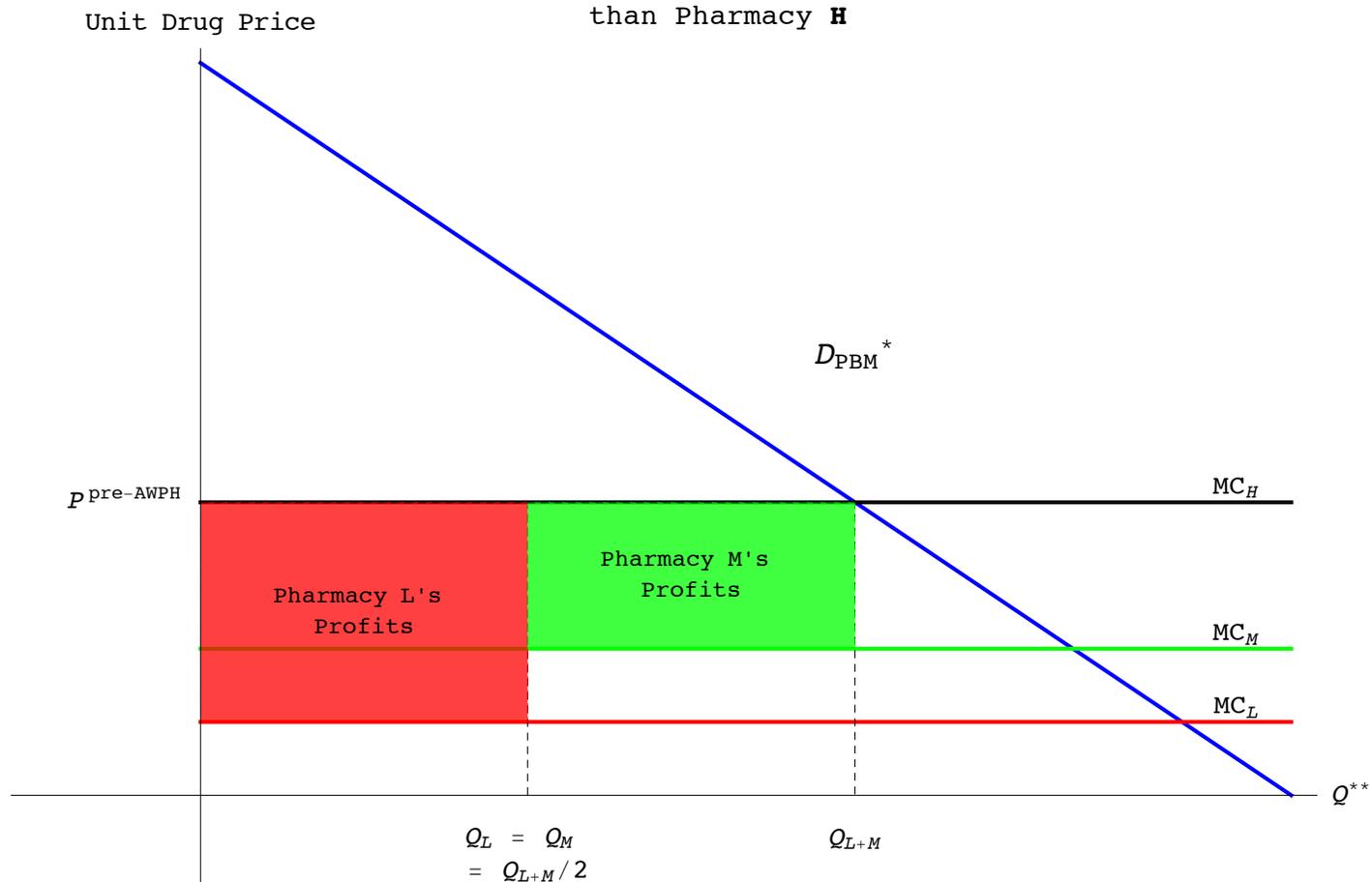
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pharmacy preferences would not change drastically if pharmacy prices increase from the “undercutting” to monopoly price (e.g., due to adverse selection).

