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BEER ADVERTISING AND MARKETING UPDATE: STRUCTURE, CONDUCT, AND SOCIAL COSTS

by

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Abstract. Beer advertising is a topic that has frequently attracted the attention of industrial organization economists. This update reviews major events, data trends, and research for each of three issues: (1) the importance of advertising and product differentiation for structural change in the brewing industry; (2) the manner and extent to which brewers can strategically alter market shares using advertising; and (3) the social costs of beer advertising and marketing, including advertising bans, targeting of underage youth, and recent changes in the three-tier system of alcohol distribution. Major legal decisions pertaining to commercial speech and other regulations also are discussed.

Keywords: Advertising, Brewing Industry, Regulation

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I. Introduction

Advertising of beer is a topic that has frequently attracted the attention of industrial organization economists. Several interrelated issues have been analyzed, including: (1) the importance of advertising and product differentiation for structural change in the brewing industry; (2) the manner and extent to which brewers can strategically alter market shares using advertising; and (3) the social costs of alcohol advertising and marketing. Seminal research on the first issue was performed by Elzinga (1971, 1973), Greer (1971, 1981), Keithahn (1978), Lynk (1984, 1985), and Scherer et al. (1975). Seminal research on the second issue was performed by Baker and Bresnahan (1985), Grabowski (1977), Hatten et al. (1978), Kelton and Kelton (1982), and Tremblay (1985a, b). Analyses of both issues include attempts to determine the net welfare effects of beer advertising. On the third issue, economists have analyzed advertising's possible influence on alcohol consumption and underage drinking, and as a contributor to social costs such as drunk driving fatalities (Nelson, 1999, 2001). Several regulatory concerns are related to this issue, including use of advertising bans (First Amendment); advertising placements that might target underage youth; legal rights of states under the three-tier system of alcohol distribution (Twenty-First Amendment); and other advertising or marketing restrictions that affect competition in the industry (e.g., price advertising bans, price-posting and price affirmation laws, mandated exclusive territories).

The U.S. brewing industry is dominated by three firms – Anheuser-Busch, SAB-Miller, and Coors – who together account for about 80% of beer shipments. Anheuser-Busch has been the leading firm in the industry every year since 1957 (Keithahn, 1978, p. 22). Miller joined the top three in 1976, following the introduction of Lite beer. Coors became one of the top three brewers in 1989 after it expanded nationally and displaced Stroh. However, despite a high level of industry concentration, the real price of beer has been stable or declining since 1963. In recent years, a number of marketing concerns have affected the industry leaders, including growth of beer imports to an 11% share; a decline of sales of leading premium brands (Budweiser, Miller High Life, Miller Genuine Draft); competition from new products and marketing methods (flavored malt beverages, direct shipments of beer and wine); competition from specialty-craft brewers; and continued attempts by neo-prohibition groups to demonize the industry, especially its advertising and marketing practices.

The purpose of this paper is to provide an update on advertising and marketing of beer as it relates to three issues – structural change, advertising rivalry, and social cost regulation. The paper is not a complete survey of the literature, and I avoid drawing conclusions on some issues. Rather, the update provides an accounting of beer advertising and marketing trends during 1990-2003, and compares this period to earlier years. Research relating to these trends is reviewed or cited contextually, and I also note

some of the gaps in the literature. With regard to the social cost issue, I provide a selective survey of several existing and emerging concerns, including new research results on possible targeting of adolescents in magazine advertising. Legal and regulatory issues related to the First and Twenty-First Amendments are discussed. Overall, the paper attempts to provide the reader with a timely update and foundation for future research.

The remainder of the paper is divided into five sections. Section II provides an overview of beer advertising and marketing for the period 1975-2003. This section sets the stage for the rest of the paper by reviewing major trends, events, and recent competitive issues. Section III examines market-wide trends in beer consumption, advertising, and advertising intensity as well as sales and advertising by the three leading brewers. The relationship of advertising to market concentration is summarized and discussed. Section IV focuses on product differentiation, including sales and advertising by product category and leading brewers. I also examine changes in sales of the top 10 brands of beer. Research on strategic rivalry is summarized and discussed in this section. Section V examines the possible role of beer advertising as a contributor to social costs. Specific issues discussed include the legal setting for advertising bans provided by Supreme Court decisions; possible effects of advertising on total beer consumption; targeting of adolescents by beer advertisers in magazines; and threats to the three-tier distribution system posed by internet marketers, direct shipments of beer and wine, and mass-market retailers. Section VI contains the conclusions.

II. Beer Advertising Overview, 1975-2003

In 1970, the conglomerate Philip Morris acquired the Miller Brewing Company. In 1972, Miller purchased the brand names of Meister Brau, a defunct Chicago brewer, including its low-calorie Lite brand. Miller reconstituted the formula and in 1973 put its version of Lite into test markets (Nelson, 2001; Rosenbaum, 1987; Scherer, 1996). Lite went national in 1975 and was heavily promoted; Miller spent about $15 million on Lite's promotion in 1976, principally on television. Imitation of Miller Lite by other brewers occurred in late 1975 by Schlitz and in 1976 by Pabst. By 1982, at least twelve brands of light beer were being produced by leading brewers, including light versions of Bud, Michelob, Natural, Miller, Stroh, Schlitz, Old Milwaukee, Old Style, Coors, Pabst, Extra, and Hamms brands. By 1986, Miller Lite advertising expenditures had grown to $67 million ($0.33 per case). Advertising by rival Bud Light peaked in 1988 at $70 million ($0.51 per case). However, it was not until 1994 that sales of Bud Light surpassed those of Miller Lite. Given Miller's first-mover advantage and the success of the light beer category, it seems safe to say that the "light beer war" affects all subsequent advertising and

marketing decisions by leading brewers. Hence, the year 1975 is an appropriate dividing point between the early history of the beer industry and more recent events.

Table 1 highlights a number of advertising and marketing events since 1975. Among the notable entries are the following: (1) per capita beer consumption peaked at 34 gallons in 1980 and fell to 29.1 gallons in 2003; (2) total real advertising peaked in 1985 at $1.1 billion (2000 constant dollars) and did not return to that level until 2002; (3) Anheuser-Busch increased its market share from 35% in 1976 to 50% in 2001; (4) a number of product innovations have attracted the attention of the industry leaders, including dry beer, ice beer, craft beer, low-carb beer, and flavored malt beverages; and (5) light beer sales dominate the U.S. market, accounting for 45% of domestic sales in 2000 compared to only 25% in 1988. The top three light-beer brands presently account for about one-third of all beer sales in the U.S.

Despite the success of light beer and the dominance of the top three brewers, Table 1 highlights three areas where new competition has prospered. First, by 1996, the U.S. had more than 1,000 specialty brewers, microbrewers, and brewpubs in operation (collectively specialty-craft brewers), and this number has grown to more than 1,400 (*Beer Handbook*, 2004). Most specialty-craft beers sell at super-premium prices and many are not pilsner-style beers, suggesting that the consumer can easily substitute or "trade-up" along a price-quality locus.[1] Second, beer imports grew from only 1.1% of the market in 1975 to 11% in 2001. Many importers and specialty brewers abstain from heavy national advertising, but this is not always true. Advertising outlays for Corona Extra, Heineken, and Samuel Adams are above the average spending per case. Third, Table 1 illustrates how rivalry among the industry leaders spilled over to the market for flavored malt beverages (FMBs). This trend was fueled in part by the 1991 federal tax hike on beverage alcohol, which shifted output of coolers away from more heavily-taxed wines. While FMBs are not beers, their marketing reflects consumer tastes for lighter beverages and the possibility that FMBs might be the next runaway product category. However, under a proposed federal regulation issued by the Treasury Department's, Alcohol and Tobacco Tax and Trade Bureau, a product could be classified as a malt beverage only if less than 0.5% of its alcohol content is derived from flavor concentrates (68 *Federal Register* 14291, March 24, 2003). Many FMBs derive 75-95% of their alcohol content from distilled spirits (*Beer Handbook*, 2003). A change in classification for tax purposes would lead to price increases for all FMBs, thereby slowing or halting growth of this category. In summary, recent product

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[1] Definitions for specialty-craft brewers and the other beer categories used here are given in the *Beer Handbook* (2004, p. 47). The leading brewers entered the craft category by creating semiautonomous subunits or subsidiaries (Carroll and Swaminathan, 2000), including Coors' Unibev Division (Blue Moon, Killian's); Miller's American Specialty Craft Brewing (Weinhard, Leinenkugel, Red Dog); and Anheuser-Busch's Specialty Brewing Group (Bare Knuckle, Elk Mountain, Killarney, Muenchener, Red Wolf, World Select, Ziegen).

innovations present the consumer with a variety of choices and, as demonstrated below, may have helped to spark a renewed advertising rivalry.

