

**"THE EFFECT OF ADVERTISING ON PRICE
AND QUALITY: THE OPTOMETRIC
INDUSTRY REVISITED"**

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Abstract

Theoretical research has long debated whether advertising increases market efficiencies (fostering high quality, low-priced products) or leads to perverse equilibria (fostering low-quality, higher-priced rip-offs). This debate, and subsequent empirical studies, has had an impact on policy making and the deregulation of advertising and marketing activities, especially for professional service industries. Since a landmark U.S. Supreme Court decision in 1977, professions have engaged in previously banned commercial practices including newspaper, radio and television advertising. Empirical studies have investigated the possible existence of perverse equilibria in optometric markets where advertisers offering low-quality eye examinations compete against nonadvertisers (offering higher quality). Unlike the lemons outcome foreseen by advocates of advertising restrictions, these cross-sectional studies, relying on data collected prior to the impact of the Supreme Court decision, find that prices fall without an erosion of optometric quality where advertising restrictions are not present. This research examines the optometric industry since 1977 and reevaluates data collected by the U.S. Federal Trade Commission in 1977. Contrary to previous studies, our analysis reveals an apparent perversion of the optometric industry: an erosion of eye examination quality without a decline in prices.

Key Words: Advertising and Quality, Quality and Price,
Lemons, Optometry, Professional Services.

I. Introduction

Theoretical research has long debated whether advertising increases market efficiencies (fostering high quality, low-priced products) or leads to perverse equilibria (fostering low-quality, higher-priced rip-offs). This debate, and subsequent empirical studies, has had an impact on policy making and the deregulation of advertising and marketing activities, especially for professional service industries. Government regulation of advertising and other forms of marketing practice is often designed to remedy possible market perversion associated with consumer inability to judge product quality. In the case of professional services, as with other product categories, marketing deregulation is advocated as a means to lower entry barriers, increase competition, and lower market prices. This paper examines the long-running controversy over the effect of advertising restrictions on the price and quality of professional services and, in particular, optometric services. The empirical literature has focused primarily on the impact of low-quality, advertising optometrists (who often practice in or are employed by chain firms) on market prices and quality of eye care (examinations and eyewear). Empirical studies have generally shown that restrictions existing to prohibit the growth of optometric chain firms or of advertising increase market prices without gains in eye care quality or consumer welfare; these include Lee Benham (1972), Lee Benham and Alexandra Benham (1975), Ronald Bond et al. (1980, 1983), Roger Feldman and James Begun (1978, 1980, 1985), Begun and Feldman (1981), Begun (1979), John Kwoka (1984), and Deborah Haas-Wilson (1986).

The abundance of convergent studies has prompted the United States Federal Trade Commission (FTC) to advocate the elimination of advertising and nonadvertising commercial restrictions (e.g., the use of brand names) in markets where they exist.¹ The elimination of advertising and commercial restrictions, it is argued, will not reduce quality in that low quality providers will gravitate to a high-volume, low price advertising mode and high quality providers will continue to offer high-quality service at lower prices. Economies associated with high-volume operations should generate price declines without an erosion of quality. However, in a review of empirical literature on optometric and other health care professions Gary Gaumer (1984) notes that studies investigating the impact of regulation have focused only on incremental variation in regulatory practices without considering information from unregulated environments. In the case of optometry, the empirical studies cited above rely on data gathered prior to the impact of the mid-1977 U.S. Supreme Court decision which found restrictions on advertising by professionals unconstitutional.²

¹ See FTC proceedings for Trade Regulation Rule on Ophthalmic Advertising (known as Eyeglasses I) and FTC Ophthalmic Practice Rules—proposed trade regulation rule (Eyeglasses II).

² *Bates v. State Bar of Arizona*, 1977, 433 U.S.

Unlike previous studies, this research examines evidence gathered prior to and after the advertising deregulation resulting from the 1977 Bates decision. The hypothesis that advertising deregulation has lowered market prices without reducing optometric quality is tested via a longitudinal review of the industry and cross-sectional studies on price and quality.

Following a discussion of theoretical issues (Section II), Section III summarizes the evolution of the optometric industry since 1977. Section IV reevaluates data collected by the FTC in 1977 in order to reconcile current pricing trends with pre-Bates practice. Section V reports a study of eye examination quality conducted eight years after the 1977 Bates decision for the purpose of gauging possible changes in quality after advertising deregulation. Finally, Section VI discusses plausible explanations for the apparent divergence between this research and the pre-Bates literature cited above.

II. Theoretical Considerations

The literature has given guidance to policy makers by suggesting that the effects of advertising/marketing restrictions on prices, quality, and concentration are a function of the extent of information asymmetry on quality, the form of advertising/marketing activities, and the role of countervailing institutions which stand to prevent perverse equilibria. Phillip Nelson (1970, 1974, 1978) examines the role of advertising for goods with search and experience qualities which can be accurately assessed prior to or after consumption, respectively. Michael Darby and Edi Karni (1973) consider a third type of goods having credence qualities which are difficult to assess prior to or even during use. They suggest that the role of advertising and countervailing institutions varies depending on the type of qualities encountered.

In the case of search goods, Nelson argues that firms will not misrepresent quality in their advertisements since consumers will ultimately discover a product's quality, forcing the appropriate price adjustment. Similarly, Benjamin Klein and Keith Leffler (1981) and Paul Milgrom and John Roberts (1986), among others, show that repeat purchase behavior associated with experience goods would also discourage false claims in advertising. Nelson contends that, in such cases, firms selling high-quality products (price adjusted) have the most to gain from advertising, whereas low-quality sellers will in the long run be required to adjust price or quality to competitive levels. Advertising in these cases is likely to inform consumers of price, product quality and value vis-à-

vis competitive substitutes. Richard Schmalensee (1978) shows, however, that low-quality producers may advertise more heavily than high-quality sellers depending on their unit cost advantage and consumers' response function to advertising. Empirical studies have either shown a positive relationship between quality and advertising (Robert Archibald, Clyde Haulman and Carlisle Moody, 1983; Federal Trade Commission, 1953; Jean-Jacques Lambin, 1976; R. A. Marguardt and A. F. McGann, 1975) or are inconclusive (R. H. Cole et al., 1955; Paul Farris and Robert Buzzel, 1979; H. Rotfeld and T. Rotzoll, 1976; Gerard Tellis and Claes Fornell, 1988). These studies generally fail to consider directly or to control for the extent to which information asymmetry exists for the goods in question.

The case for regulation is strongest when products are dominated by credence qualities. George Akerlof (1970) shows that, when there is extreme information asymmetry between consumers and sellers, markets of high-quality products will ultimately disappear when low quality products are introduced. This outcome is labeled the "lemons" process after the market for used automobiles. William Comanor and Thomas Wilson (1967, 1974, 1979), among others, strongly argue that, in such cases, advertising by low-quality producers will be noninformative and serves to reduce cross-price elasticities of demand. Empirical studies have shown such a relationship between advertising and price elasticities (see, for example, Lakshman Krishnamurthi and S. P. Raj, 1985). In theory, noninformative advertising can compensate for low-quality, allowing low-quality sellers to charge equal or higher prices than high-quality nonadvertisers. The lemons process can consist of low-price, high-quality products being replaced by high-priced, heavily advertised, low-quality products.

A number of countervailing institutions which may prevent such perverse equilibria have been studied, including licensing and minimum-quality standards (Hayne Leland, 1979; David Besanko et al., 1988), warranties and guarantees (Russel Cooper and Thomas Ross, 1985; Yuji Kubo, 1986; Winard Emons, 1988), mandatory disclosure rules (Stevens Matthews and Andrew Postlewaite, 1985), and branding (Thomas Ross, 1988). In many cases, market perversion is avoided when a certain proportion of the population is sufficiently informed on product quality. Asher Wolinsky (1983) shows that, in such cases, price, acting as a signal, will be correlated with quality; the greater the asymmetry, however, the higher the profits associated with lower quality.

Empirical studies of professional services have generally examined market outcomes on price and quality to measure the possible existence of a lemons process. The optometric industry has received attention due to the existence of certain objective measures of price, quality, and quality adjusted price across practitioner types and regulatory environments. The ability to measure price and quality, the existence of brand names, chain firms, licensing, minimum quality standards, and,

presumably, information asymmetry makes this industry desirable for empirical tests of the impact of advertising on market equilibria.

III. The Optometric Industry

Since 1977 the optometric industry has undergone significant regulatory and commercial changes. Prior to that time, forty states restricted the use of price or nonprice advertising by optometrists (Douglas Mackintosh and Susan Frey, 1978). Moreover, since the early 1900s, "commercial" restrictions have existed to varying degrees on the use of trade/brand names, location in retail malls, employment of optometrists by nonoptometrists, use of branch offices, and use of franchise agreements (Ronald Bond et al., 1980; Alex Mauziri et al., 1981). In mid-1977 the Supreme Court's landmark Bates decision found price and nonprice advertising restrictions unconstitutional but left intact the myriad of state-level commercial restrictions. Despite these commercial restrictions, chain retail optical firms have grown dramatically since 1977 and are now found in all states and major cities (Anne Cahill et al., 1985; Deborah Haas-Wilson, 1986). In 1982, there were 3,500 optical chain firm outlets and 16,000 private optometric offices; in 1987 there were 6,000 chain firm outlets and 450 "superoptical" chain firm outlets versus 15,000 private optometric offices (Irving Bennett, 1988). Superoptical chain firms, not present before 1977, have substantially higher volumes than traditional chain firms.³ The number of superoptical outlets grew from less than 25 in 1983 to 100 in 1985, 300 in 1986 and 450 in 1987 (Jody Stone, 1984; Peggy Odenbach, 1986; Bennett, 1988). Bennett (1988, p. 2) reports that the increase in the number of chain firm outlets in 1987 was "negated by the closing of a similar number of smaller private offices."

