The Role of Retail Prices and Promotions in Determining Cigarette Brand Market Shares

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Abstract. Over the past two decades, two forms of price competition have emerged within the cigarette industry: the introduction and spread of discount and deep discount cigarettes and the increased use of price-related promotions. In this paper, we use quarterly market-level, scanner-based data on cigarette prices, promotions, and sales for 50 US markets over the period from 1994-IV through 2002-II to examine the impact of price and promotions on market shares for premium, discount, and deep discount brand cigarettes. Our estimates indicate that changes in relative prices, including those resulting from promotions, account for much of observed changes in market shares.

Key words: brand choice, cigarettes, master settlement agreement, premium, discount and deep discount brands, price and promotion.

JEL Classifications: L1, L66, M30.

I. Introduction

The US cigarette industry has always had distinctive features that have perennially intrigued industrial organization economists. From the 1950s through the early 1990s, six companies dominated the cigarette market, controlling over 99% of the market – R. J. Reynolds, Philip Morris, Brown and Williamson, American Tobacco, Ligget and Lorrilard. Over the past 15 years, there has been some consolidation among the top firms, with Brown & Williamson acquiring American Tobacco in the early 1990s and the merger of Brown & Williamson with R.J. Reynolds that was completed in 2004. For most of the 20th century, the industry is best described as a product differentiated oligopoly with a small number of major firms accounting for nearly all output.

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Historically, there has been relatively little price competition in the cigarette market, with price changes adopted by one firm being quickly matched by comparable price changes by the other firms. When price competition has emerged, it typically has been through the introduction of "discount" and "deep discount" brands priced well below other brands.

In recent years, the cigarette industry's market structure has changed, with a competitive fringe emerging as new firms began entering the market in the mid-to-late 1990s. In the deep discount and discount segments of the market, new brands introduced by entering firms increased the number of firms and the relative share of deep discount/discount brands. At the same time, there has been increased price competition within each market segment, largely through the increasing use of price promotions (e.g. promotional allowances, multi-pack discounts and coupons). This paper examines the role of retail cigarette prices and related price promotions in affecting market shares for the three price segments. Much of the change in market shares can be explained by changes in relative prices, particularly the rise of premium and discount brand prices relative to the prices of deep discount brands.

II. History

In the mid 19th century, cigarettes were hand manufactured in relatively small enterprises and total output was quite small.[1] Towards the end of the 19th century, mechanical cigarette machines were introduced. These machines were continually refined and improved; by 1894, machines producing 120,000 cigarettes over a 10 h shift were perfected. These machines were quite expensive but significantly reduced the marginal cost of producing cigarettes; the small competitive industry of the mid-19th century was transformed into an industry characterized by increasing returns to scale. Increasing returns to scale in production were complemented by increasing returns to scale in distribution and advertising.

By the early 20th century, the industry was dominated by American Tobacco Company until a 1911 Supreme Court decision that dissolved the company for violations of the Sherman Act (*US v. American Tobacco Co., 221 US 106*). Several new firms were created from the dissolution of American Tobacco, including a new American Tobacco Company (later American Brands, Inc.), R.J. Reynolds Tobacco Company, Lorillard Tobacco Company, and Ligget & Myers Tobacco Company. Together, these four firms controlled over 90% of the U.S. cigarette market for much of the next two decades (see Table I).

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[1] This short historical narrative is extracted from Kluger (1996).

Table I. Market shares of U.S. cigarette companies, selected years, 1913–2003

Year	R.J. Reynolds	Philip Morris	Brown & Williamson	American Tobacco	Lorillard	Liggett & Myers	Total
1913	0.2	NA	NA	35.3	22.1	34.1	91.7
1925	41.6	0.5	NA	21.2	1.9	26.6	91.8
1940	21.7	9.6	7.8	29.5	5.4	20.6	94.6
1955	25.8	8.5	10.5	32.9	6.1	15.6	99.4
1970	31.8	16.8	16.9	19.3	8.7	6.5	100
1985	31.7	35.8	11.8	7.4	8.2	5.0	99.9
1997	24.2	48.1	15.9	NA	8.7	1.3	98.2
2003	19.8	45.8	9.8	NA	8.5	2.2	86.1

Sources: US Department of Health and Human Services (2000) and Price Waterhouse Coopers (2004).