III. Beer Advertising and Structural Change

As detailed by Tremblay and Tremblay (2005), the structural transformation of the beer industry occurred in several stages. First, during the period 1950-1964, an intense advertising rivalry took place among the top three brewers: Anheuser-Busch, Pabst, and Schlitz. These firms successfully exploited the new medium of television and the economies of scale associated with national advertising and distribution. The number of brewers fell from 404 in 1947 to 150 in 1963 (Elzinga, 2001). The second period lasted from 1965 to 1974, and was marked by a lower level of advertising intensity.[2] However, the number of brewers continued to decline to 57 in 1974. Structural change during this period was marked by increased size of individual plants and multi-plant operations by the industry leaders (Scherer, 1996). Miller Brewing emerged as a leading firm based in part on advertising and repositioning of its flagship premium brand, Miller High Life. The third period lasted from 1975 to 1986, and was marked by an intense advertising rivalry between Anheuser-Busch and Miller during the "light beer war." During this period, Schlitz and Stroh merged and Pabst dropped out of the top group. The number of independent mass-market brewers declined to 33 in 1986. During this period, the legal drinking age in all states increased to 21 years. The fourth period identified by Tremblay and Tremblay lasted from 1987 to 1995, but by the end of this period the total number of firms was rising. According to the Institute for Brewing Studies, there were 85 microbreweries in 1990 and 281 in 1995 (*Beer Handbook*, 2004). Further, the number of regional specialty brewers increased from only one (Anchor Brewing) in 1987 to 27 in 1995. Several microbreweries expanded and entered the ranks of the specialty brewers, including Boston Beer, Full Sail, Pete's, Sierra Nevada, and Widmer. Nevertheless, the market share of the top three firms rose from 75% in 1990 to 80% in 1995. Finally, during the period 1996-2003, further exit from the leading group occurred as Stroh went out of business and sold its brand names to Miller and Pabst. In 2002, Miller Brewing was sold by Philip Morris to South African Breweries Ltd. (SAB), a London-based firm.

1. Data Trends for Advertising Levels and Intensity

Given these dramatic structural changes, the importance of advertising has been debated on several fronts. I first provide a summary of data trends and then discuss past and present research. Table

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[2] Using data from Keithahn (1978, p. 76), beer advertising increased steadily from 1947 to 1963. Nominal advertising intensity peaked in 1963 at $0.19 per case and then declined to $0.10 per case in 1973.

2 summarizes industry data on beer consumption, real prices, and advertising since 1975. Although total beer shipments have grown, per capita consumption declined after 1980. Beer consumption in 1980 was 33.6 gallons, but by 2003 it had declined to 29.1 gallons per capita (ages 18+). Despite high advertising levels, the average U.S. consumer is drinking less beer. The null relationship between consumption and advertising has not gone unnoticed by industry officials (*Brewers Digest*, 1990), and illustrates the fact that advertising in a "mature" industry primarily affects brand shares (Nelson, 1997, 2001). It also may reflect a tendency by affluent consumers to trade-up to higher-priced beers, which is an under-researched issue (see Berggren and Sutton, 1999; Treno et al., 1993). Table 2 shows that real beer prices were stable or declining during most of the time period, with the exception of upward adjustments during 1991-1992, which followed a federal excise tax hike that doubled the tax per barrel.

Table 2 demonstrates that real advertising declined from 1985 to 1996, and then rose by 34% between 1996 and 2002. However, real advertising outlays of about $1.1 billion in 2002 represented the same spending level as occurred in 1985. In terms of intensity, real advertising in 2003 was $0.36 per case, which is below the level of $0.44 attained in 1985. Expressed on a per capita basis (ages 18+), real advertising in 2003 was $4.69 per capita compared to $6.29 in 1985. Despite several product innovations and growth of some market segments, advertising intensity in the beer industry is below the level attained in the mid-1980s. As suggested by Greer (1981), this outcome might reflect a quadratic relationship between market concentration and advertising. The spending trend during 1996-2003 was upward, suggesting that a renewed period of advertising rivalry might be underway (*Modern Brewery Age*, 2002, 2003a, b).

Table 3 summarizes market shares and advertising by the three leading brewers for the period 1975-2003. Both Anheuser-Busch and Miller demonstrated remarkable output growth between 1975 and 1990, but market share changes after 1990 have been more modest. Between 1990 and 2003, Anheuser's market share rose from 44 to 50%, Miller's share declined from 21 to 18%, and Coors' share rose from 10 to 11%. Nominal advertising intensities illustrate the much discussed fact that Anheuser's average spending per case is below that of its smaller rivals, reflecting the advantages of size, a broader product line, or superior marketing skills (Greer, 1971; Färe et al., 2004). Advertising intensities rose substantially from 1976 to 1985, and then stabilized for Anheuser and Miller. Coors' advertising continued to increase as outsiders entered the ranks of its management. During the recent period 1990-2003, the leaders increased nominal spending by an additional $0.05 to $0.09 per case. However, the real changes were all negative as real spending per case by Anheuser and Miller declined slightly after 1990, and Coors' real spending fell by $0.07 per case.

2. Advertising and Structural Change

Early industrial organization studies linked the disappearance of local and regional brewers to several factors, including transportation improvements, plant scale economies, packaging innovations, multi-plant economies, mergers, product positioning, and national advertising. Elzinga (1973, 1977) argued that the decline in numbers was principally due to the widening of geographic markets combined with economies of scale and technological change at the plant level. For example, rates of operation of can-closing lines increased significantly in the late-1960s. Keithahn (1978), Lynk (1984), McGahan (1991), and Tremblay (1987) emphasized the same set of forces. Other factors, such as increased off-premise sales and exclusive distribution, also had adverse effects on local and regional brewers (Fogarty, 1985). Scherer et al. (1975) modified Elzinga's model to include the advantages of multi-plant operations, promotional scale economies, and the ability of leading firms to charge premium prices, thereby increasing the market area over which a given brewery could profitably ship its products. In Scherer's model, advertising helped establish a premium-brand image for the leading firms, and increased concentration allowed them to "squeeze the traditional premium-popular price differential" (Scherer et al., 1975, p. 249).

In contrast, Greer (1971) attributed the decline in numbers almost solely to product differentiation and advertising rivalry ("competitive escalation of outlays"), rather than exogenously-driven reductions in costs. Greer argued that advertising and higher levels of concentration were positively associated during the 1960s, due largely to increased television advertising. He suggested that as concentration continued to increase, advertising spending might stabilize around a lower industry-wide optimum. As shown above, real advertising did decline from 1985 to 1996. In a follow-up study, Greer (1981) disputed Scherer's price-squeeze model, and argued that "product differentiation explains why many firms big enough to exploit economies of scale in production nevertheless fail, *and* why many firms of suboptimum size survive prosperously" (Greer, 1981, p. 96; emphasis added).

None of the above studies relied on regression analysis. Lynk (1984), using state data for 1970-1980, obtained a positive regression relationship between beer consumption and national concentration, suggesting that cost reductions were being passed on to consumers in the form of lower retail prices. Tremblay (1985b) used firm-level data to analyze the net effects of concentration, advertising, and cost changes on wholesale beer prices during the period 1950-1977. Although the measured effect of concentration on prices was negative, Tremblay argued that escalating advertising prior to 1971 was sufficient to keep prices from falling. Lynk (1985) responded that the competitive issue was retail prices.

The structural debate has continued to the present day, although several new participants have entered the fray. Recent studies by Greer (1998, 2002) emphasize the combined advantages of multi-

plant operations and national television advertising. He argues that all mass-produced lager and light beers are essentially the same, regardless of price. According to Greer, the image-building efforts of the leading firms are the root cause of rising concentration and the decline of non-craft regional brewers. Scherer (1996, p. 414) adds first-mover advantages to his model, wherein product innovations are reinforced with advertising to determine the success of individual firms and market concentration. A similar story is advanced by Sutton (1991, pp. 285-303), who argues that endogenous advertising outlays for differentiated products interact with scale economies to determine equilibrium market structures. Elzinga (2001, p. 101) acknowledges that the decline of several once-prominent brewers is partly due to their lack of success in the light-beer segment of the market. None of these studies, however, has analyzed the recent rise in advertising that began around 1996 (Table 1) or the role of advertising in Miller's decline since 1990 (Table 2). The latter trend has been attributed by industry analyst Robert Weinberg (*Modern Brewery Age*, 2000a) to Miller's lack of successful new products.[3]

In a comprehensive study, Gisser (1999) develops a model of dynamic net welfare gains to consumers in a market where new technology leads to increased concentration, and increased concentration leads to imperfectly competitive prices. Using this model, he estimates welfare gains and losses in the beer industry for the period 1959-1962 (rising real prices) and 1963-1989 (falling real prices). Price is measured as real average revenue per barrel. Gisser demonstrates that: (1) input prices do not Granger-cause beer prices; (2) an index of technological change does Granger-cause beer prices; and (3) advertising does not Granger-cause either beer prices or technological change.[4] The latter result also is supported by a null relationship between the Herfindahl index and either contemporaneous or lagged advertising. Further, Gisser estimates a reduced-form price equation for 1949-1989 that includes explanatory variables for the real prices of barley, corn, aluminum, and real advertising intensity. The regression coefficients for contemporaneous and lagged advertising are negative and insignificant. Overall, Gisser finds that the static deadweight loss to consumers from oligopoly pricing is small

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[3] Weinberg's explanation also reflects an industry rule-of-thumb that once a beer brand is in decline, it is virtually impossible to reverse that trend. Hence, the importance of advertising for brand loyalty.