The growth of chain firm outlets has been accompanied by increases in marketing activities including local/national advertising campaigns whose costs are spread over a large number of outlets with the same brand name. Following annual double-digit growth rates in the post-Bates period, industry advertising reached \$150 million in 1987. In 1977 virtually all advertising expenditures were dedicated to print media, especially to Yellow Pages display advertisements (Leslie Harris, 1978; Stone, 1985; Bennett, 1987). In 1987 Yellow Pages were still the media of choice across all types of practitioners but television network advertisements represented some 50 percent of total advertising expenditures, incurred mainly by large chain retail optical firms (Bennett, 1988). Also in 1987, Precision Lens Crafters, the leading superoptical (231 outlets) spent

³ In 1987, superopticals typically had 4,500 square feet of retail space and grossed \$1.4 million per outlet versus \$275 thousand per outlet for typical chain firms having some 1,100 square feet of retail space (Bennet 1988; Stone 1984). Private (nonchain) optometrists' offices, though larger in square footage than traditional chain firms at some 1400 square feet, grossed on average \$188 thousand per year in 1987 (Stone, 1984; Bennet, 1988).

32 percent of total industry television advertising versus 23 percent for Pearle Vision Centers, the leading traditional chain firm (700 outlets; Bennett, 1988). This concentration of marketing expenditures corresponds, in 1987, to superopticals capturing some 27 percent of the market controlled by optical chain firms while having less than 7 percent of chain outlets (Bennett, 1988). The percentage of optometrists who advertise has increased from 26 percent in 1981 to 46.3 percent in 1986 and 73 percent in 1988 (*20/20*, December 1981, p. 27; Bennett, 1987; Bennett, 1988). These percentages contrast with a 1976 pre-Bates survey indicating that only 8 percent of optometrists favored the use of advertising by optometrists (R. L. Guerrein, 1976).

Reflecting the freedom to advertise and the apparent circumvention of state commercial restrictions designed to curb their growth, noted by Kwoka, is the increase of chain firms' share of the optical industry. In 1976 chain firms employed 8.6 percent of optometrists and garnered 33.3 percent of optometric industry sales (Bennett, 1987). These shares have gradually grown to 18.9 percent of employment and 53.7 percent of sales, respectively, in 1987 (Bennett, 1988).⁴ Private optometrists' shares therefore declined to 81.1 percent of employment and 46.3 percent of sales, respectively. In 1986, 50 percent of ophthalmologists (M.D.s), 44 percent of chain firm optometrists (O.D.s) and 33 percent of independent optometrists indicated that the larger chain firms had "irrevocably destroyed private practitioners" (Peggy Odenbach, 1986). These post-Bates share changes are consistent with pre-Bates conclusions drawn by Benham (1972), who evaluated 1963 eye examination and eyeglass market shares across states having no advertising restrictions and those having some form of restriction. Benham finds that firms/clinics ("likely to represent larger commercial firms") had up to 76 percent share in areas where advertising was not restricted and as little as 7.7 percent share where advertising was prohibited (the latter percentage being a better reflection of the employment shares of chain firms in restrictive markets).⁵ As Benham concludes, advertising restrictions, as opposed to commercial restrictions which are circumvented, can be considered as the primary deterrent to commercial firm expansion.

In addition to the growth of commercial optometry, the 1980s witnessed an increase of chain-firm ownership by companies/corporations having broader marketing skills, yet not traditionally associated with optometry, including Grand Metropolitan Hotels of Great Britain (Pearl Vision Centers), Quaker Oats (Eyelab), Gillette (EyeWorld, Eye + Tech), U.S. Shoe (Lens Crafters), Sears (Eye Care Centers of America), and various regional/national drug store chains. Advocates

⁴ Share statistics are net of optometrists employed by the military, veterans hospitals, and health maintenance organizations.

⁵ Benham's shares, which incorporate examinations and eyeglasses sold by ophthalmologists translate to 52 percent and 5.3 percent, respectively.

of this increasing concentration and commercial expansion in optometry claim that advertisers/chain firms lower market prices and pass on economies of scale typical of nonoptometric high-volume retail chain operations (Alden Haffner, 1982). Restrictions on marketing activities can be seen as reflecting a strategy of nonadvertisers to increase the costs of entry and operation for advertisers (see, for example, Sharon Oster, 1982; and Steven Salop and David Scheffman, 1983). Opponents of these commercial practices feel that high volume optometric firms (advertisers and chain firms) provide lower (inadequate) eye examination quality to consumers in spite of licensing and minimum examination requirements (Mark Bowman, 1982). In the presence of information asymmetry, retail marketeers are seen as having objectives incompatible with providing adequate eye care or meeting minimum requirements.

Based on data collected prior to the impact of the 1977 Bates decision which were generated via self-reported mail surveys or on-site visits by trained subjects, the literature cited in the introduction has consistently concluded that pre-Bates advertisers or chain firms offered lower priced eye examinations (not adjusted for quality) and/or eye wear (offered separately or in bundles) than nonadvertisers or private practitioners. By the early to mid-1980s, well after advertising restrictions had been lifted, nationwide surveys revealed that higher patient volumes are not necessarily correlated with lower prices in post-Bates markets. By 1981 "group incorporations", which had higher patient volumes, charged 10 percent more than "solo" practitioners for eye examinations and between 1 percent and 6 percent more for eyewear (James Gregg, 1981). In an empirical study of price dispersion limited to California, James Wardlaw (1982) reports that the lowest eyewear prices are not offered by chain optical firms. By 1984 "high volume" practices (with over \$200,000 in sales) were charging some 7 percent more for eye examinations and eye wear than "low volume" practices having less than \$200,000 in sales (Stones, 1984).⁶ By 1986 examination fees charged by chain firms were 14 percent higher than nonchain/independent practitioners; chains charged 27 per cent more than independents for eye examinations bundled with frames and lenses, and 6 percent more for eye examinations bundled with contact lenses (Odenbach, 1986). In 1987 the 7.6 percent growth in industry gross revenues was due "primarily to the strong increase in prices charged at all levels and not to any substantial increase in the amount of product sold"; prices charged by private optometrists were lower than those of most chains for eyewear products, though in-store chain optometrists were found to charge less for examinations (not bundled with eyewear) than private optometrists (Bennett, 1988, pp. 2, 8). Overall, higher priced superoptical chain firms "allowed other players in the market to remain in business; many would not survive a down price marketplace" (Bennett, 1988, p. 6).

⁶ Subsequent studies in 1986 indicate that over 50 percent of nonchain practitioners were "low-volume" practices, while over 70 percent of chains were "high-volume" practices (Odenbach, 1986).

In addition to price differences, there is substantial pre-Bates evidence concerning eye examination quality differences across practitioners. Optometric eyecare quality has been traditionally measured by the length of, or the number of components in, the eye examination. Based on these measures, the literature cited in the introduction consistently concludes that pre-Bates chain firms and/or advertisers offered lower levels of eye examination quality than private or nonadvertising optometrists. These lower quality levels can be attributed in part to the higher volumes of chain firm optometrists; Don Phillips (1983) notes that individual optometrists from the leading national chain firm see more patients in one year than a private optometrist sees in three years. The post-Bates equilibrium appears, therefore, to consist in a growing proportion of optometrists becoming advertisers (73 percent in 1987), with the larger volume suppliers not necessarily charging lower prices than low-volume practitioners. The 27 percent of optometrists who chose not to advertise in 1987 had seen their form of practice gradually decline in market share and employment levels over the previous decade. If one accepts pre-Bates definitions of quality, the negative correlation between quality and advertising (e.g., advertisers offer the lowest quality), coupled with the price trends reported above, would suggest a gradual perversion of this industry during the 1980s.

The next sections of this paper investigate price, quality, and quality-adjusted price for both eye examinations and eyewear. The primary focus here, as in regulatory proceedings and in the literature, is on eye examinations (as opposed to eye wear), since examinations are regulated via minimum standards, are provided by licensed doctors, and are the service provided by optical establishments for which public health is supposedly at risk if quality declines. Eyewear quality has been shown to be equivalent across low- and high-volume practices, since both may sell the same national brands and/or use the same grinding laboratories (see Bond et al.); the dispensing of eyewear, unlike examinations, is generally not regulated and can be performed by nonphysicians (including opticians). A re-evaluation of pre-Bates data is used to investigate signs of market perversion prior to advertising deregulation in 1977. Following this re-evaluation, an empirical study testing for the possible increase in chain firm eye examination quality is reported; the result of which might explain post-Bates prices vis-à-vis other (nonchain) optometrists.

IV. Re-evaluation of the Pre-Bates Data

Prior to the impact of the 1977 Bates decision, the Bureau of Economics of the FTC undertook an extensive survey of the price and quality of optometric services across markets with varying degrees of advertising and chain firm existence. The 1977 FTC data has been analyzed and

reported in numerous publications, including Bond et al., Haas-Wilson, and Kwoka. Among these, Kwoka directly tests the lemons hypothesis, relying on a subset of the data which includes the price of eye examinations, the quality of examinations (measured as time), and prices adjusted for quality differences.