# **FIGURES 1 - 4**

# Figure 1:

Pre-AWPH Competitive Bidding Equilibrium  
 Pharmacies L and M have Lower Drug Acquisition Costs  
 than Pharmacy H



\* $D_{PBM}$  denotes a PBM's demand for prescription drugs sold through Part D preferred pharmacies.

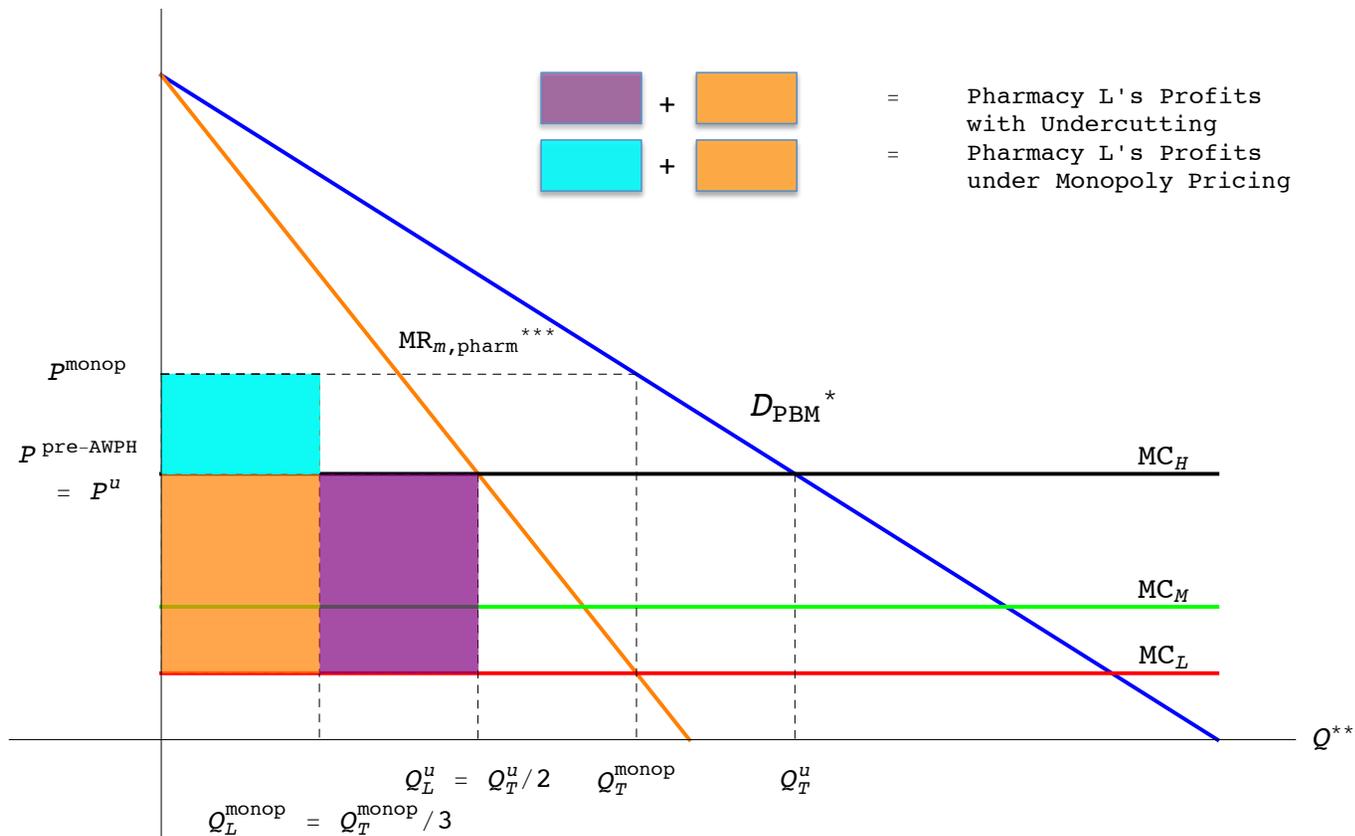
\*\* $Q$  denotes the total quantity of prescription drugs sold through Part D preferred pharmacies by the PBM.