[4] Gallet and Euzent (2002) estimate an aggregate model of imperfect competition in the brewing industry that includes a conventional demand function and an Appelbaum-Bresnahan inverse supply function. The supply relationship for the real CPI price of beer includes: (1) marginal cost variables (wage rate, prices of barley and corn); (2) predicted level of demand; (3) negative demand shocks; (4) expected future industry profits; and (5) the industry advertising-sales ratio. The model is estimated using annual data for the period 1964-1992, during which the real price was falling. Gallet and Euzent find that the advertising levels did not significantly affect beer demand, but the advertising-sales ratio had a positive effect on the supply price. They interpret this finding to mean that increased advertising intensity resulted in decreased competition, and therefore higher market prices and lower consumption. However, Gisser's causality results do not support this interpretation.

compared to the large dynamic gains from technological change and cost reductions. Advertising's role in this dynamic process is apparently confined to determining winners and losers, rather than altering competitive conditions generally. An updating of Gisser's study is a worthwhile research topic.

IV. Beer Advertising and Strategic Rivalry

Given technological change, product innovations, and rivalistic pricing, many smaller brewers exited the industry after 1947. However, stability at the top level can be demonstrated for the leading brewers and brands, at least since 1990. More generally, all brewers do not advertise to the same extent or promote their individual brands on an equal basis or have equal costs of production. These differences within the industry have attracted the interest of industrial organization researchers. In this section, I first review some of the important product and brand changes since 1975, and then turn to a summary of past and present research on advertising and strategic rivalry.

1. Product Categories, Top Brands, and Advertising by Strategic Group

Beer is not a homogeneous product. Some important real differences exist by product type or quality, but there also are perceived differences due to advertising. Table 4 illustrates shipment trends for six product categories as defined by the *Beer Handbook* (2004). Several important trends are evident, including (1) the significant growth of the super-premium category since 1990; (2) substantial declines of the non-light premium and popular-priced categories; (3) substantial growth of the light-beer category; and (4) significant growth of beer imports. In Table 4, the light category includes sales of both premium- and popular-priced light beers. Using a list of the top 120 brands from the *Beer Handbook* (2004, p. 20), it is possible to divide the light-beer category by price level. Premium and super-premium light-beer sales in 2003 accounted for 1059.2 million cases, or 79% of sales in the light category. Popular-priced beer accounted for most of the remaining 21% of light sales. Distributing the light beers by price category yielded the following results for 2003: (1) premium beer and premium-light beer sales are 55% of total sales; and (2) popular beer and popular-light beer sales are 20% of total sales. These revised data suggest that the premium category (light plus non-light) has grown compared to 1975, whereas the popular-priced category has gone from 43% of the market to about 20%. Hence, the category trends in Table 4 reflect trading-up by consumers, with major sales losses incurred by the popular-priced category. This category was once dominated by the regional and smaller national brewers, suggesting that

advertising has affected consumers' choice of beer brands and categories, but not total consumption.[5]

Table 5 displays shipment and nominal advertising figures for five groups of brewers for the years 1993 and 2003, including some smaller brewers. Data for the top three firms in the industry again illustrate the fact that Anheuser's advertising intensity is below that of Coors and Miller. None of the firms in the second group did much advertising in 1993 or 2003. Among the regional-specialty firms, Boston Brewing is an intensive advertiser. Further, the leading importers now advertise on a per case basis that equals or surpasses the industry leaders.[6] It would appear that once a brand takes off, higher rates of advertising inevitably follow, with exceptions found among the regional-specialty firms.

Table 6 demonstrates how consumer preferences and advertising interact to determine success at the brand level. Among the top 10 brands during 1993-2003, three brands were able to successfully enter this elite group: Corona Extra, Busch Light, and Heineken. Remarkably, the top four brands now account for almost half (48.5%) of U.S. beer sales and the top 10 brands account for two-thirds of the sales. In 2003, the top four brands also accounted for 46% of beer advertising (*Beer Handbook*, 2004). Despite a general lack of turnover among the leading brands, there are a few important changes. Sales of Bud Light and Corona Extra increased substantially between 1993 and 2003, while Coors Light, Natural Light, and Busch Light also made major gains. Significant negative sales trends are found for Budweiser, Busch, and Miller Genuine Draft.

2. Advertising and Strategic Rivalry

A number of studies have analyzed advertising rivalry among groups of brewers or rivalry at the brand level. The Caves-Porter model of strategic groups and mobility barriers motivated early studies. Hatten et al. (1978) examined profitability as measured by yearly returns on book value of common equity for 13 brewers between 1952 and 1971. They regressed firm profitability on no less than 16

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[5] Ries and Ries (2002, p. 49) argue that no industry is as line-extended as the beer industry, and this has tended to erode ("cannibalize") the leaders' core brands without increasing firm sales or consumption per capita. Tremblay and Tremblay (1996) studied annual new product introductions by beer producers during the period 1950-1988. Industry-wide variables – concentration, advertising, and profits – had no significant effect on number of products, but a firm's past success and national status did affect the incentive to diversify. Historically, less successful and smaller firms were more likely to pioneer new products. During this period, the large national firms were not innovators. For example, light beer was introduced by Rheingold and Meister Brau in 1967 and 1968.

[6] The impact of advertising on import competition has not been analyzed, although several observers correctly anticipated the growing internationalization of the industry (e.g., Karrenbrock, 1990). For example, Anheuser owns 50% of Groupo Modelo, the Mexican producer of Corona Extra (*Wall Street Journal*, 2003), and SAB-Miller has a 50% interest in Foster's USA. During 2004, Anheuser and Miller competed to acquire part ownership of several of China's larger brewers (*Wall Street Journal*, 2004a, b).

variables, including the number of brands, marketing expenditures at the firm level, and the industry advertising-sales ratio. Endogeneity tests were not conducted. Using Chow homogeneity tests, firms were grouped into six strategic groups. The number of brands was significantly negative for the two industry leaders – Anheuser and Schlitz – and significantly positive for a group of four regional brewers. Marketing expenditures and industry advertising were never significant, although negative coefficients suggested that the leading firms might be sacrificing current profits for long-term growth. In a second study, Kelton and Kelton (1982) used a Markov model to examine the effects of advertising on market shares of Anheuser, Miller, and a group of six smaller brewers. Using data for 1971-1977, they concluded that brand-shift probabilities were sensitive to intraindustry advertising differentials, and that Miller's advertising during this time period was especially effective. In contrast, Baker and Bresnahan (1985, p. 435) found no effect of firm advertising on residual demand functions for Anheuser-Busch, Pabst, and Coors.

A fourth analysis was conducted by Tremblay (1985a). The sample consisted of annual firm data for the three leading national brewers – Anheuser, Pabst, and Schlitz – and nineteen regional brewers for the period 1950-77. Using pooled data, Tremblay regressed real average revenue per barrel (price) for each firm on own- and cross-output (in barrels), real own- and cross-advertising, quantity of imported beer, group dummies, and other non-strategic variables (population of 20-44 year olds, per capita income). He found a positive own-advertising effect for the leading producers; a negative cross-advertising effect by national rivals; and a small, but positive, cross-advertising effect by the regional rivals. The interpretation of the latter result is unclear since it could reflect trading-up to premium brands or, as suggested by Tremblay, a *positive* spillover effect of regionals' advertising on the leaders' average revenues. Nevertheless, the net effect of advertising is dominated by the positive own-advertising effect. Tremblay concluded that advertising and production rivalry was more rigorous inside a strategic group as significant differences existed in the demand and cost conditions among national and regional brewers.

Three recent studies have failed to provide much insight into the changes in rivalry since 1975. Wilcox (2001) reports a set of linear regressions for the individual market shares of eleven leading brands, which includes real own-advertising as an explanatory variable. Own-advertising is positive and significant for eight brands during the period 1977-1998. The exceptions are Bud Light, Miller High Life, and Old Milwaukee. However, Wilcox ignored rivals' advertising, which is a necessary aspect of strategic rivalry. Two other studies estimate different specifications of a differential duopoly advertising game, and focus exclusively on market shares and nominal advertising by Anheuser-Busch and Miller. Erickson (1992) estimates this model for the period 1971-1988, and compares open-loop and closed-loop (simultaneous equation) specifications. Although the advertising variables are only weakly significant,

the positive parameter estimates suggest that Anheuser is a more effective advertiser than Miller. Chintagunta and Jain (1995) estimate a different closed-loop duopoly specification, which accounts for the effect of own-advertising on the rival's market share and the effect of own-share on the rival's share. Using data for 1974-1989 and lagged values of advertising as instruments, they find roughly equal impacts of own-advertising on the shares of Anheuser and Miller. Hence, the two game-theoretic studies provide conflicting results for roughly the same time period.

In a comprehensive study, Tremblay and Tremblay (1995) update and extend their earlier work on the determinants of beer prices. They use annual data for 22 brewers for the period 1950-1988 and instrumental variable methods. The price model includes marginal cost variables (real wage rate, real prices of materials) and a supply relationship that includes each firm's real output (barrels of beer), the growth rate of output, real own-advertising, real advertising of rivals, market share, and the Herfindahl concentration index. The results indicate that both own- and cross-advertising are significantly positive. While this result might reflect the shift away from popular-priced beer, Tremblay and Tremblay conclude that higher advertising results in higher real average revenues (prices). Their conclusion contrasts with the evidence that the real beer price index has been stable or declining since 1963, but the partial relationship can be positive. Moreover, the welfare results in Tremblay and Tremblay conflict with those in Gisser (1999). Both studies ignore the important shifts among product categories. Additional research is needed to sort out the welfare effects of technological change, product category innovations, consumer preferences, increased concentration, and beer advertising levels or intensities.[7]

V. Beer Advertising and Social Costs

Beverage alcohol has been implicated in a number of social ills, including traffic fatalities, crime, violence, suicide, educational failure, productivity losses, and other intoxicating or addictive problems. Underage alcohol use is a particular concern and, in fiscal 2000, $71 million was allocated to prevent underage alcohol use through programs run by the U.S. Departments of Health and Human Services, Justice, and Transportation (GAO, 2001).[8] Several attempts have been made to estimate the total external costs of alcohol abuse, but it is common for these estimates to overstate social costs by including private

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[7] Future researchers might consult studies of cigarette advertising rivalry, such as Brown (1978), Roberts and Samuelson (1988), Seldon and Doroodian (1990), and Thomas (1989).