Post-breakup pricing in the industry quickly became characterized by price leadership, with one firm announcing a price change that was quickly matched by the others, with prices well above the competitive level. This created an opportunity for new entry or expansion by fringe firms competing on the basis of price. For example, the "10 cent brands" that were introduced in the 1920s and 1930s by new entrants and small existing firms were about two-thirds of the price of the brands sold by the dominant firms of the time. The discount brands captured about one quarter of the market by 1932 before the "big three" of the time responded by cutting their prices (Kluger, 1996). While most of the firms that entered with discount brands disappeared after the price cuts, two of the new firms – Philip Morris and Brown & Williamson – were able to gain a foothold.

Price competition all but disappeared in the wake of the price cuts and cigarette prices returned to relatively high levels, with pricing strategies again characterized by price leadership. These coordinated pricing practices resulted in a second major anti-trust action against the industry, culminating in the 1941 court decision that firms conspired to restrain competition in the wholesale and retail cigarette markets, a decision upheld by the Supreme Court in 1946 (*American Tobacco Co., et al., v. US, 328 US 781*). However, relatively minor penalties were imposed in this case (fines and some restrictions on the firms' conduct aimed at preventing them from engaging in coordinated behavior).

The 1946 decision had little impact on industry structure and pricing behavior. For most of the next five decades, the "big six" (five after Brown & Williamson's acquisition of American Brands in the early 1990s) controlled over 99% of the U.S. cigarette market. While combined market share was relatively stable from the mid-1940s through the mid-1990s, there have been

changes over time in the relative positions of the firms (e.g. Philip Morris' emergence as the industry's dominant firm in the 1970s). These changes are largely the result of the rise and fall of particular brands.

Branding has been an important aspect of the tobacco industry since the mechanization of the industry in the late 19th century. Each of the major tobacco companies maintained a portfolio of brands. Brands varied in taste, marketing strategies, and distribution; in contrast, there was little variation in price across brands for most of this period. This allowed tobacco companies to segment the market by various criteria (e.g. income, region, age, and/or gender). For example, in order to develop a market for female customers companies introduced brands specifically targeting women. Marlboro was initially marketed in the 1920s to appeal to women; Virginia Slims is a more recent example of this strategy.

Some of the differentiation among brands resulted from a second major wave of price competition that emerged in the mid/late-1980s and early 1990s. This is reflected in the growth of deep discount and discount cigarette brands. In contrast to the "ten cent brands" that were introduced by new or fringe firms in the 1920s and early 1930s, this growth resulted from existing firms' introduction of low-priced brands and/or repositioning of existing brands as discount brands. Eventually, a three-tiered price structure emerged, with the lowest priced deep discount brands (e.g. Liggett's generic brands and Brown & Williamson's GPC brand), mid-priced discount brands (e.g. R.J. Reynold's Doral brand and Philip Morris' Basic brand), and the highest priced premium brands (e.g. Philip Morris' Marlboro brand and Lorillard's Newport brand).

By early 1993, the deep-discount and discount brands had captured nearly 40% of the overall cigarette market (with deep discounts accounting for more than one-quarter of this), capturing significant market share from premium brands. The price differences were significant; in early 1993, for example, wholesale prices for deep discount brands were $32.70 per thousand, while comparable prices for discount and premium brands were $48.98 and $71.10, respectively (SpecComm International, Inc., 2000). Various factors contributed to the growth in the shares of the non-premium brands, including federal and state excise tax increases, a recession and low consumer confidence, and a growing interest among consumers in "value priced" products of all types (SpecComm International, Inc., 1994).

As with the growth of the "10 cent brands" in the early 1930s, the growth of the deep discount and discount brands in the early 1990s was reversed by significant reductions in premium brand prices, beginning with industry leader Philip Morris' 40 cent per pack reduction in Marlboro prices on April 2, 1993 – what's come to be known as "Marlboro Friday." The price reduction was initially accomplished through a combination of promotional efforts that were quickly matched by other

firms for their premium brands; these price cuts were eventually made "permanent" in August 1993 through premium brand wholesale price reductions that were initiated by Philip Morris and matched almost immediately by R.J. Reynolds, Brown & Williamson, American Brands, and Lorillard, and followed soon after by Liggett. The impact of Marlboro Friday was immediate and profound. The market share of premium brands rose while the upward trend in the share of discount and deep discount brands was reversed. By 1997, the market share of premium brands was about 73%, with the share of discount and deep discount brands at 27%.