## Figure 2:

### Post-AWPH Equilibrium with Underpricing

Pharmacies L and M have Lower Drug Acquisition Costs than Pharmacy H

Unit Drug Price



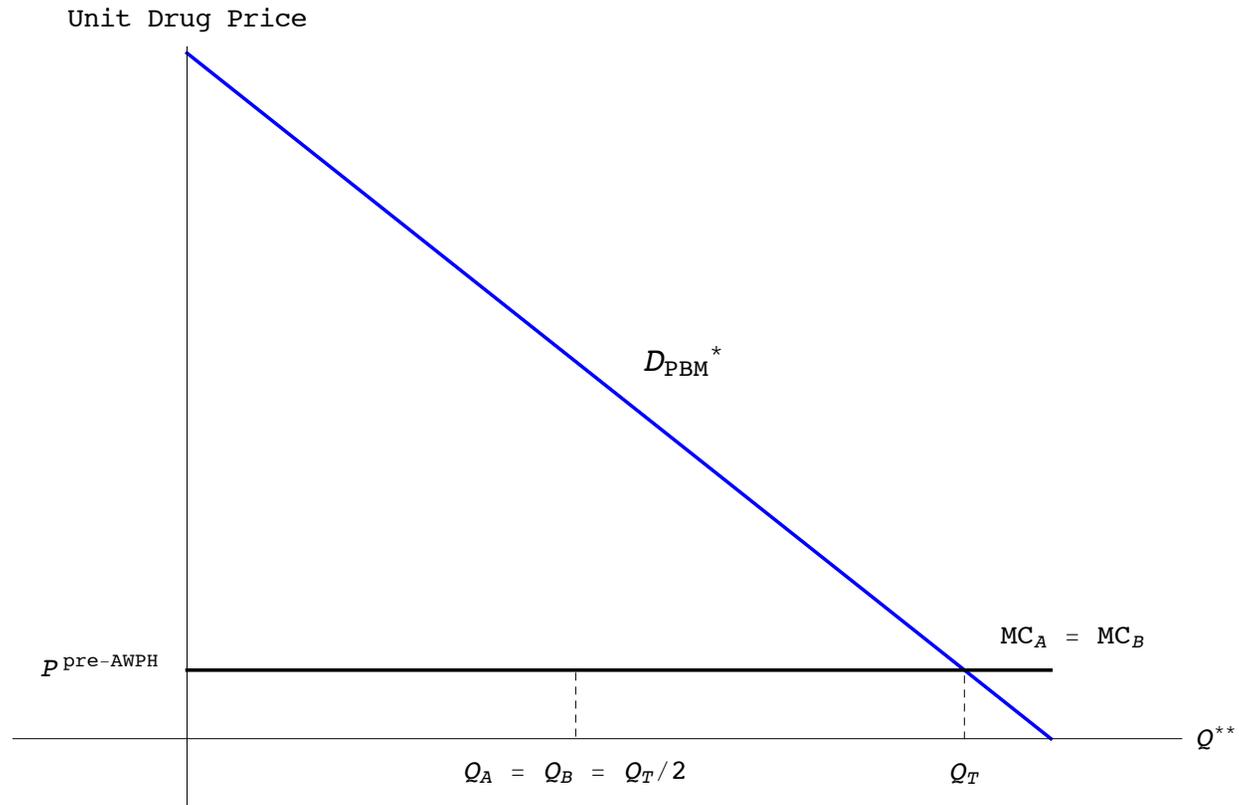
\* $D_{PBM}$  denotes a PBM's demand for prescription drugs sold through Part D preferred pharmacies.

\*\* $Q$  denotes the total quantity of prescription drugs sold through Part D preferred pharmacies.

\*\*\* $MR_{m,pharm}$  denotes the marginal revenue curve faced by a 'monopolist' pharmacy negotiating with the PBM.