[8] According to the *Monitoring the Future* survey, 30-day prevalence of alcohol use by twelfth graders declined from 72% in 1980 to 47.5% in 2003; data available at http://www.monitoringthefuture.org. It is interesting, in light of the negative trend, that there should be rising social concern about youth drinking. For a rent-seeking model that might shed some light on this regulation, see McChesney (1987, 1997).

costs (Heien, 1995; Sindelar, 1998). For example, lost productivity is largely a private cost. Various public-interest groups, such as the Center for Science in the Public Interest (1995), have singled-out advertising as a major contributor to alcohol problems. The continuing nature of this concern is reflected in reports by the Federal Trade Commission (FTC, 1985, 1999, 2003a), Center on Addiction and Substance Abuse (2002), Center on Alcohol Marketing and Youth (2002a, b), National Research Council (2004), and National Institute on Alcohol Abuse and Alcoholism (NIAAA, 1995, 2000). Proposals to ban all alcohol advertising occurred as early as 1954 when Rep. John Dingell, Sr. (D, MI) introduced a bill to ban interstate advertising of tobacco products and alcohol beverages. More recently, four class-action lawsuits were pending as of March 2004 against leading beer producers, alleging illegal profits on sales to underage youth and illegal targeting of youth in product advertising and marketing.

This section covers four aspects of the ongoing debate over external costs of alcohol beverage consumption: (1) First Amendment limits on advertising restrictions; (2) empirical evidence on the effectiveness of advertising bans; (3) empirical evidence on targeting of youth in magazine ads; and (4) recent challenges to the three-tier system of alcohol distribution and the Twenty-First Amendment. Space prevents coverage of all social cost issues, but the reader can consult surveys by Cook and Moore (2000, 2002), National Research Council (2004), Nelson (2001, 2004a), and NIAAA (2000).

In the United States, the distribution of alcohol beverages is regulated by the individual states. The Twenty-First Amendment, passed in 1933, repealed Prohibition and granted legal powers over the distribution and sale of alcohol to the states, thereby resolving the conflicts among "wet" and "dry" interests (Miron, 1998; Munger and Schaller, 1997; Strumpf and Oberholzer-Gee, 2000). As a result, alcohol laws vary importantly by state, and these differences represent a natural experiment with regard to the economic effects of regulation.[9] Until recently, the assumption was that states' rights under the Twenty-First Amendment extended to restrictions or bans of alcohol advertising. Several court decisions since 1980 have modified this authority. State laws also differ by beverage, suggesting that substitution among beverages is one possible consequence of regulation. For example, state laws for distilled spirits typically are more stringent than similar laws applied to beer and wine. While each state has adopted its own unique regulatory system, several broad categories can be identified for analysis. Following repeal,

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[9] The main areas of state regulation are: (1) labeling and container sizes; (2) advertising regulations on billboards, print, broadcast, circulars, price premiums in ads, and sample distribution; (3) novelties, retail display, and window-interior display regulations; (4) credit regulations; (5) container deposits and other container-use regulations; (6) litter assessments; (7) permissible alcohol content; (8) state excise tax rates; (9) shipping requirements; and (10) brewer-wholesaler regulations (exclusive territories, filing requirements). Summaries of the applicable state laws for beer are found in several publications, including the *Modern Brewery Age Bluebook.*

eighteen states adopted public monopoly control of the distribution of distilled spirits, with the remaining states issuing private licenses. Thirteen of the monopoly states presently operate retail stores for the sale of spirits and two states also control retail sales of table wine (Pennsylvania, Utah). In five monopoly states, only the wholesale distribution of distilled spirits is controlled. Monopoly control increases search costs by restricting outlet numbers, hours of operation, product variety, and advertising. Because beer and wine can be substitutes or complements for spirits, state monopoly control of spirits can increase or decrease total alcohol use, or the net effect might be zero (see Benson et al., 2003; Nelson, 1990, 2003). No state has monopolized beer sales, but laws in several states provide for restrictions on private beer sales by alcohol content.

A second broad experiment includes state regulations banning advertising of alcohol beverages or which restrict the advertising of prices.[10] Following repeal, fourteen states banned billboard advertising of distilled spirits, including seven of the private license states. Several of these states also banned billboard advertising of beer and wine. Because the bans have been in existence for many years and change infrequently over time, these regulations provide evidence on the long-term effectiveness of advertising bans. For example, it is often argued that billboards have an important effect on youth behaviors, and this belief has been a basis for municipal ordinances that ban billboard advertising of alcohol and tobacco. Given long-standing bans, it can be expected that youth alcohol behavior will show up as cross-state differences in adult per capita consumption. Indeed, these two variables are highly correlated (Cook and Moore, 2001). Further, fifteen states banned price advertising by retailers using billboards, newspapers, or visible store displays. In general, a ban of price advertising reduces retail competition and increases search costs of consumers. However, these regulations were not intended to advance temperance, but were anti-competitive measures obtained by alcohol retailers and wholesalers (McGahan, 1995). For example, in *44 Liquormart* (1996) the appeals court noted that Rhode Island's ban of price advertising was designed to protect smaller retailers from in-state and out-of-state competition, and was closely monitored by the liquor retailers association. Milyo and Waldfogel (1999) analyze the aftereffects of the 44 Liquormart decision on alcohol prices in Rhode Island.

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[10] Two federal agencies also have broad authority over alcohol advertising, the Federal Trade Commission (FTC) and the Department of Treasury, Alcohol and Tobacco Tax and Trade Bureau (TTB). The TTB's authority is derived from the Federal Alcohol Administration Act of 1935, which prohibits false, misleading, obscene, and indecent statements in advertising. TTB's beer advertising regulations apply at the state-level if the state has adopted the provisions of the FAA Act. TTB also regulates alcohol labeling. Over the years, TTB has been involved with controversies regarding health warnings labels; health-related claims, including calorie and carbohydrate content; ingredients listing; and alcohol content labeling. TTB has recently proposed rules for classification of flavored malt beverages; see 68 *Federal Register* 14291 (March 24, 2003).

1. Supreme Court Decisions: *Central Hudson* and *44 Liquormart*

For many years, the Supreme Court held that the broad powers of government to regulate commerce included the "lesser power" to restrict commercial speech. In *Valentine* (1942), the Court held that the First Amendment did not protect "purely commercial advertising." However, in the mid-1970s the Court invalidated several state regulations affecting advertising of services and products, such as abortion providers and pharmaceutical drugs. In *Virginia State Board of Pharmacy* (1976), the Court struck down a Virginia law that prohibited the advertising of prices for prescription drugs, and held that the First Amendment protects the right to receive information as well as the right to speak. The Court concluded that the First Amendment protects commercial speech because of its value to consumers and to competition. The Court held that advertising is "dissemination of information as to who is producing and selling what product, for what reason and at what price . . . it is a matter of public interest that [economic] decisions, in the aggregate, be intelligent and well informed [and] to this end, the free flow of information is indispensable" (425 U.S. 748, at 765). In *Central Hudson Gas & Electric* (1980), the Court refined its approach and laid out a four-prong test for scrutiny of restrictions on commercial speech. First, the message content cannot be misleading and must be concerned with a lawful activity or product. Second, the government's interest in regulating the speech in question must be substantial. Third, the regulation must directly and materially advance that interest. Fourth, the regulation must be no more extensive than necessary to achieve its goal; that is, there must be a "reasonable fit" between means and ends, with the means narrowly tailored to achieve the objective.