Optometrists in the FTC survey are classified as belonging to two pre-Bates environments: (1) markets where chain firms and price advertising for eyeglasses and nonprice advertising for examinations were present; and (2) markets where advertising and chain firms were not present (only nonadvertisers were observed in these markets). In markets where both advertising and chain firms were present, optometrists are further classified as nonadvertisers (NONE), in-store advertisers (STORE), small-media advertisers not associated with national chains (SMED), and optometrists associated with large national chains (LMED). In 1977, a bold-faced listing in the Yellow Pages or a newspaper advertisement was a sufficient condition to be classified as an advertiser (SMED) by the FTC. Based on a pooled cross sectional analysis, Kwoka's major conclusions include:

- C1: Nonadvertisers in pre-Bates advertising markets are forced to lower prices (not adjusted for quality) to compete; their reduction is much less than that made by advertisers themselves (p. 213). Pre-Bates large- and small-firm advertisers (LMED and SMED, respectively) appear to charge (not adjusted for quality) \$11 to \$12 less than optometrists in restrictive markets (p. 213). All optometrists in pre-Bates advertising markets lower their prices (not adjusted for quality) from \$1.40 (nonadvertisers) to over \$11 (large-firm advertisers); statistical significance of the nonadvertisers' price reduction is diminished vis-à-vis an OLS model after correction for heteroskedasticity (p. 214).
- C2: By choice, pre-Bates nonadvertisers actually provide service of quality superior to that of nonadvertisers in pre-Bates restrictive markets (p. 215). Pre-Bates large-firm optometrists spend about 5 minutes less for a typical examination than optometrists in pre-Bates restrictive markets (p. 215). If one weights the time differences by the frequency of each type of optometrist found, the mean time spent for examinations in pre-Bates advertising markets is actually longer [in nonrestrictive markets] than in pre-Bates restrictive markets (p. 215).
- C3: The price of additional examination time may be higher in pre-Bates advertising environments, even while total price is lower (p. 215). Pre-Bates restrictive markets cause a leveling of prices despite the existence of quality diversity (p. 216). The removal of advertising restrictions [implying a post-Bates environment] would cause constant quality prices to decline over 20 percent. And, to reiterate, this occurs without a decline in overall market quality (p. 216). These results are inconsistent with key elements of the professions argument against advertising, but imply instead considerable social benefits from loosening restrictions as shown for the practice of optometry (p. 216).

These conclusions are consistent with other pre-Bates studies of the optometric industry cited earlier, which conclude that restrictions on marketing and commercial practices by the professions

generally increase market prices without providing higher levels of quality. However, Bond et al. (1980, p. 87) warn that low explained variance in their analysis may be consistent with the view that consumer misinformation plays an important role in optometric markets, among other factors. Kwoka (p. 215) also warns that residual imperfections in consumer information, in addition to unmeasured quality differences, may explain cross-practitioner quality-constant price differences.

For comparative purposes, the sub-sample of the 1977 FTC data analyzed in Kwoka is retained here. The goal of this re-evaluation is to test for signs of market perversion prior to the impact of the Bates decision. The sample consists of 147 observations collected in two standard metropolitan statistical areas (SMSAs) where there was an absence of chain firms and advertising (Knoxville, Tennessee; and Providence, Rhode Island) and three SMSAs where advertising and chain firms were present (Baltimore, Maryland; Washington, D.C.; and Minneapolis, Minnesota).⁷ Table 1, Panel A summarizes cell means, sample sizes, and aggregate averages across these markets for variables included in Kwoka's investigation. Borrowing Kwoka's notation, NONE, STORE, SMED and LMED are dummy variables indicating types of practice as defined earlier.

Due to the limited number of chain firms present in 1977 and the desire to capture sufficient variance, the FTC sampled two restrictive and three nonrestrictive SMSAs. Within each nonrestrictive SMSA, stratified sampling "was necessary because practitioners in large chain optical firms and practitioners in local optical firms were generally a small percentage of all practitioners. Hence, a simple random sample of all practitioners would have generated very few observations for advertisers" (Bond et al., p. 43, 1980). Despite such sampling, relatively few chain firm (n=26) and small firm (n=23) advertisers were visited across the three nonrestrictive SMSAs. Because of the requirement to pool across cells, the underlying FTC data have been adjusted for cost of living (COLA), income per capita (YPC), and number of optometrists per capita (ODPC) across the SMSAs. Given the key role these adjustments may have in obtaining estimates of price and quality differences, the following discussion examines their reasonableness. The adjustments were used to replicate Kwoka's "base" price model reported in Table 2.

A. Data Adjustments

As noted by Kwoka, the level of detail contained in the FTC survey is unsurpassed for the optometric industry. This complexity and sparse documentation make its use extremely difficult.

⁷ Kwoka reports 147 observations across seven cities, though one additional observation is present for a subject who had only one visit (which is retained for this study); for two cities classified as restrictive and nonrestrictive by the FTC, no observations are present.

The underlying FTC data control for cost of living differences across the SMSAs for eye examination prices (PRICE) and income per capita (YPC) using the index labeled COLA in Table 1, Panel A. Though not documented in the data base's variable descriptions, the COLA index is based on a Bureau of Labor Statistics index of Urban Family Budgets (labeled BLS in Table 1, Panel A). As reported, the BLS index is not available for the two restrictive SMSAs: the 45 observations of adjusted price (ADJPRICE) and income per capita (ADJYPC) are, in essence, missing values for these cities. The FTC extrapolate these observations with an index based on a cross-sectional multiple regression model ($N = 39$, $R^2 = .71$). The linear model, reported in Bond et al. (1980, pp. 91-93), has three explanatory variables:

$$\text{BLS} = f(\text{1975 population per square mile; 1970 percentage of families living below the poverty level; total local taxes per capita based upon local government tax data in 1971-72 for the 1970 population}).$$

Among the 21 cities/observations with BLS indexes less than 100, two cities have predicated indexes which deviate by more than five percentage points from the BLS index. Substantial deviation can also be noted by comparing the COLA index with the ACCRA index published by the American Chamber of Commerce Research Association.⁸ The FTC COLA index and the ACCRA index place the same value of 100 for the cities of Seattle, Washington, and Little Rock, Arkansas, respectively (SMSAs surveyed by the FTC but not included in this subsample). The ACCRA index also gives the value of 94.6 to Knoxville, Tennessee. However, the COLA index extrapolates the value of 85 to both Knoxville and Little Rock -- deviations from the ACCRA index of 9.6 and 15 percentage points respectively, or deviations from the Seattle COLA index of 15 percentage points for both markets. The impact of such wide deviations is to inflate prices dramatically in restrictive markets and in particular, Knoxville, as seen in Table 1, Panel A for the variable ADJPRICE.

In a study of pre-Bates eyeglass markets, Jeffrey Keller (1983, p. 10) shows that city-to-city ophthalmic price differences may not be due to cost-of-living differences: "higher costs observed in states with advertising restrictions are at least as much a manifestation of higher overall health care costs (nonophthalmic) as they are a result of the restrictions on price advertising." Mark Pauly and Kathryn Langwell (1983, p. 144) further note that SMSAs are often too large, "but sometimes too small", to represent the economic market area for a medical establishment (e.g., hospital). Within one SMSA in North Carolina (studied by the 1977 FTC survey), for example, the ACCRA index

⁸ American Chamber of Commerce Research Association, *Intercity Cost of Living Indicators*, First Quarter, 1977; the ACCRA index can not be used to substitute for the COLA index since it is not available for many of the SMSAs surveyed.

places a value of 104.9 for one city (Greensboro) and 99.8 for another (Winston-Salem). Finally, the Bureau of Labor Statistics has called into question the validity of the underlying Urban Family Budget index because the market baskets and consumption weights were not identical across SMSAs (see Mark Sherwood, 1975). Given the uncertain validity of the COLA index and the complex nature of regional medical price variation, it is appropriate to investigate the sensitivity of the FTC data to the extrapolated cost of living adjustments.

The comparison of transaction prices (not adjusted for quality) is performed using the "base model" reported in Table 2, which controls for two economic factors: YPC and ODPC. Income per capita (YPC) adjusted by COLA (ADJYPC) has been used to control for local demand conditions. Table 1, Panel A indicates an apparent experimental design correlation between the level of restriction and ADJYPC; lower incomes correspond to more restrictiveness. Kwoka notes that ADJYPC is not generally statistically significant though positive in sign (as reported in Table 2).

Optometrists per capita (ODPC) is used to control the "intensity of monopolistic competition." Citing Benham and Benham, Kwoka (p. 213) states, "There is reason to believe that the number of optometrists per capita may be greater where advertising exists. If so, present estimates understate the full effect of advertising." As shown in Table 1, Panel A, however, the restrictive markets under study have on average almost twice the number of optometrists per capita than nonrestrictive markets and can therefore be considered more competitive. In the base model reported in Table 2 the negative parameter estimate for ODPC reveals an apparent contradiction in the SMSAs studied. According to the consulting optometrists to the 1977 FTC study, graduating optometrists most often start practice in their home states, their spouses' home states, or near schools of optometry; restrictions on commercial practice were not cited as a motivation for initial location after graduation.⁹ Contrary to the stated rationale, values for ODPC would suggest that pre-Bates optometrists may have been driven from nonrestrictive markets to restrictive markets. Given the underlying values for YPC and ADJYPC, ADJYPC's lack of statistical significance, the questionable nature of COLA, and the implied contradictions, a sensitivity analysis of the data adjustments appears justified.

⁹ Based on interviews with consulting optometrists to the 1977 FTC study: Alder N. Haffner, former President of the State College of Optometry, Associate Chancellor for Health Sciences, State University of New York; Edward R. Johnston, former Dean for Academic Affairs, President, New York State College of Optometry; D. Leonard Werner, Professor and Chairman of the Clinical Optometric Sciences Department and Director for Professional Services SUNY; Stuart M. Podell, Chief of the Primary Care Optometric Department and Professor of Optometry, SUNY; Lester E. Janoff, former Coordinator of Curriculum and Professor of Optometry, Pennsylvania College of Optometry, Director of Professional Services Eye Institute, and Professor of Optometry, Pennsylvania College of Optometry.

Finally, it should be noted that the FTC study's unbalanced design, which includes observations across SMSAs selected on a convenience basis, results in the logical inclusion of control variables.¹⁰ These variables introduce substantial multicollinearity often of a complex nature, including control/design collinearity. The investigation of nested alternatives, as commonly suggested, is proposed to unravel the effects of the adjusting variables and design interactions.¹¹ Table 2 illustrates the sensitivities of the adjustments discussed above, in comparison with the base model. The alternative models investigate the sensitivity of previous results to the inclusion of ADJPRICE and PRICE, ADJYPC and YPC, and ODPC. In all the regressions, the comparison group is all optometrists in the restrictive SMSAs, as reflected in the constant term.