### Figure 3:

Pre-AWPH Competitive Bidding Equilibrium  
Pharmacy Firms **A** and **B** have  
Equal Drug Acquisition Costs

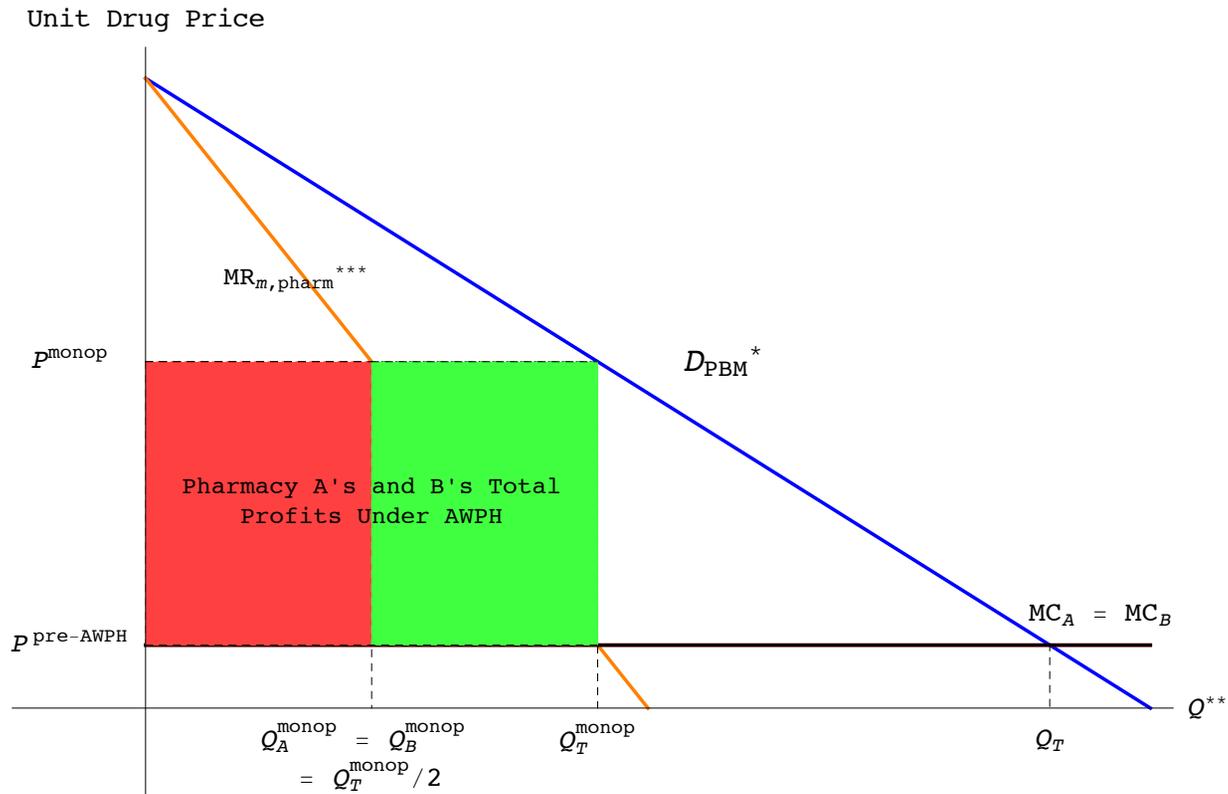


\* $D_{PBM}$  denotes a PBM's demand for prescription drugs sold through Part D preferred pharmacies.

\*\* $Q$  denotes the total quantity of prescription drugs sold through Part D preferred pharmacies by the PBM.

## Figure 4:

Post-AWPH Equilibrium under 'Monopoly' Pricing  
 Pharmacy Firms **A** and **B** have  
 Equal Drug Acquisition Costs



\* $D_{PBM}$  denotes a PBM's demand for prescription drugs sold through Part D preferred pharmacies.

\*\* $Q$  denotes the total quantity of prescription drugs sold through Part D preferred pharmacies.

\*\*\* $MR_{m,pharm}$  denotes the marginal revenue curve faced by a 'monopolist' pharmacy negotiating with the PBM.