Applying the third and fourth-prongs, the Court in *44 Liquormart* (1996) struck down a Rhode Island law that banned retail price advertising of beverage alcohol. In doing so, the Court made it clear that a state's power to ban alcohol entirely under the Twenty-First Amendment did not include the "lesser power" to restrict advertising in an anti-competitive manner. *44 Liquormart* was the most recent in a long series of Court decisions that weakened the states' ability to use their regulatory powers (Denning, 2002). Prior to 1980, the common understanding was that the Twenty-First Amendment gave the states absolute power to regulate beverage alcohol, despite interference with other federal laws. However, in *Midcal Aluminum* (1980), the Supreme Court struck down California's price posting law as a violation of the Sherman Act. In *Bacchus Imports* (1984), the Court decided that Hawaii's tax scheme favoring in-state alcohol producers violated the Commerce Clause. In *Brown-Forman* (1986), the Court determined that New York's concurrent price affirmation law violated the Commerce Clause. These cases establish that in order to survive a constitutional challenge, a state's alcohol laws must be realistically designed to

promote temperance and not mere economic protectionism (Foust, 2000).[11]

In summary, Central Hudson requires a "balancing-of-interests" test to examine censorship of commercial speech. The test weighs the government's obligations toward freedom of expression with its interest in limiting the content of some advertisements. Reasonable constraints on time, place, and manner are tolerated, and false or deceptive advertising remains illegal. Faced with this constraint, local governments have attempted to design alcohol and tobacco advertising ordinances that might survive a Central Hudson test. Typically, the justification advanced for the ordinance is a desire to protect youth and young adults by restricting exposure to billboard advertising. The legality of these ordinances is uncertain. In May of 1996, the Supreme Court remanded *Schmoke* (1996) that left standing a ban on outdoor advertising of alcohol in Baltimore City. The City contended that advertising increased alcohol consumption, but no evidence was presented to support this claim. However, in 2001, the Court in *Lorillard* (2001) struck down a Massachusetts ban on advertising of cigarettes, holding that the ban was more restrictive than necessary and pre-empted by federal law. The ruling in *Lorillard* suggests that only narrowly proscribed advertising ordinances can survive a Central Hudson test.[12]

2. The Advertising-Response Function and Advertising Bans: Empirical Evidence

Does advertising increase alcohol or beer consumption? Will an advertising ban reduce consumption? The effect of a ban on market demand depends on the nature of the two-dimensional relationship between advertising expenditures and aggregate beverage sales, which is the industry advertising-sales response function. Two questions regarding this function have been debated. First, it is not clear that a well-defined function exists at the industry level, since persuasive advertising primarily affects brand shares. The appropriate issue is the spillover, if any, from *successful* brand advertising to

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[11] Other post-1980 alcohol advertising cases include *Capital Cities Cable* (1984) (Oklahoma's ban of cable TV advertising held pre-empted by federal law); *Coors* (1995) (federal law banning labels displaying alcohol content of beer held to violate the First Amendment); *Bad Frog Brewery* (1998) (New York's ban of certain beer labels not sustained under the Central Hudson test); and *Utah Licensed Beverage Assoc.* (2001) (Utah's restrictions on advertising not sustained under the Central Hudson test).

[12] In *Pitt News* (2004), the appeals court for the third circuit struck down Act 199, a Pennsylvania law passed in 1996 that banned advertisers from *paying* for the dissemination of alcohol beverage advertising by any communications media affiliated with a university, college, or other educational institution (i.e., student newspapers). The state argued that newspapers could run free advertisements, but failed to provide evidence that the law would be effective in limiting underage drinking. Applying the third and fourth prongs, the court ruled that Act 199 was an impermissible restriction of commercial speech. The court noted that state regulations dealing with alcohol are subject to the same First Amendment restrictions that apply to the federal government. The court also ruled that the law was presumptively unconstitutional because it targeted a narrow segment of the media, and thereby imposed a financial burden on a particular media. (The author testified at the initial hearing in this case.)

aggregate market demand (Nelson, 2001). Second, if an industry-level response function exists, consumption levels should be subject to diminishing marginal returns from advertising, but it is unclear where diminishing returns begin (the inflection point) or the magnitude of this effect. Some analysts argue that diminishing returns begin at high levels of industry advertising, and sharply increasing returns exist at lower levels (Saffer, 1993). According to this view, comprehensive bans of alcohol advertising will reduce market demand. This argument is at odds with the evidence for a variety of products, including alcohol (Assmus et al., 1984; Nelson, 2003b; Simon and Arndt, 1980; Tellis, 2004). [13]

Several empirical approaches can be used to assess the nature of the response function. First, traditional demand functions incorporating advertising expenditures have been estimated using time-series data for different time periods, beverages, and countries. For example, a study of annual U.S. beer demand by Lee and Tremblay (1992, p. 74) found "no support for the hypothesis that advertising has a significant effect on market demand" for the period 1953-1983. Second, recent studies have used cointegration methods to estimate long-run demand relationships. Coulson et al. (2001) studied U.S. beer, wine, and spirits consumption and advertising using quarterly data for 1970-1990. None of the long-run own- and cross-advertising elasticities for beer were statistically significant, but demographics played an important role. Short-run dynamics were estimated using an error correction model, which yielded little in the way of an adjustment process. Overall, the results support the view that the primary effect of advertising is to redistribute brand shares, with little inter-beverage effects. Cointegration and unit root tests have been applied to alcohol advertising in other countries with similar results, including studies for Canada (Larivière et al., 2001), Italy (Cavaliere and Tassinari, 2001), and the United Kingdom (Abbott et al., 1997; Blake and Nied, 1997; Duffy, 2003).

A third approach has been to incorporate advertising bans into demand functions based on pooled state data. A recent study by Nelson (2003a) covered 45 states for the time period 1982-1997. Several subsamples were examined, including all 45 states, license states, and two time periods, 1982-1988 and 1989-1997. A number of explanatory variables were considered, including prices, income, tourism, demographics, and the legal drinking age. During both time periods, state billboard bans increased consumption of wine and spirits and reduced consumption of beer. The net effect on total ethanol consumption was significantly *positive* during 1982-1988, and insignificant thereafter. During both time periods, bans of price advertising of spirits were associated with lower consumption of spirits, higher

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[13] Advertising in the macro-economy is pro-cyclical, which is contrary to the Galbraith's claim that major corporations use advertising to manage or control aggregate demand; see the series of articles on advertising during the 2001-2002 recession appearing in the *Wall Street Journal* (2001a, b, c, 2002).

consumption of beer, and no effect on wine or total alcohol consumption. The results indicate that advertising regulations have different effects by beverage, but the empirical evidence in Nelson (2003a) and earlier studies demonstrate that state bans of billboards have had little or no effect on temperance.

Lastly, four studies used cross-national panel data on alcohol consumption and advertising bans: Nelson and Young (2001); Saffer (1991); Saffer and Dave (2002); and Young (1993). Because alcohol behavior or "cultural sentiment" varies by country, it is important that the social setting is considered. In particular, the level of alcohol consumption in the wine-drinking countries is substantially greater than in other countries: France, Italy, Luxembourg, Portugal, and Spain have consumption levels that are about one-third greater than average. Further, 20 to 25% of consumption in the Scandinavian countries is systematically under-reported due to cross-border purchases, smuggling, and home production. In contrast to earlier studies, Nelson and Young (2001) accounted for these differences. The study examined alcohol demand and related adverse behaviors in a sample of 17 OECD countries (western Europe, Canada, U.S.) for the period 1977 to 1995. Control variables included prices, income, tourism, demographics, unemployment, and drinking sentiment. The results indicate that bans of broadcast advertising of spirits did not decrease per capita alcohol consumption or affect other adverse outcome (traffic fatalities, cirrhosis mortality). During the sample period, five countries adopted broadcast bans of all alcohol advertisements, apart from low-alcohol beer (Denmark, Finland, France, Norway, Sweden). The regression estimates for complete bans were insignificantly positive. For the U.S., the cross-country results are consistent with studies of successful brands, studies of advertising expenditures, and studies of billboard bans. The results in Nelson and Young are inconsistent with an industry advertising-response function with a well-defined inflection point.

3. Targeting of Adolescents in Magazine Advertisements

Two recent studies claim to demonstrate that alcohol producers are targeting youth through placements of advertisements in magazines. These studies have severe scientific limitations. A study by the Center for Alcohol Marketing and Youth (CAMY, 2002a, p. 1) claims to show that "marketers of beer and distilled spirits delivered more advertising to youth than to adults in magazines in 2001." The problem with this claim is that CAMY used gross rating points to judge the *relative* amount of advertising reaching different age groups of readers (FTC, 2003a). Gross rating points (GRPs) are the product of an advertisement's reach *within* a given population group (% of a target population) and frequency (average number of exposures per time period). GRPs ignore the total audience or readership of a magazine, which can be overwhelmingly composed of adults. A more appropriate exposure measure is an advertisement's total impressions, which is the product of the target population and the GRP. For

example, if more than 15.75% of a magazine's readership is "youth" (defined as ages 12-20), a magazine is classified by CAMY as "youth-oriented," even if the vast majority of readers are adults (ages 21+). Thus, *Sports Illustrated* and *Motor Trend* are classified as youth-oriented by CAMY. For the nation, there were 36.4 million people in CAMY's target youth group in 2001 compared to 196.9 million adults. Measured by total impressions, adult readers are the primary group being reached by advertisements in major magazines, which is easily confirmed by the CAMY data (see FTC, 2003a).

A second study by Garfield et al. (2003) appeared in the prestigious *Journal of the American Medical Association*. This study examined the frequency of alcohol advertising in magazines conditional on readership cohorts for the five-year period 1997-2001. Garfield et al. reports that annual alcohol advertising placements increased proportionately more than adolescent readership, which suggests targeting of "youth" (ages 12-19). Their Poisson regression model controlled for the number of readers in two other age groups (young adults, older adults) and readership demographics (number of readers by gender, race, and income-level). However, there are at least two empirical problems with this study. First, the explanatory variables do not vary over time, whereas the dependent variable – log of annual number of alcohol advertisements – does vary with time. Consequently, the variables for readership cohorts can only explain the cross-sectional variation, and a set of year dummies explains all of the temporal variation. This is a very restrictive specification, which does not withstand attempts at replication using only the cross-sectional variation. Second, the study suffers from severe collinerarity problems due to use of number of readers in several cohorts that simply reflect the total readership of a magazine. Major magazines, such as *Sports Illustrated*, have large numbers of youth, young adult, and adult readers.