B. Examination Prices (not adjusted for quality)

The sensitivity regressions reported in Table 2 call into question the conclusions cited earlier with respect to examination transaction prices (C1). Conclusion C1 states that nonadvertisers are forced to lower prices to compete in markets where advertising and chain-firm competition are present (based on the value of NONE = -2.59, $\alpha = .05$ in the base model). Conclusion C1 also notes that the significance level is reduced when correction is made for heteroskedasticity. Model (b), Table 2 demonstrates that the significance of this result is also sensitive to the inclusion of ADJYPC or YPC, as $\alpha = .10$, when these insignificant variables are dropped. Models (c), (d), and (e) show a reversal (sign change) at significant levels, when prices are not extrapolated using the FTC COLA index. Models (f), (g), and (h) indicate a reversal when ODPC is eliminated from the equation irrespective of whether price adjusted or unadjusted by the FTC COLA index (see also Models (i), (j) and (k)). These sensitivities imply that nonadvertisers may actually increase price by \$2.25 to \$7.07 per examination over optometrists in restrictive markets. Likewise, the reduction of price by in-store advertisers, estimated in the base model (STORE = -7.56, $\alpha < .01$), is highly sensitive to the data adjustments and is for the most part not statistically significant across the alternative models; it should be noted that the FTC data base has a sample of only 4 observations for these optometrists, as reported in Table 1, Panel A. Finally, C1 states that advertisers charge some \$11 to \$12 less than nonadvertisers in nonrestrictive markets. This difference reduces to some \$1.61 for SMED and \$3.03 for LMED, depending on the model adjustments.

A plausible explanation for such price differences is the FTC sampling methodology's failure to

¹⁰ Bond et al. (1980, pp. 39-47) indicate that SMSAs were selected using a process of elimination which did not consider the existence of a cost-of-living index.

¹¹ See George Judge et al. (1980).

exclude specialized nonadvertising optometrists in both restrictive and nonrestrictive markets.¹² Robert Refowitz (1978, 1981) finds that 5.1 percent of optometrists provide specialized services (i.e., visual training/orthoptics, low vision aids) as a primary field of practice and 10.9 percent as a secondary field of practice; some 51.6 to 55.1 percent do not provide specialized services; 4.2 percent of optometrists receive greater than 5 percent of their patients as referrals from peer optometrists and ophthalmologists (some 33.3 percent of optometrists never receive referrals). Cahill et al. find that the highest priced optometrists generally offer specialized services and would have been classified as nonadvertisers by the FTC; this premium is analogous to sports car garages charging more for routine tune ups, given their opportunity cost for time. The FTC survey's failure to control for such optometrists stands to widen the dispersion of prices, with higher transaction prices being attributed to nonadvertisers in both restrictive and nonrestrictive markets.

In contrast, therefore, to C1 this re-evaluation leads to plausible alternative conclusions (stated as such while considering the limited sample sizes of the FTC data base):

- AC1: Pre-Bates nonadvertisers in nonrestrictive markets do not decrease, and may even increase, prices (not adjusted for quality) in the face of competition from advertisers and chain firms; the conclusion that nonadvertisers in nonrestrictive markets decrease prices in the face of competition is a function of data adjustments, the use of which is of questionable validity.
- AC2: There is insufficient evidence to conclude that in-store advertisers in nonrestrictive markets charge less than nonadvertisers in restrictive markets.
- AC3: Pre-Bates chain firms and small media advertisers have lower prices (not adjusted for quality) than nonadvertisers in restrictive markets, the difference being possibly the result of different (specialized) service offerings.
- AC4: There are a greater number of optometrists per capita in pre-Bates markets where advertising and chain firms are not present.¹³

C. Examination Quality

Regressions measuring the effects of advertising on quality are reported in Table 3. Conclusion C2 states that nonadvertisers in nonrestrictive markets offer more time per examination than

¹² Bond et al. (1980, p. 43) note that stratified subsamples were based on a single list including all practitioners in the SMSAs.

¹³ Cahill et al. (1985) report similar findings based on the FTC's definition of most versus least restrictive markets; they use post-Bates figures (1982) for optometrists per 100,000 in population and optical outlets per 100,000 in population (1985).

nonadvertisers in restrictive markets and that media advertiser and chain firm examinations are five minutes shorter than nonadvertisers' examinations. Models (l), (m), (n), (o), and (p) show that these conclusions are sensitive to the elimination of the statistically insignificant adjusting variables, the theoretical nature of which is not clear given the dependent variable. Across the alternatives, the statistical significance of NONE varies between $\alpha = .01$ and $\alpha = .12$, and the time spent by nonadvertisers in restrictive markets varies from 4 to 11 minutes more than that spent by advertisers. STORE has no significance across the models. Within restrictive markets, advertisers and chains provide examinations which are some 15 minutes less than nonadvertisers ($\alpha < .01$). Contrary to previous analyses of pre-Bates data, this analysis indicates that the lack of difference in quality between nonadvertisers across restrictive and nonrestrictive markets can only lead to a decline in overall quality as the share of chain optical firms increases.

The treatment of time as a continuous measure may not reflect important qualitative differences across practitioners. The first 6 minutes provided during a quick examination may not have the same value as the last 6 minutes of a complete 20-minute examination. All State Regulatory Boards require optometrists to provide a number of services during a basic eye examination. Optometrists have a legal responsibility to provide such services, despite any asymmetry of information on examination quality between doctor and patient. A prescription based solely on patient refraction may initially improve visual acuity but will not affect an undetected underlying cause such as diabetes, high blood pressure, or tumors (conditions optometrists should detect and will generally refer to specialists). The failure to identify underlying causes of visual problems can have dramatic consequences on patient health, the deterioration of which is not easily traced to an incomplete eye examination. A basic eye examination is generally required by state law to include a case history (age, family eye history, personal eye history and symptoms), an eye health examination (external visual examination, eye movements, cover tests, pupil reactions to light, biomicroscope--split lamp, ophthalmoscopy, tonometry--glaucoma test, visual field screening and tests); vision tests (initial visual acuity, color vision test, depth perception test, distant binocular tests--phorias at distance and ductions at distance, near binocular tests--phorias and ductions), refraction error tests (retinoscopy, subject refraction, binocular balance, amplitude of accommodation, and near point convergence tests). Illegal "quicky" examinations usually focus on subject refraction, which is relied upon for prescribing lenses. In general (i.e., not including minor adjustments to previous prescriptions), a basic examination should last twenty minutes or more if state mandated procedures are undertaken. Irrespective of the examination technology used or the reliance on assistants for certain procedures, under no circumstances can an examination last less than 15 minutes and be legally or medically adequate.¹⁴

¹⁴ The conclusions in this paragraph were of the unanimous opinion of the consulting optometrists interviewed (see footnote 9) and optometrists representing chain optical firms during public hearings before the FTC; Dr. Barry Davis and

The dependent variables $ADQTIME \geq 15$ and $ADQTIME \geq 20$ are dummy variables which indicate whether sample examinations lasted 15 minutes or more and 20 minutes or more, respectively. Using the more conservative indicator of 15 minutes or more, Table 1, Panel B indicates that approximately 40 to 50 percent of chain firms and media advertisers provide illegal examinations, compared with 6 and 9 percent for nonadvertisers in nonrestrictive and restrictive markets, respectively. Table 3, models (q) and (r), reports that the difference between advertisers and nonadvertisers in restrictive markets is statistically significant ($\alpha < .01$), while the differences among nonadvertisers are not significant across competitive environments (no adjustments are made to the data given that this is a test for minimum requirements). As above, where quality is measured as TIME, and in contradiction with earlier pre-Bates studies cited, this analysis indicates that the introduction of chain firms can only erode average market quality by increasing the number of illegal or medically inadequate eye examinations.

Conclusion C2 states that if one weights the time differences by the frequency of each type of optometrist found the mean time spent in advertising markets is actually longer than in nonrestrictive markets. This weighting is necessary because nonrandom samples were collected within each nonrestrictive SMSA due to the low number of chain firms present in 1977. Weights were determined based on Yellow-Page listings and newspaper advertisements observed over a seven month period. As Kwoka (p. 215) notes, this weighting scheme does not reflect the likely larger share of chain firms. Weighting based on the frequencies observed by the FTC survey implies markets shares in nonrestrictive markets of 9.5 percent for chain firms (LMED), 19.1 percent for small media advertisers (SMED), and 71.5 percent for onsite advertisers and nonadvertisers.¹⁵ A number of factors can explain the difference between these frequency weights, as used by Kwoka and Bond et al., and actual market shares reported in the preceding section (e.g. chain firms having 53.7 percent of sales, and 73 percent of optometrists advertising in 1987; see also Benham, 1972, and footnote 5). In addition to chain-firm optometrists seeing more patients in one year than a typical nonchain optometrist in three years (Phillips, 1983), chain-firm outlets often employ several optometrists at the same location. Finally, the growth of national television advertising not present in 1977 may have resulted in greater shares than those possible prior to the Bates decision. The increasing proportion of advertisers and the market shares reported earlier would imply an overall decline in quality, especially when considered in the light of illegal

Dr. Richard Zaback (NAOO Panel 1-A, J-71 (k), July 8, 1985, Tr. 1973 and 1978), representing chain firms, note that examinations should last between 20 and 30 minutes in order to meet minimum health requirements.

¹⁵ These weights are reported for all four of the least restrictive SMSAs by Ronald S. Bond in a letter to the FTC (James P. Greenan) on May 29, 1985 and reported in Cahill et al. (1985).

examinations. This would be true, however, only if advertisers and chain firms have not improved their quality since the late 1970s, a hypothesis investigated in the next section.