In Nelson (2004b), I used cross-sectional data for number of youth readers (12-19 years); number of young adult readers (20-24 years); number of adult readers (25+ years); number of male readers; number of black readers; and number of low-income readers. Advertising exposure was measured by the five-year totals for beer advertising placements; wine advertising placements; and spirits advertising placements. Additional explanatory variables introduced in my study were the number of issues per year (weekly or monthly), median reader income, and median reader age for adults. The last two variables serve to reduce the collinearity problem. Following Garfield et al. (2003), the dependent variables are specified as the logarithms of the total number of beer, spirits, or wine magazine ads, respectively, but measured in my study for the five-year period 1997-2001. Again following Garfield et al., a value of one is added to each coefficient estimate, except for the constant term. As a result, the reported coefficients represent "advertising rate ratios" (ARR), which is the proportional change in placements for a unit change in an explanatory variable. For the cohort numbers, an AAR that is greater than one indicates that

advertisers tend to favor magazines with that readership characteristic. Table 7 summarizes my empirical results. The results fail to demonstrate that targeting of youth is occurring. Regressions (1), (4), and (7) replicate the specifications in Garfield et al. (2003), but the coefficients for youth readership are not statistically significant for beer or spirits. Six of nine coefficient estimates for youth are less than one in magnitude, including the significant coefficient for wine. The alternative demographic for adult readers – median reader age – is statistically significant in four of six regressions. Further, median reader income is significant in two of three regressions. The results demonstrate that beer and spirits advertisers tend to favor magazines with greater numbers of young adults, men, and black readers, but not adolescents. Wine advertisers favor magazines with older adults and higher-income readers, but not adolescents. The specifications that use median income and median age of readers provide a better fit for beer. Overall, the results fail to support the hypothesis that alcohol marketers, including beer producers, are targeting youth by placement of advertisements in magazines. These relationships deserve additional investigation by marketing specialists and economists.

4. The Three-Tier System, Internet Marketing, and Direct Shipments of Beer and Wine

Under the so-called three-tier system of alcohol distribution, a licensed producer of alcohol sells to a licensed wholesaler and the wholesaler in turn sells to licensed retailers. This system prohibits vertical integration between the tiers, and was intended to give the states complete control over alcohol sales within their borders by preventing, among other things, "tied house" saloons. It also creates powerful economic interests that have a stake in continued operation of a balkanized system of distribution. This is especially true for larger wholesalers. For example, it is difficult for smaller brewers to compete on an equal cost basis due to the economies associated with mass distribution. The development of "local brewers" in the form of microbreweries and brewpubs is one response to the limits imposed by the three-tier system, but their overall competitive impact has been small. Even so, beer wholesalers in some states (e.g., Colorado) have tried to restrict the annual output of brewpubs. An even greater threat to the current system is direct shipments to mass retailers, such as Costco and Wal-Mart, which might eventually force deregulation.[14] To date, the major change has been consolidation among alcohol wholesalers, where the number of establishments declined from 4,795 in 1977 to 2,566 in 2002 (*Census of Wholesale Trade* for SIC 5181 and NIACS 42281).

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[14] In February 2004, Costco filed a lawsuit in federal district court charging that Washington state's three-tier distribution system, which prohibits volume discounts, raises beer and wine prices to consumers. According to *Modern Brewery Age* (2000b, c), some national and regional accounts used by major brewers require distributors to deliver products at given prices, which is direct distribution through resale price maintenance.

All fifty states regulate to some degree the interstate shipment of alcohol to their residents. Most of the attention is presently focused on direct-shipments of wine, but a number of beer-of-the-month clubs also are affected. "Direct shipment laws" come in several forms: in 2004 there were 13 reciprocity states that allowed limited direct shipments from a winery if the shipping state reciprocates. Thirteen other states and the District of Columbia permit limited importation on a basis other than reciprocity (e.g., permit required, taxes paid, wet areas only). In the remaining 24 states, direct shipments are banned or severely limited by quantity constraints and requirements that special orders use the exiting three-tier system. Four of these states make it a felony to direct ship (Florida, Kentucky, Tennessee, Utah), while other states impose substantial fines for violations. In 2000, Congress enacted the *Twenty-First Amendment Enforcement Act*, giving the state attorneys general the additional power to bring civil actions in federal court against out-of-state shippers. In 2002, Congress passed an on-site law that allows limited direct shipments if an order is placed in person at a winery, but which also makes it more difficult to bring wine home on airplanes. Because several states have exempted in-state wineries from direct shipments or have other discriminatory provisions, there are at least eight lawsuits filed in federal courts that challenge the constitutionality of these laws. In May 2004, the Supreme Court agreed to consolidate the cases in Michigan and New York, and will attempt to resolve the constitutional conflicts with the Twenty-First Amendment.[15]

Newkirk and Atkinson (2003) and Riekhof and Sykuta (2004) analyze the political economy of state direct shipment laws. Additional analysis of this issue is found in several law journal articles (Denning, 2002; Douglass, 2000; Foust, 2000; Martin, 2000, 2001; Shanker, 1999), a House hearing on E-commerce (U.S. Congress, 2002), and a FTC staff report (2003b).[16] Using results from Wiseman and Ellig (2003), the FTC concluded that direct shipments could lower some wine prices by 10-20 percent and would enhance the variety of wines available to consumers. A FTC (2003b) survey of states that allow direct shipments reported few or no problems with shipments to underage minors. The implications of direct shipments for the beer industry would appear to be modest, although a number of on-line beer clubs exist. More generally, the possibility exists that mass retailers will use their buying power to make major

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[15] These cases involve two constitutional issues (Wiseman and Ellig, 2004). First, the "dormant" Commerce Clause prohibits economic protectionism that favors in-state interests and thus limits how that states can regulate alcohol under the Twenty-First Amendment. Second, state direct-shipment bans might violate the Constitution's "Privileges and Immunities Clause" because the bans impose burdens on specific livelihoods.

[16] Appearing on the FTC panel on wine was Nobel Laureate economist (and vintner), Daniel L. McFadden; see http://www.ftc.gov/opp/ecommerce/anticompetitive/panel/mcfadden.pdf. He argued that direct shipments have little impact on the market structure of the wine industry, but major positive benefits for wine consumers.

changes in the ways in which beer is distributed to consumers. The changing nature of the states' three-tier systems and related regulatory issues is a topic that deserves to be closely followed by industrial organization economists.

VI. Conclusions

Future studies of beer advertising should focus on policy relevant issues, such as the relationship of advertising to market concentration, mergers, collusion, predation, entry, and social costs. Given the high level of industry concentration, these issues will continue to be the subject of policy debates. With regard to social costs, this update has identified several critical issues. In particular, I have noted the lack of support for an industry-wide advertising response function; the lack of convincing evidence for targeting of adolescents by alcohol advertisers; and the changing nature of the three-tier system of distribution. Additional economic research on these topics is desirable.

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Table 1. Beer Industry Advertising and Marketing Highlights, 1975-2003

Year	Beer Advertising and Marketing Highlights
1975	Miller Brewing introduces Miller Lite nationally, following its merger with Philip Morris in 1970.
1976-81	Anheuser-Busch (A-B) responds with Natural Light (1977), Michelob Light (1978), and Bud Light (1981). Schlitz Light and Pabst Light are launched in 1976; Coors Light in 1978. A-B's market share is 35%.
1977-83	First microbrewery opens in 1977 in Sonoma, CA. First brewpub opens in 1983 in Hopland, CA.
1981-82	U.S. beer consumption reaches all-time high of 34 gallons per capita (ages 18+). Population in the age group 20-29 peaks at 42 million, and declines steadily thereafter. Schlitz closes its Milwaukee plant in 1982.
1985	Nominal advertising expenditures are $770 million or $1.1 billion in constant 2000 dollars, a figure that will not be surpassed in real terms until 2002. FTC ends its first investigation of alcohol advertising.
1986-88	Nominal advertising for Miller Lite peaks in 1986 at $86 million ($0.33 per case). Nominal advertising for Bud Light peaks in 1988 at $70 million ($0.51 per case). Legal drinking age rises to 21 years in all states.
1988	Anheuser-Busch shipments surpass 1 billion cases. A-B's advertising spending is $387 million ($0.36 per case) compared to Miller's $189 million ($0.34) and Coors' $125 million ($0.55).
1988	Light beer sales exceed 25% of total beer sales, while premium beer sales are 40% of market.
1989	Warning labels required on all containers. Dry beer is introduced in U.S. (a Japanese innovation).
1991	Federal tax hikes on wine leads to a shift to malt beverage as the base for flavored coolers.
1992	Light beer sales reach 893 million cases (34% of market), exceeding premium non-light beer sales.
1993	Miller repositions Miller High Life as a popular-priced beer. Coors introduces Zima, a clear malt-based beverage. Ice beer is introduced in U.S. (a Canadian innovation).
1994	Using its "Great Lengths" ad message, Bud Light sales of 218 million cases surpass sales of Miller Lite. A-B's overall market share is 44% compared to Miller's share of 23% and Coors' 11%.
1996	Sam Adams is 2nd leading super-premium brand (after Michelob). A-B petitions BATF on Sam Adams labels. Number of specialty-craft brewers exceeds 1000 operating firms. Seagram airs liquor ads on cable TV.
1996	Beer consumption declines to 29.5 gal. per capita. Population in the age group 20-29 falls to 36 million.
1998	Corona Extra surpasses Heineken as the top-selling imported beer and 10th leading brand overall.
1998	Light beer sales exceed 40% of total market. Premium beer sales fall below 25% and popular-priced sales are less than 15% of market. Nominal advertising falls to $764 million ($792 million in 2000 dollars).
1999	Miller sells its Lowenbrau brand to Labatt. Pabst transfers its Hamms brand to Miller. Pabst acquires Stroh, Schlitz, Blatz and 23 other brand names as part of Stroh's buy-out. Number of specialty brewers exceeds 1400.
2000	Coors Light sales surpass Miller Lite, making it the 3rd leading brand overall (behind Bud and Bud Light). Light beer sales are 45% of the total market; top 3 light brands capture 32% of the total market.
2000	Smirnoff Ice malt-based cooler is launched by Guinness. Anheuser-Busch responds with Bacardi Silver and Tequiza. Miller responds with Skyy Blue, Sauza Diablo, and other flavored products.
2001	Bud Light surpasses Budweiser as the top selling brand. A-B's market share is 49% compared to Millers's 19% and Coors' 11%. Imported beers capture 11% of the total market.
2002	A-B's advertising expenditures are $423 million ($0.30 per case) compared to SAB-Miller's $277 million ($0.52 per case) and Coors' $199 million ($0.64 per case). Nominal advertising expenditures reach $1.2 billion, or $1.1 billion in 2000 dollars. Average real spending per case is $0.40 compared to $0.44 in 1985.
2003	Per capita consumption falls to 29.1 gallons. Light beer sales are 48% of total market. A-B promotes a low-carbohydrate brand, Michelob Ultra. A-B's market share is 49.6% compared to SAB-Miller's 18.4%.