In contrast to C2 one can submit, based on **this re-evaluation**, the following plausible alternative conclusions:

- AC5: Pre-Bates advertisers' and chain firms' examinations are from 10 to 15 minutes shorter than nonadvertisers' in restrictive and nonrestrictive markets respectively; the lower quality of examinations translates into some 40 to 50 percent of examinations offered by chain firms and advertisers being illegal.
- AC6: The difference in length of examinations between pre-Bates nonadvertisers in restrictive and nonrestrictive markets is marginally significant; the proportion of illegal examinations is not statistically different across restrictive and nonrestrictive markets for nonadvertisers.
- AC7: Conservatively assuming that advertisers and chain firms garner a 50 percent share in markets where they exist and that chain firms/advertisers have not improved quality, the percentage of illegal examinations has grown from 9 percent in pre-Bates environments to 26 percent in post-Bates environments.
- AC8: Pre-Bates nonprice advertising of eye examinations is negatively correlated to eye examination quality.

The empirical conclusion that advertisers and chain firms in pre-Bates markets provide lower quality of care is consistently found in the literature (Bond et al. 1980, 1983; Begun 1979; Kwoka 1984). The erosion of overall market quality is completely dependent on weighting schemes employed which may not foresee long-term shifts in optometric employment or changes in quality on the part of advertisers as market shares change (e.g., as more optometrists are attracted to chain employment, they may not reduce the quality of their services).

D. Quality Adjusted Prices

Given that pre-Bates advertisers and chain firms offer lower eye examination quality, it is appropriate to examine differences in prices adjusted for quality. Kwoka approaches this issue by regressing price (ADJPRICE) against quality (TIME), quality interacting with advertising markets, the adjusting variables (ODPC, ADJYPC) and the type of optometrist (NONE, STORE, SMED, ODPC). Given that quality, price and level of advertising are endogenous, as noted by Kwoka, an alternative is to use quality-adjusted price as the dependent variable. The advantage of this approach is that it provides a direct measure of markup behavior within markets and across competitors, assuming a competitive labor market. The use of PRICE/TIME as a dependent measure also assumes that the two are determined jointly by optometrists.

Cell means for PRICE/TIME and ADJPRICE/TIME are reported in Table 1, Panel B. Table 3, models (s) and (t), shows that labor markups of chain firms are significantly higher than those of nonadvertising optometrists in restrictive markets -- this higher "real" price is a direct indication of the lemons process at work, especially when considering that some 50 percent of advertisers' examinations are illegal. If one were to consider paying for an examination not meeting minimum state requirements as a total loss, as one might consider money spent on a broken toy, then the economic prices charged by advertisers and chain firms are even higher. This result is found for both COLA adjusted and unadjusted prices, though significance declines in the former case. Collinearity introduced by ODPC and YPC results in insignificant estimates across practitioners. Examination of the underlying cell means reported in Table 1 indicates that within restrictive markets advertisers and chain firms charge more per minute than nonadvertisers (significant at $\alpha = .01$). John Thomas (1983) finds a similar relationship in a survey limited to the city of Atlanta, Georgia. He finds that nonchain optometrists provide examinations which are 118 percent longer in length (40.25 minutes) than chain firms (18.5 minutes), with chain firms charging 48.8 percent more per examination minute (\$1.89) than nonchain firms (\$1.27). With regard to the FTC data base, Table 3 indicates that labor markups are not statistically different across nonadvertisers in restrictive and nonrestrictive markets.

In contrast to conclusions C3 and regardless of the aggregation scheme employed, this analysis supports the following plausible alternative conclusions:

AC9: Pre-Bates quality-adjusted price appears to increase in markets where advertising restrictions are lifted and chain firms are present.

AC10: Pre-Bates advertising is negatively correlated to quality, positively correlated to price (adjusted for quality) and positively correlated to market share (on a per optometrist basis).

AC11: Overall quality is lower and quality adjusted prices are higher in pre-Bates markets where advertising and chain firms were present.

Conclusion AC11 can be reinforced by Kwoka's conclusion (C3) that the price of additional examination time may be higher in advertising environments, resulting in an alternative proposition:

AC12: High-quality care is more expensive, while low-quality care is more frequent and more expensive (quality adjusted) in pre-Bates nonrestrictive markets than in pre-Bates restrictive markets.

Finally, advertising and chain firm practices may benefit from offering consumers lower prices

based on volume purchases of testing equipment and eyewear (contact lens, frames, and so on). Some 20 to 30 percent of dispensing optometrists' revenues (excluding superopticals) are generated from eye examinations and vision therapy, while the remaining percentage is generated from eyewear (Odenbach 1979, Stone 1983). Products are often bundled with examinations, making comparisons of "total package" prices difficult (the prices investigated by Kwoka were not bundled with eyewear purchases). Advertisers' "low" examination retail prices may reflect a mixed bundling strategy to increase eyewear sales; or conversely, low eyewear prices may be bundled to extract greater surplus on eye examinations. To examine this possibility, Table 1, Panel B reports eyeglass frame markups and sample sizes (itemized retail price divided by national wholesale price). These data which are part of the FTC study, were collected in separate visits by trained subjects who purchased both examinations and eyeglasses (where eyeglasses were itemized separately). Markups calculated in this fashion are likely to underestimate actual markups for chain firms or large volume practices which may receive discounts on national wholesale listings due to bulk purchases distributed across multiple nonchain outlets (though optometrists obtain discounts via association membership and cooperative buying; Bennett, 1988, p. 8). With the exception of Minneapolis, eyeglass frame markups appear to be greater for advertisers than nonadvertisers, though sample sizes are limited. Table 3 reports that markups (MARKUP) charged by small advertisers (SMED) are significantly higher ($\alpha = .04$) than for nonadvertisers in restrictive markets; there is no statistical difference when the FTC COLA Index is applied (ADJMARKUP).

Thomas finds that retail markups over published wholesale list prices of national chains are not statistically different from those of nonchain advertisers and nonadvertising private optometrists (without considering possible volume discounts). Relying on a broad-based national survey, Stone finds that markups of high volume providers (practices with revenues over \$200,000) are 17.6 percent higher for ophthalmic frames, 29.6 percent higher for spectacle lenses, 30.4 percent higher for contact lenses and solutions, 39.4 percent higher for accessories, and 27 percent higher for plano-sunglasses than those of small volume practices. Stone's results are self-reported and may reflect to some extent large-volume operation markups over possibly discounted wholesale prices. Bennett (1988) also reports that chains charge higher prices for eyewear products than private optometrists; Odenbach finds that chains charge higher prices than private optometrists for eyewear bundled with examinations.

There is some evidence supporting the contention that advertisers and chain firms in the pre-Bates era offered lower examination prices at the retail level than competing nonadvertisers (not adjusted for quality). The evidence does not unequivocally support the contention that prevailing market prices were lower in nonrestrictive markets than restrictive markets. Post-Bates surveys suggest that large-volume operators and chain firms do not necessarily charge less at the retail level for

basic eye examinations (or when bundled with eyewear) than solo/independent practitioners. Given the documented pre-Bates quality of service provided by advertisers and chain firms, the apparent perversion may nevertheless not have occurred in the mid-1980s if advertisers and chain firms had substantially improved their quality to levels equal to or greater than nonadvertisers. The next section reports a 1985 study designed to test this hypothesis directly.

V. Quality of Care: Post-Bates Test - 1985

In order to investigate the possible improvement of chain-firm care over time, 11 trained subjects having common, yet nonroutine, eye conditions were sent to chain and private practitioners in the boroughs of New York City; New York City was chosen due to the high concentration of both chain and private practitioners, thus avoiding the possible need to control for ODPC and YPC but allowing samples sizes larger than the FTC study. A list of the subjects' eye conditions is given in Table 4. The subjects were not informed of the purpose of the examinations, but were trained to record two key elements: (1) the extent to which the optometrist asked about the subjects' medical history; and (2) examination length (in minutes) including time spent with assistants. All optometrists were classified as "private" or "chain" by directory listings. Random samples were drawn from each population frame.¹⁶

Table 5 shows the percentage of optometrists asking for medical histories by group. The t-statistic of 2.7 being significant at $\alpha < .01$ level suggests that "process" quality of chain firms is lower than that of private practices, corroborating the FTC data. On average, chain firm examinations lasted less than 14 minutes; private practice examinations lasted 31 minutes, the difference being statistically significant at $\alpha < .01$ level (t statistic equals 4.21). Table 5 also shows the proportion of eye conditions correctly diagnosed. Unlike previous studies relying on the FTC data which indicated no difference in prescription accuracy ("outcome" quality) across practitioners (Bond et al. 1980, 1983), these data indicate that chain firm optometrists were less able to detect eye conditions than private practitioners (t-statistic equals 2.88 significant at .01 level). The use of subjects with nonroutine conditions (versus using subjects with simple myopia or similarly routine conditions, as in the FTC study) can explain this result. The lack of diagnosis may also lend support to those in favor of market intervention in the form of minimum quality standards and explain why examinations lasting less than 15 minutes cannot meet current standards.

¹⁶ A more detailed description of the survey methodology and sampling procedure is provided in Cahill et al. (1985).

VI. Discussion

In the post-Bates era, the evidence presented tends to support a lemons process: low-quality advertisers do not charge lower prices/markups (both adjusted and unadjusted for quality) while increasing employment and market shares vis-à-vis high quality optometrists. Consistent with this outcome, John Rizzo and Richard Zeckhauser (1990, pp. 497-8) find in an empirical study of physicians that "the FTC's strong interventions in favor of physician advertising may have promoted entry and competition in the short run, while established physicians remained hesitant to advertise. Eventually, however, through the aging of the population and the breakdown of norms, physicians falling into this group will begin to advertise... more established physicians will gain at the expense of their less established peers. Competition will be diminished."

In addition to the higher throughput per optometrist, several factors can explain the inherently low eye examination quality provided by optical chain firms. Public testimony presented before the FTC reveals that some chain firms provide bonuses to their optometrists based on the number of patients seen. For many chain firms, patients are seen on a "first-come first-served" walk-in basis (without appointment). Thus, during busy hours of the day optometrists have incentives to give quicker examinations so that customers forming a queue do not leave due to lengthy waiting. Some optical chains openly advertise their speed in filling eyewear prescriptions. Holding to such claims may also induce shorter examinations, as service and product are often bundled. In addition, chain firms are also employers of newly licensed optometrists who have little or no clinical experience (Bennett 1988, see also footnote 9). Some argue that these new hires are moulded to accept quicker examinations though they are trained in the latest techniques. Finally, advertising-induced volume increases per employed optometrist will decrease quality to the extent that volume increases cannot be perfectly matched with the quantity of professional labour supplied.

The presence of information asymmetry on eye examination quality in optometry, as noted by Bond et al. and Kwoka, may explain the rapid penetration of low-quality, high-volume practitioners. In a comparison of untrained consumer (patient) judgements of quality, with those of licensed (peer) optometrists, Jesse Rosenthal (1980) finds that only 2 percent of patients feel unable to judge eye examination quality. Opinions formed by the remaining 98 percent of untrained consumers are statistically independent of those formed by peer optometrists, who judged the quality of subjects' eye examinations as unsatisfactory for (1) failure to refer ocular pathology properly; (2) prescribing eyeglasses which do not adequately correct visual acuity or visual function; (3) not prescribing eyeglasses which could significantly improve vision; or (4) prescribing

unnecessary eyeglasses.¹⁷ J. Ehrlich et al. (1961) and John Lebow (1974) similarly find that patients generally judge the quality of medical care as being higher than care actually received (as judged by independent expert reviewers). Such asymmetry has long been recognized in medical professions (see Kenneth Arrow, 1963, and Mark Pauly, 1978).

Studies of optometric services reveal a rather complex form of information asymmetry. Despite an apparent lack of search and experience qualities, untrained consumers feel qualified to make judgements, though incorrectly, on the quality of eye examinations. Such unrecognized credence or pseudo-experience qualities stand in contrast to "simple credence" qualities which consumers recognize as too complex for evaluation, prompting the use of expert advice or other signals (with known uncertainty) as surrogate quality measures. Optometric examination quality may be subject to widespread self-deception by those who are unwilling to admit a lack of expertise or who rely on irrelevant quality signals. One optometrist, representing chain-firm interests during public hearings before the FTC, notes the use of office decoration (the "high tech" room) by consumers as an irrelevant signal of quality:

They [the patients] are taken back outside [to the lobby from the "high tech room"], and a doctor calls them. A lot of the time the patients say, "oh, there is more?" They think they are done, have had a thorough exam. And they haven't even been seen by a doctor.¹⁸

Apparently patients believe they have had a thorough examination even before a refraction is performed and before they are examined with an ophthalmoscope. Likewise, in many advertisements, chain firms stress that eye examinations are provided by licensed optometrists. The term "licensed" implies standard care which should be, but is not, equally produced at chain and nonchain locations; the term "license" can act as an irrelevant signal. Finally, when customers enter retail optical chains they invariably see nationally distributed eyeglass frames, as well as accessories which are also found in nonchain locations. The existence of these in-store displays may act as irrelevant eye examination quality signals.

The inherent complexity of optometric services, the negative correlation between advertising and examination quality, and possible consumer self-deception in judging quality would suggest that advertising and other marketing activities can be noninformative by not reducing information

¹⁷ Even among the peer optometrists some 19 percent were unable to assess examination quality based on these four criteria; the authors qualify these findings due to certain design limitations in measuring judgement asymmetries.

¹⁸ Dr. James Ellis [J-71(K)], July 8, 1985, Tr. 1943, FTC Proceedings.

asymmetry (see Comanar and Wilson). In the 1977 FTC survey, using bold faced print in the Yellow Pages was a sufficient condition to be classified as an advertising optometrist. In pre-Bates SMSAs having chain firms, only "nonprice" advertising was detected for eye examinations and "price" advertising for eyewear (advertising in newspapers and telephone directories). By the mid-1980s, some chain firms had expanded to the national level, allowing substantial economies to television advertising and brand name usage. Pearl Vision Centers, the largest chain firm in 1985, began televised campaigns with the ambiguous theme, "Nobody cares for eyes more than Pearl." Some chains' advertisements, via patient testimonials, emphasize consumer satisfaction with the "speed" of service, thus defining quality as being compatible with high volume operations. It is difficult for empirical studies of the optometric industry to evaluate the impact of advertising's scope (local versus national), type (price and nonprice), and media (Yellow Pages, on-site, print media, radio and television).

The economic value of a trade name based on advertising may therefore be perverse in the optometric profession by the fact that consumers cannot distinguish between an adequate eye examination and one that is incomplete. Two optometric trade names can be of equal value based on repeat purchase reputation while the quality of care delivered by them is divergent. Since consumers are accustomed to brand names signaling standardized or guaranteed quality (Benjamin Klein and Keith Leffler 1981), we infrequently observe brand advertising designed to signal illegal or "inadequate" quality. Optical chain firms may therefore take advantage of prior brand signaling in product categories unrelated to optical goods and services. This general carry-over effect is accentuated when optical chains open offices in nonoptical retail establishments, as is the case in Sears department stores. These arguments have been used to justify legal restrictions on the use of trade/brand names. Barry Waldman (1981) cites three Supreme Court findings with respect to optometric trade names being uncorrelated to quality and/or competitive prices: (a) the reputation of the firm may be based on individuals no longer employed; (b) a firm may assume a new name if the former name becomes associated with negligent practice; and (c) the same firm using several brand names gives a false impression of competition among shops under common ownership.

The literature's focus on eye examination quality as a single attribute may also explain the divergence between pre-Bates studies and post-Bates outcomes. The higher prices (adjusted or unadjusted for examination quality) charged by chain firms may reflect higher aggregate utility levels for consumers who see optometric practices as offering a multiattribute service: eye examinations, rapid eyewear dispensing, location in convenient retail malls, pleasant offices, and cheery personnel. Though empirical measures of "convenience" qualities, among others, are difficult to quantify, some evidence exists which suggests that consumers value examination quality and the professional integrity of the optometrist more than "location convenience" and "acceptable

fees" (Koetting and Craig Andrews, 1979).¹⁹ The greater number of retail outlets (implying greater convenience quality in restrictive markets, as seen in pre-Bates levels of ODPC) may explain earlier findings that offer prices are higher in restrictive markets (see Pauly and Satterthwaite). Cahill et al. surveyed the SMSAs studied by the FTC and found (in the post-Bates era) that markets having greater restrictions on chain firms have a greater percentage of outlets advertising weekend and evening opening hours.

Despite the lack of empirical evidence that post-Bates chain firms offer higher levels of objective quality than pre-Bates practices, a test of the lemons process can consider the impact of asymmetry on perceived utility and purchase outcomes: would the purchase decisions of chain-firm patrons change if they were fully informed (i.e. if they recognize their previous self-deception and accept objective or peer optometrist measures of examination quality)? Full information may therefore affect consumer assessments of attribute quality; it may also affect the weight consumers give to each criteria in formulating an overall quality judgement. The FTC collected information on their trained subjects' overall subjective opinions of the optometric establishments surveyed in 1977; the aggregate of the responses can be used as a benchmark against long-run equilibrium shares generated by untrained consumers. In particular, FTC subjects were asked: "Would you send a member of your family or a personal friend to this office for an eye health examination?" Subjects answered "yes" in 52.1 percent (n = 140) of the cases for nonchain practices and 15.9 percent (n = 63) for chain firms.²⁰ Assuming that trained subjects are not self-deceived and that affirmative answers can be translated into purchase outcomes, chain firms and small-firm advertisers would garner 23.4 percent in markets with full information, while nonadvertisers would garner 76.6 percent. As noted above, 73 percent of optometrists advertised in 1988 and chain firms alone had 53.7 percent of industry sales in 1987. The difference between the hypothetical and actual shares cited demonstrates the extent to which this industry may be suffering from a "sweet" lemons process (i.e. quality declines with higher prices and presumably higher levels of satisfaction).²¹

Akerlof specifically cites three institutions which arise to counteract the effects of quality

¹⁹ The authors cite a second unpublished survey of customers patronizing a large chain firm with branches located in department stores which provides similar results.

²⁰ Subjects were also asked if they would send a member of their families or personal friend to the office for vision testing for an Rx; hypothetical shares based on this question are 70.3 percent for nonchains and 28.6 percent for chains; differences are statistically significant at the 95 percent level for the two-tailed test; in-store advertisers are included in nonchain practices.

²¹ The focus here on tests of mean differences is consistent with the literature; equilibria associated with perceptions of variance differences may merit further attention.

uncertainty: brand names, commercial chains, and licensing. All three institutions currently exist in the optometric industry. Information asymmetry and self-deception, coupled with informed marketing techniques, may interact with these institutions to reinforce or even accelerate the lemons process, not prevent it. The impact of extreme information asymmetry suggests renewed theoretical research in light of apparent public policy and institutional failure in the optometric industry in guaranteeing the quality of eye examinations. As noted by Kwoka, post-Bates chain firms in particular have circumvented state commercial restrictions on location, employment and trade names by using, for example, "side-by-side" arrangements whereby examinations are given in an office immediately adjacent to the opticians' shop where prescriptions are filled. The two entities appear physically as one or are represented as one in the Yellow Pages or television advertisements, but are in fact separated by a partition/wall. Though created and managed by the same corporate entity, the two side-by-side operations may have separate legal entities. Policies designed to reduce information asymmetries (as opposed to increasing entry barriers) may also warrant further consideration. Finally, the multi-attribute nature of optometric services would also suggest continued empirical research on the influence of consumer perception and information asymmetry on purchase behavior within this and similar industries.