Sources: *Beer Handbook* (various); *Beer Industry Update* (various); Nelson (2001); and Ries and Trout (1986).

Table 2. Beer Consumption, Real Price, and Advertising, 1975-2003

Year	Shipments (mil. Cases)	Gal. per capita	Real Price (2000 =100)	Total Ads (mil. $)	Real Ads (mil. $)	Real Ad $ Per case	Real Ad $ Per capita
1975	2043.7	30.9	106.4	139.6	367.4	0.18	2.47
1980	2449.8	33.6	100.0	419.6	775.4	0.32	4.73
1985	2525.3	32.3	97.6	770.0	1104.7	0.44	6.29
1990	2661.9	32.3	96.6	659.3	808.0	0.30	4.36
1991	2620.8	31.4	104.5	743.6	880.0	0.34	4.68
1992	2624.3	31.0	105.9	759.7	879.3	0.34	4.62
1993	2631.8	30.7	103.3	694.6	785.7	0.30	4.08
1994	2648.9	30.6	101.3	747.5	827.8	0.31	4.25
1995	2588.6	29.5	99.6	736.3	799.5	0.31	4.05
1996	2621.1	29.5	100.1	713.1	759.4	0.29	3.80
1997	2632.2	29.3	99.1	726.1	761.1	0.29	3.77
1998	2667.8	29.3	98.1	764.2	791.9	0.30	3.87
1999	2727.2	29.6	99.0	799.7	816.9	0.30	3.94
2000	2765.7	29.6	100.0	910.4	910.4	0.33	4.33
2001	2788.8	29.5	100.1	985.4	962.3	0.35	4.52
2002	2824.7	29.5	101.1	1169.8	1125.9	0.40	5.22
2003[P]	2817.4	29.1	101.7	1079.4	1021.2	0.36	4.69
% Chg., 90-03	+5.8	-9.9	+5.3	+63.7	+26.4	+20.0	+7.6

Sources: All data for 2003 are preliminary. Consumption: *Liquor Handbook* and *Wine Handbook* (various) for 1975-1985, and *Beer Handbook* (various) for 1990-2003, including consumption of flavored malt beverages after 1997. Advertising: *Impact* (Dec. 1, 1992) for 1975-1990 and *Beer Handbook* (various) for 1991-2003. Real values are deflated by the GDP implicit price deflator (2000 = 100). Population deflator is the estimated U.S. population ages 18 and over from the *Economic Report of the President* (2004, Table B-34). A case of beer equals 24 cans (12 oz.) or 2.25 gallons. Real price of beer is the BLS index for beer consumed at home, adjusted to 2000 = 100 and deflated by the IPD. The price increase in 1991 reflects a doubling of the federal excise tax to $18 per barrel.

Table 3. Top 3 Brewer Shipments and Advertising, 1975-2003

Year	Anheuser-Busch				Miller/SAB-Miller				Coors			
	Cases (mil.)	Share (%)	Ads $ (mil.)	$ per case	Cases (mil.)	Share (%)	Ads $ (mil.)	$ per case	Cases (mil.)	Share (%)	Ads $ (mil.)	$ per case
1975	484.9	23.4	27.4	0.06	177.2	8.5	21.3	0.12	163.6	7.9	1.2	0.01
1980	691.0	28.2	121.3	0.18	514.0	21.0	96.0	0.19	190.0	7.8	25.2	0.13
1985	897.4	35.5	230.0	0.26	489.7	19.4	161.2	0.33	195.4	7.7	55.9	0.29
1990	1163	43.7	284.2	0.24	569.8	21.4	195.1	0.34	264.3	9.9	123.0	0.47
1991	1158	44.2	281.2	0.24	578.1	22.1	230.4	0.40	266.4	10.2	128.0	0.48
1992	1173	44.7	315.9	0.27	581.1	22.1	230.4	0.40	269.8	10.3	121.0	0.45
1993	1162	44.2	282.7	0.24	595.0	22.6	219.2	0.37	276.1	10.5	114.7	0.42
1994	1171	44.2	273.5	0.23	606.3	22.9	250.0	0.41	282.5	10.7	128.7	0.46
1995	1185	45.8	282.6	0.24	616.0	23.8	270.7	0.44	273.0	10.5	107.0	0.39
1996	1225	46.7	282.9	0.23	598.2	22.8	270.7	0.45	267.1	10.2	120.3	0.45
1997	1234	46.9	232.2	0.19	590.7	22.4	260.3	0.44	266.8	10.1	139.3	0.52
1998	1277	47.9	309.4	0.24	580.0	21.7	203.1	0.35	272.8	10.2	136.0	0.50
1999	1319	48.4	321.7	0.24	577.5	21.2	166.7	0.29	299.8	11.0	165.9	0.55
2000	1346	48.7	355.3	0.26	560.6	20.3	171.4	0.31	313.5	11.3	199.4	0.64
2001	1361	48.8	331.7	0.24	540.9	19.4	240.4	0.44	311.8	11.2	201.1	0.64
2002	1386	49.1	422.7	0.30	534.0	18.9	277.1	0.52	312.3	11.1	199.0	0.64
2003[P]	1398	49.6	412.4	0.29	519.2	18.4	223.2	0.43	308.3	10.9	166.9	0.54
Chg., 90-03	---	+5.9	---	+0.05	---	-3.0	---	+0.09	---	+1.0	---	+0.07

Sources: *Beer Handbook* (various) and *Beer Industry Update* (various). Market share estimates reflect import shipments. Real advertising per case in 1975, 1980, 1985, 1990, 1995, and 2003 were as follows: Anheuser-Busch, $0.16, $0.33, $0.37, $0.29, $0.26, and $0.27; Miller, $0.32, $0.35, $0.47, $0.42, $0.48, and $0.41; and Coors, $0.03, $0.24, $0.42, $0.58, $0.42, and $0.51.

Table 4. Beer Shipments and Shares by Category, 1975-2003

Year	Super Premium		Premium		Light		Popular-Priced		Dry & Ice		Imports	
	Cases (mil.)	Share (%)	Cases (mil.)	Share (%)	Cases (mil.)	Share (%)	Cases (mil.)	Share (%)	Cases (mil.)	Share (%)	Cases (mil.)	Share (%)
1975	35.4	1.7	1006	49.2	35.4	1.7	882.3	43.2	---	---	23.4	1.1
1980	136.8	5.6	1296	52.9	317.3	13.0	553.0	22.6	---	---	63.0	2.6
1985	110.9	4.4	1096	43.4	549.9	21.8	569.6	22.6	---	---	109.1	4.3
1990	63.9	2.4	978.3	36.8	805.3	30.3	543.4	20.4	70.3	2.6	121.0	4.5
1991	54.9	2.1	934.6	35.7	845.8	32.3	518.8	19.8	56.8	2.2	109.2	4.2
1992	79.1	3.0	839.3	32.0	893.4	34.0	536.7	20.5	46.8	1.8	114.6	4.4
1993	98.8	3.8	742.8	28.2	935.2	35.5	570.3	21.7	37.9	1.4	127.4	4.8
1994	100.0	3.8	716.8	27.1	930.8	35.1	498.7	18.8	138.6	5.2	144.5	5.5
1995	121.4	4.7	674.4	26.1	961.1	37.1	472.6	18.3	95.6	3.7	156.0	6.0
1996	142.6	5.4	667.4	25.5	998.8	38.1	432.0	16.5	99.0	3.8	171.8	6.6
1997	158.6	6.0	638.2	24.2	1031.7	39.2	400.1	15.2	100.4	3.8	196.2	7.5
1998	161.1	6.0	617.2	23.1	1082.6	40.6	376.9	14.1	105.5	4.0	226.1	8.5
1999	174.1	6.4	597.7	21.9	1155.8	42.3	349.7	12.8	110.2	4.0	250.3	9.2
2000	179.5	6.5	575.4	20.8	1211.6	43.8	330.0	11.9	106.3	3.8	278.3	10.1
2001	200.2	7.2	552.5	19.8	1247.8	44.7	307.8	11.0	101.2	3.6	302.9	10.9
2002	214.4	7.6	532.3	18.8	1297.0	45.9	291.2	10.3	96.9	3.4	321.0	11.4
2003[P]	206.0	7.3	504.0	17.9	1343.0	47.7	279.0	9.9	91.0	3.2	327.0	11.6
Chg., 90-03	---	+4.9	---	-18.9	---	+17.5	---	-10.5	---	+0.6	---	+7.1

Sources: *Beer Handbook* (various) and *Beer Industry Update* (various). Category definitions in the table follow the *Beer Handbook's* classification. Super Premium category includes favored malt beverages after 1997and Premium category includes dry beer after 1999. Malt Liquor category is not shown: shipments in 1992 were 114 million cases (4.4%) and in 2003, 67 million cases (2.4%). All categories reflect repositioning of brands. Excluded categories are non-alcoholic beer, flavored malt beverages (before 1997), and specialty products.