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Table 1. 1977 FTC Study

Panel A: Sample Sizes, Dependent and Independent Variable Means, and Cost-of-Living Adjustments (COLA)

Presence of Advert.: SMSA	PRICE (ADJPRICE) ^a				TIME ^a				YPC				SAMPLE SIZE			
	NONE	STORE	SMED	LMED	NONE	STORE	SMED	LMED	DDPC	(ADJYPC)	BLS	COLA	NONE	STORE	SMED	LMED
1. No Advert. Knoxville	22.65 (26.64)	----- (-----)	----- (-----)	----- (-----)	25.30	-----	-----	-----	66.6	4201 (4951)	N/A	85	17	(-----)	(-----)	()
2. No Advert. Providence	18.17 (18.73)	----- (-----)	----- (-----)	----- (-----)	26.80	-----	-----	-----	140.7	4550 (4691)	N/A	97	29	(-----)	(-----)	(-----)
Aggregate	19.83 (21.65)	----- (-----)	----- (-----)	----- (-----)	26.25	-----	-----	-----	103.7	4375.5 (4821)	N/A	91	46	(-----)	(-----)	(-----)
3. Advertising Baltimore	26.52 (26.26)	25.00 (24.75)	16.88 (16.72)	15.73 (15.57)	33.40	20.00	11.30	14.00	44.4	5001 (4951)	101	98	19	1	9	11
4. Advertising Washington	26.35 (25.10)	19.67 (18.73)	17.40 (16.57)	14.86 (14.14)	26.5	16.00	17.20	11.30	65.9	6404 (6099)	105	106	17	3	10	7
5. Advertising Minneapolis	25.29 (24.32)	----- (-----)	18.50 (17.79)	17.75 (17.06)	31.90	-----	21.30	20.40	58.7	5206 (5006)	104	102	13	(-----)	4	8
Aggregate	26.13 (25.34)	21.00 (20.24)	17.39 (16.84)	16.12 (15.64)	30.61	17.00	15.60	15.24	55.3	5537 (5352)	103	102	49	4	23	26

Panel B: Additional Variable Means and Sample Sizes

Presence of Advert.: SMSA	ADQTIME _x ≥ 15 min. (cases) ^a				PRICE/TIME (ADJPRICE/TIME) ^a				FRAMES: MARKUP (ADJMARKUP)				FRAMES: Sample Size			
	NONE	STORE	SMED	LMED	NONE	STORE	SMED	LMED	NONE	STORE	SMED	LMED	NONE	STORE	SMED	LMED
1. No Advert. Knoxville	0.94 (16)	----- (-----)	----- (-----)	----- (-----)	1.03 (1.21)	----- (-----)	----- (-----)	----- (-----)	2.19 (2.58)	----- (-----)	----- (-----)	----- (-----)	12	-----	-----	-----
2. No Advert. Providence	0.90 (26)	----- (-----)	----- (-----)	----- (-----)	.83 (0.86)	----- (-----)	----- (-----)	----- (-----)	1.91 (1.97)	----- (-----)	----- (-----)	----- (-----)	7	-----	-----	-----
Aggregate	0.91 (42)	----- (-----)	----- (-----)	----- (-----)	0.90 (0.99)	----- (-----)	----- (-----)	----- (-----)	2.09 (2.36)	----- (-----)	----- (-----)	----- (-----)	19	-----	-----	-----
3. Advertising Baltimore	0.95 (18)	1.00 (1)	0.22 (2)	0.45 (5)	.99 (0.97)	1.25 (1.24)	1.58 (1.56)	1.32 (1.31)	2.01 (1.99)	2.12 (2.09)	2.47 (2.44)	3.10 (3.07)	11	3	4	1
4. Advertising Washington	0.88 (15)	0.66 (2)	0.60 (6)	0.29 (2)	1.27 (1.21)	1.72 (1.63)	1.18 (1.12)	1.39 (1.33)	2.00 (1.90)	2.35 (2.24)	2.75 (2.64)	3.13 (2.98)	3	2	4	1
5. Advertising Minneapolis	1.00 (13)	----- (-----)	0.75 (3)	1.00 (8)	.90 (0.86)	----- (-----)	1.06 (1.02)	0.93 (0.90)	1.76 (1.70)	1.74 (1.67)	1.74 (1.67)	1.79 (1.72)	6	2	1	5
Aggregate	0.94 (46)	0.75 (3)	0.48 (11)	0.58 (15)	1.06 (1.02)	1.60 (1.53)	1.32 (1.27)	1.22 (1.19)	1.93 (1.89)	2.08 (2.01)	2.51 (2.44)	2.17 (2.09)	20	7	9	7

a. Sample sizes are reported in Panel A.

Table 2. OLS Regression Sensitivities for Price of Optometric Services (Significance levels in parentheses).^a

Model	Dependent Variable	Constant	None	Store	SMED	LMED	ODPC	ADJYPC	YPC	R _a ²	F
Kwoka (Base Model)	ADJPRICE	28.92 (0.00)	-2.59 (0.05)	-7.56 (0.00)	-11.13 (0.00)	-12.35 (0.00)	-9.88 (0.00)	8.24 (0.28)	----- (-----)	.54	29.4
(a)	ADJPRICE	30.19 (0.00)	-3.37 (0.06)	-8.32 (0.00)	-11.89 (0.00)	-13.11 (0.00)	-10.53 (0.00)	---- (----)	7.69 (0.28)	.54	29.7
(b)	ADJPRICE	32.52 (0.00)	-1.95 (0.10)	-6.55 (0.00)	-10.40 (0.00)	-11.76 (0.00)	-9.58 (0.00)	---- (----)	----- (-----)	.54	35.3
(c)	PRICE	23.20 (0.00)	2.80 (0.03)	-2.30 (0.33)	-5.97 (0.00)	-7.23 (0.00)	-5.40 (0.00)	5.72 (0.43)	----- (-----)	.52	27.3
(d)	PRICE	24.02 (0.00)	2.25 (0.20)	-2.86 (0.29)	-6.52 (0.00)	-7.78 (0.00)	-5.85 (0.00)	---- (----)	5.51 (0.43)	.52	27.3
(e)	PRICE	25.69 (0.00)	3.23 (0.00)	-1.60 (0.46)	-5.45 (0.00)	-6.81 (0.00)	-5.17 (0.00)	---- (----)	---- (----)	.52	27.3
(f)	ADJPRICE	22.26 (0.00)	3.76 (0.00)	-1.29 (0.60)	-4.73 (0.00)	-5.95 (0.00)	---- (----)	-1.25 (0.88)	---- (----)	.40	20.8
(g)	ADJPRICE	28.00 (0.00)	5.24 (0.00)	0.92 (0.72)	-3.06 (0.03)	-4.54 (0.00)	---- (----)	---- (----)	-1.43 (0.04)	.42	22.3
(h)	ADJPRICE	21.66 (0.00)	3.61 (0.00)	-1.42 (0.54)	-4.82 (0.00)	-6.01 (0.00)	---- (----)	---- (----)	---- (----)	.41	26.2
(i)	PRICE	19.50 (0.00)	6.27 (0.00)	1.10 (0.62)	-2.48 (0.03)	-3.74 (0.00)	---- (----)	0.68 (0.93)	---- (----)	.48	27.7
(j)	PRICE	22.80 (0.00)	7.07 (0.00)	2.27 (0.33)	-1.61 (0.21)	-3.03 (0.01)	---- (----)	---- (----)	6.74 (0.28)	.48	28.2
(k)	PRICE	19.83 (0.00)	6.31 (0.00)	1.17 (0.58)	-2.43 (0.02)	-3.71 (0.00)	---- (----)	---- (----)	---- (----)	.48	34.9

a. All estimates are generated using OLS; generalized least squares estimation provides similar estimates, though price differences among practitioners is reduced, as reported by Kwoka (p. 214); OLS estimates tend, therefore, to favor the hypothesis that chain firms and advertisers charge lower prices

Table 3. Regression Sensitivities for Quality and Markups of Optometric Products and Services (Significance Levels in parentheses).

Model	Dependent Variable	Constant	None	Store	SMED	LMED	ODPC	ADJYPC	YPC	R _a ²	F
Kwoka	TIME ^a	49.53 (.00)	7.55 (.03)	-4.23 (.50)	-6.92 (.07)	-8.09 (.03)	2.49 (.54)	-32.33 (.10)	----	.40	7.4
(l)	TIME ^a	44.96 (.00)	10.60 (.02)	-1.15 (.87)	-3.93 (.43)	-5.06 (.29)	5.00 (.27)	----- (-----)	-3.08 (.10)	.34	6.8
(m)	TIME ^a	35.79 (.00)	4.94 (.12)	-8.01 (.17)	-9.87 (.00)	-10.43 (.00)	1.11 (.77)	----- (-----)	----- (-----)	.33	7.1
(n)	TIME ^a	51.28 (.00)	5.97 (.01)	-5.68 (.33)	-8.54 (.00)	-9.68 (.00)	----- (-----)	-29.86 (.12)	----- (-----)	.34	7.4
(o)	TIME ^a	45.98 (.00)	6.56 (.02)	-5.30 (.39)	-8.01 (.00)	-9.02 (.00)	----- (-----)	----- (-----)	-2.03 (.20)	.34	7.3
(p)	TIME ^a	37.04 (.00)	4.30 (.05)	-8.56 (.13)	-10.50 (.00)	-11.08 (.00)	----- (-----)	----- (-----)	----- (-----)	.34	7.7
(q)	ADQTIME ≥ 15 ^b	2.35 (.00)	.38 (.63)	-1.25 (.32)	-2.44 (.00)	-2.04 (.00)	----- (-----)	----- (-----)	----- (-----)	---	---
(r)	ADQTIME ≥ 20 ^b	1.04 (.00)	.75 (.16)	-1.04 (.32)	-2.32 (.00)	-1.85 (.00)	----- (-----)	----- (-----)	----- (-----)	---	---
(s)	PRICE/TIME ^c	.45 (.00)	.18 (.14)	.77 (.01)	.44 (.00)	.40 (.00)	----- (-----)	----- (-----)	----- (-----)	.14	3.2
(t)	ADJPRICE/TIME ^c	.54 (.00)	.06 (.65)	.62 (.05)	.31 (.04)	.27 (.06)	----- (-----)	----- (-----)	----- (-----)	.11	2.7
(u)	FRAME MARKUP	2.09 (.00)	-.16 (.35)	-.01 (.96)	.43 (.04)	.08 (.72)	----- (-----)	----- (-----)	----- (-----)	.06	2.0
(v)	FRAME ADJMARKUP	2.35 (.00)	-.47 (.01)	-.34 (.16)	.08 (.70)	-.26 (.27)	----- (-----)	----- (-----)	----- (-----)	.10	2.7

a. Adjusted for subject dummies; OLS Estimation

b. Probit estimated are reported; the results are insensitive across logistic, probit, or OLS estimation procedures

c. Parameters for STORE, SMED and LMED are not statistically significant when ODPC, YPC or ADJYPC are introduced; Adjusted for subject dummies; OLS Estimation