Table 5. Shipments and Advertising by Leading Brewer, 1993 and 2003

Group/Supplier	Year 1993				Year 2003			
Group 1 – Leaders	Cases (mil.)	Share (%)	Ad $ (mil.)	$ per case	Cases (mil.)	Share (%)	Ad $ (mil.)	$ per case
Anheuser-Busch	1162	44.2	282.7	0.24	1398	49.6	412.4	0.29
Miller/SAB-Miller	574	21.8	211.8	0.37	519	18.4	223.2	0.43
Coors	276	10.5	114.7	0.42	308	10.9	166.9	0.54
Group 2 – Small National								
Stroh	259	9.8	8.3	0.03	Brands merged with Pabst			
G. Heileman	123	4.7	11.3	0.09	Brands merged with Stroh & Pabst			
Pabst	80	3.0	1.6	0.02	109	3.9	1.0	0.01
Group 3 – Regional and Specialty								
Boston (Sam Adams)	6.6	0.2	6.7	1.02	17	0.6	35.4	2.08
High Falls (Genesee)	24	0.9	1.1	0.05	9.5	0.3	0.4	0.04
Yuengling	na	---	---	---	18	0.6	0.7	0.04
Group 4 – Imports								
Heineken	34	1.3	26.9	0.79	73	2.6	74.9	1.03
Barton/Gambrinus	25	0.9	3.0	0.12	130	4.6	51.3	0.39
Labatt	31	1.2	6.8	0.22	67	2.4	39.4	0.59
Diageo-Guinness	9.3	0.4	0.9	0.10	38	1.3	53.4	1.41
Molson	21	0.8	7.4	0.35	12	0.4	4.1	0.34
All Others Brewers	6.9	0.3	4.0	0.58	118	4.2	15.9	0.13
Total Shipments	2632	---	695	0.26	2817	---	1079	0.38

Source: *Beer Handbook* (1994 and 2004). Barton Beers and Gambrinus Co. are joint importers of Corona Extra and other Groupo Modelo brands, and distributors of other imported and domestic beers.

Table 6. Top 10 Brand Shipments, Sales Rank, and Shares, 1993-2003

Brand (category)	Brand Shipments in mil. 2.25-gal. Cases (sales rank)						
		1995	1997	1999	2001	2003	% Chg.
Bud Light (L-P)	198.5 (3)	241.0 (2)	314.5 (2)	395.0 (2)	469.5 (1)	517.0 (1)	+160
Budweiser (P)	603.3 (1)	546.0 (1)	497.5 (1)	475.0 (1)	438.0 (2)	404.0 (2)	-33.0
Coors Light (L-P)	179.5 (4)	183.0 (4)	185.0 (4)	218.8 (4)	231.0 (3)	229.0 (3)	+27.6
Miller Lite (L-P)	230.0 (2)	218.5 (3)	220.1 (3)	220.0 (3)	217.0 (4)	217.0 (4)	-5.7
Natural Light (L-PP)	95.2 (7)	95.0 (6)	96.0 (6)	106.0 (6)	113.0 (5)	115.0 (5)	+20.8
Corona Extra (I)	14.0 (27)	21.2 (20)	39.4 (13)	65.5 (10)	85.1 (7)	96.1 (6)	+586
Busch (PP)	120.5 (5)	110.0 (5)	108.1 (5)	109.5 (5)	105.0 (6)	96.0 (7)	-20.3
Busch Light (L-PP)	53.7 (11)	56.0 (10)	62.5 (9)	70.5 (9)	75.5 (8)	80.5 (8)	+49.9
Miller HL (P/PP)	73.7 (9)	69.5 (8)	72.0 (8)	72.3 (8)	72.0 (9)	72.5 (9)	-1.6
Heineken (I)	29.2 (14)	34.3 (13)	39.9 (12)	47.0 (11)	56.8 (11)	62.5 (10)	+11.4
Miller GD (P)	99.5 (6)	92.0 (7)	77.8 (7)	75.1 (7)	70.0 (10)	59.4 (11)	-40.3
Milwaukee Best (PP)	88.0 (8)	69.0 (9)	53.0 (10)	44.8 (12)	38.3 (13)	32.0 (16)	-63.6
Old Milwaukee (PP)	69.0 (10)	52.0 (11)	44.2 (11)	34.0 (14)	28.5 (16)	24.5 (18)	-64.5
Total Top 4 Brands	1211.3	1188.5	1217.1	1308.8	1355.5	1367.0	+12.9
% Top 4	46.0	45.9	46.2	48.0	48.6	48.5	---
Total Top 10 Brands	1757.2	1680.0	1686.5	1807.7	1876.1	1889.6	+7.5
% Top 10	66.8	64.9	64.1	66.3	67.3	67.1	---
Total Shipments	2631.8	2588.6	2632.2	2727.2	2788.8	2817.4	+7.1

Source: *Beer Handbook* (various). I = import brand; L = light beer; P = premium; and PP = popular-priced.

Table 7. Poisson Regression Analysis of Alcohol Advertisements in Magazines (dependent variables: Ln magazine advertising placements by beverage)

Variable	(1) Beer	(2) Beer	(3) Beer	(4) Spirits	(5) Spirits	(6) Spirits	(7) Wine	(8) Wine	(9) Wine
Constant	0.506 (2.35)*	2.551 (2.56)*	4.237 (6.09)*	1.219 (8.05)*	2.802 (6.12)*	2.840 (4.90)*	1.327 (4.75)*	1.007 (.730)	-4.673 (1.86)
Youth (no.)	1.175 (1.42)	0.970 (.200)	0.869 (1.44)	1.083 (.990)	0.990 (.150)	0.916 (1.15)	0.534 (2.43)*	0.855 (.530)	1.343 (1.16)
Young adults (no.)	0.968 (.330)	---	---	1.251 (5.91)*	---	---	1.661 (5.22)*	---	---
Adults (no.)	0.964 (1.21)	---	---	1.063 (1.95)	---	---	1.239 (4.92)*	---	---
Median age (yrs)	---	0.385 (2.13)*	0.917 (5.41)*	---	0.957 (3.26)*	0.945 (4.02)*	---	1.009 (.200)	1.071 (1.88)
Men (no.)	1.050 (1.43)	1.090 (2.10)*	1.095 (2.89)*	1.002 (.100)	1.056 (2.07)*	1.056 (2.08)*	1.094 (1.74)	1.089 (1.09)	0.927 (.840)
Blacks (no.)	1.057 (1.96)*	1.100 (3.88)*	1.057 (1.79)	1.109 (3.02)*	1.064 (3.35)*	1.061 (2.78)*	0.899 (.940)	0.816 (1.87)	0.937 (.570)
Low income (no.)	0.969 (.330)	0.940 (1.31)	---	0.609 (2.94)*	0.929 (1.47)	---	0.175 (4.98)*	0.967 (.250)	---
Median income ($)	---	---	0.984 (2.84)*	---	---	1.006 (1.07)	---	---	1.040 (2.62)*
No. of issues	1.006 (1.59)	1.007 (1.90)	1.009 (2.70)*	1.002 (.540)	1.002 (.490)	1.003 (.730)	0.976 (2.71)*	0.994 (.420)	1.003 (.370)
R-Sq	0.130	0.145	0.156	0.066	0.048	0.046	0.250	0.068	0.141
MSE	0.954	0.868	0.733	1.319	1.626	1.669	0.682	1.752	1.487
J-B (p)	0.998	0.814	0.595	0.179	0.166	0.107	0.672	0.496	0.898

Notes: Following Garfield et al. (2003), the dependent variables are natural logs of the total number of advertisements for years 1997-2000, with zero observations excluded. Poisson estimates obtained using Stata 8.0. Z-statistics in parentheses are based on robust standard errors; asterisk indicates statistically significant coefficient at the 95% level, two-tailed test. All regressions are statistically significant based on a Wald chi-square test. All coefficients, except the constant term, have been scaled by adding a value of one and adjusting the standard errors. Median income is in thousands of U.S. dollars. MSE is the residual mean squared error. J-B (p) is the p-value for the Jarque-Bera test statistic for the null hypothesis that the residuals are normal.