Table 4 : 1985 Survey Subjects' Eye Conditions

Eye condition	Description ^a
Anisocoria	Occurs in 20 percent of population.
Astigmatism	Approximately 40 percent of the population has astigmatism of 0.5 to 1.5 diopters; subjects had 0.75 to 1.25 diopters.
Muscle Imbalance (Hyperphoria and hypertropias)	Incidence from 15 to 30 percent of the population; 1 percent having vertical imbalances.
Diabetic Retinopathy	Prevalent in 4 million persons (1.6 percent of the population) and is leading cause of blindness.
Retinoschisis	Most frequent in persons over 40 years old.

a. Cahill et al., (1985).

Table 5 : Quality of Eye Examinations:
Private Practitioners versus Chain Firms: 1985

Subject Number	Sample Size: Number of Exams		Number of Exams: Including Medical History		Average Length of Examinations (in minutes)		Examinations Detecting Eye Condition	
	Private	Chain	Private	Chain	Private	Chain	Private	Chain
1	5	4	1	1	32.0	6.4	4	1
2	4	5	2	4	12.0	5.4	1	2
3	5	5	4	2	34.4	7.8	5	1
4	3	5	3	1	25.0	10.0	5	3
5	5	4	3	1	85.0	25.3	2	1
6	5	5	4	3	25.4	13.6	4	2
7	5	5	4	2	33.0	21.0	2	0
8	5	5	4	4	37.0	21.0	3	2
9	5	5	3	2	26.0	15.0	2	1
10	5a	5	4	1	25.1	13.4	3	4
11 ^b	5	5	5	4	24.0	12.6	0	0
Total/Average	52	53	37	25	31.0	13.7	31	17
t-statistic (proportions)	--		2.71		4.21		2.88	
Significance	--		.01		.01		.01	

a. Information on medical history was not available for one examination

b. Subject eleven had a mild condition; exclusion of this subject from the sample increases the differences between chain and private practitioners

			86/11	Philippe A. NAERT and Alain BULTEZ	"From "Lydiometry" to "Pinkhamization": misspecifying advertising dynamics rarely affects profitability".
<u>1986</u>			86/12	Roger BETANCOURT and David GAUTSCHI	"The economics of retail firms", Revised April 1986.
86/01	Arnoud DE MEYER	"The R & D/Production interface".	86/13	S.P. ANDERSON and Damien J. NEVEN	"Spatial competition à la Cournot".
86/02	Philippe A. NAERT Marcel WEVERBERGH and Guido VERSWIJVEL	"Subjective estimation in integrating communication budget and allocation decisions: a case study", January 1986.	86/14	Charles WALDMAN	"Comparaison internationale des marges brutes du commerce", June 1985.
86/03	Michael BRIMM	"Sponsorship and the diffusion of organizational innovation: a preliminary view".	86/15	Mihkel TOMBAK and Arnoud DE MEYER	"How the managerial attitudes of firms with FMS differ from other manufacturing firms: survey results", June 1986.
86/04	Spyros MAKRIDAKIS and Michèle HIBON	"Confidence intervals: an empirical investigation for the series in the M-Competition".	86/16	B. Espen ECKBO and Herwig M. LANGOHR	"Les primes des offres publiques, la note d'information et le marché des transferts de contrôle des sociétés".
86/05	Charles A. WYPLOSZ	"A note on the reduction of the workweek", July 1985.	86/17	David B. JEMISON	"Strategic capability transfer in acquisition integration", May 1986.
86/06	Francesco GIAVAZZI, Jeff R. SHEEN and Charles A. WYPLOSZ	"The real exchange rate and the fiscal aspects of a natural resource discovery", Revised version: February 1986.	86/18	James TEBOUL and V. MALLERET	"Towards an operational definition of services", 1986.
86/07	Douglas L. MacLACHLAN and Spyros MAKRIDAKIS	"Judgmental biases in sales forecasting", February 1986.	86/19	Rob R. WEITZ	"Nostradamus: a knowledge-based forecasting advisor".
86/08	José de la TORRE and David H. NECKAR	"Forecasting political risks for international operations", Second Draft: March 3, 1986.	86/20	Albert CORHAY, Gabriel HAWAWINI and Pierre A. MICHEL	"The pricing of equity on the London stock exchange: seasonality and size premium", June 1986.
86/09	Philippe C. HASPESLAGH	"Conceptualizing the strategic process in diversified firms: the role and nature of the corporate influence process", February 1986.	86/21	Albert CORHAY, Gabriel A. HAWAWINI and Pierre A. MICHEL	"Risk-premia seasonality in U.S. and European equity markets", February 1986.
86/10	R. MOENART, Arnoud DE MEYER, J. BARBE and D. DESCHOOLMEESTER.	"Analysing the issues concerning technological de-maturity".	86/22	Albert CORHAY, Gabriel A. HAWAWINI and Pierre A. MICHEL	"Seasonality in the risk-return relationships some international evidence", July 1986.

86/23	Arnoud DE MEYER	"An exploratory study on the integration of information systems in manufacturing", July 1986.	86/34	Philippe HASPELAGH and David JEMISON	"Acquisitions: myths and reality", July 1986.
86/24	David GAUTSCHI and Vithala R. RAO	"A methodology for specification and aggregation in product concept testing", July 1986.	86/35	Jean DERMINE	"Measuring the market value of a bank, a primer", November 1986.
86/25	H. Peter GRAY and Ingo WALTER	"Protection", August 1986.	86/36	Albert CORHAY and Gabriel HAWAWINI	"Seasonality in the risk-return relationship: some international evidence", July 1986.
86/26	Barry EICHENGREEN and Charles WYPLOSZ	"The economic consequences of the Franc Poincare", September 1986.	86/37	David GAUTSCHI and Roger BETANCOURT	"The evolution of retailing: a suggested economic interpretation".
86/27	Karel COOL and Ingemar DIERICKX	"Negative risk-return relationships in business strategy: paradox or truism?", October 1986.	86/38	Gabriel HAWAWINI	"Financial innovation and recent developments in the French capital markets", Updated: September 1986.
86/28	Manfred KETS DE VRIES and Danny MILLER	"Interpreting organizational texts.	86/39	Gabriel HAWAWINI Pierre MICHEL and Albert CORHAY	"The pricing of common stocks on the Brussels stock exchange: a re-examination of the evidence", November 1986.
86/29	Manfred KETS DE VRIES	"Why follow the leader?".	86/40	Charles WYPLOSZ	"Capital flows liberalization and the EMS, a French perspective", December 1986.
86/30	Manfred KETS DE VRIES	"The succession game: the real story.	86/41	Kasra FERDOWS and Wickham SKINNER	"Manufacturing in a new perspective", July 1986.
86/31	Arnoud DE MEYER	"Flexibility: the next competitive battle", October 1986.	86/42	Kasra FERDOWS and Per LINDBERG	"FMS as indicator of manufacturing strategy", December 1986.
86/31	Arnoud DE MEYER, Jinichiro NAKANE, Jeffrey G. MILLER and Kasra FERDOWS	"Flexibility: the next competitive battle", Revised Version: March 1987.	86/43	Damien NEVEN	"On the existence of equilibrium in hotelling's model", November 1986.
86/32	Karel COOL and Dan SCHENDEL	Performance differences among strategic group members", October 1986.	86/44	Ingemar DIERICKX Carmen MATUTES and Damien NEVEN	"Value added tax and competition", December 1986.
86/33	Ernst BALTENSPERGER and Jean DERMINE	"The role of public policy in insuring financial stability: a cross-country, comparative perspective", August 1986, Revised November 1986.	<u>1987</u>		
			87/01	Manfred KETS DE VRIES	"Prisoners of leadership".

87/02	Claude VIALLET	"An empirical investigation of international asset pricing", November 1986.	87/15	Spyros MAKRIDAKIS	"METAFORCASTING: Ways of improving Forecasting. Accuracy and Usefulness", May 1987.
87/03	David GAUTSCHI and Vithala RAO	"A methodology for specification and aggregation in product concept testing", Revised Version: January 1987.	87/16	Susan SCHNEIDER and Roger DUNBAR	"Takeover attempts: what does the language tell us?", June 1987.
87/04	Sumantra GHOSHAL and Christopher BARTLETT	"Organizing for innovations: case of the multinational corporation", February 1987.	87/17	André LAURENT and Fernando BARTOLOME	"Managers' cognitive maps for upward and downward relationships", June 1987.
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