In addition to the growth of discount brands, the increasing use of price promotions contributed to increasing price competition during the 1980s and 1990s. As illustrated by the data contained in the annual Federal Trade Commission reports on cigarette marketing expenditures, there has been a pronounced shift in the relative importance of various marketing activities over time, away from the more traditional, image oriented advertising and towards promotions that directly or indirectly reduce cigarette prices. Given changes over time in the categories reported by the FTC, it's difficult to perfectly distinguish price-related marketing activities from other marketing efforts, but the trend away from image-oriented advertising to price-related marketing is clear. Figure 1 illustrates this shift by reporting per-pack real expenditures on various cigarette marketing activities from 1975 through 2003; image-oriented marketing expenditures are defined to include expenditures on billboard, transit, magazine, newspaper, direct mail, point-of-sale, sponsorship, and Internet advertising, while price-related marketing expenditures are defined to include expenditures on retail value added, promotional allowances, coupons, sampling, and specialty item distribution. Retail value added promotions include promotions that involve free cigarettes (e.g. buy one pack, get one pack free promotions) and promotions that involve a gift with the purchase of cigarettes (e.g. a free lighter or baseball cap). Expenditures on promotional allowances include payments to downstream firms (retailers and wholesalers) for product placement, as well as volume rebates and various incentive payments that result in lower retail prices; starting in 2002, FTC disaggregated these, separating expenditures for "price discounts" from expenditures more related to placement. Expenditures on specialty item distribution reflect the expenditures on programs that provide gifts to reward brand loyalty (e.g. the Marlboro Miles and Camel Cash programs). Finally, the FTC reports "other" marketing expenditures in a separate category, with the expenditures included in this category changing over time; for example, expenditures on coupons and retail value added promotions were included in the other category until 1988 when growth in this category led FTC to separately report coupon and retail value added promotions.

Several conclusions emerge from Figure 1. First, real cigarette marketing expenditures per pack have risen sharply over time; total per pack real
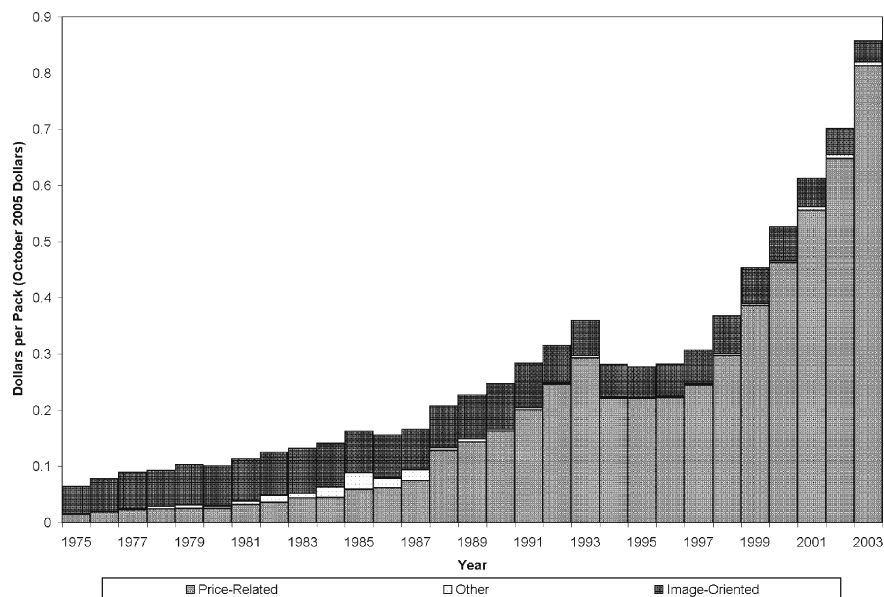
Figure 1. Price-related and image-oriented cigarette marketing expenditures per pack, inflation adjusted, 1975–2003. *Source*: Federal Trade Commission (2005) authors' calculations.

marketing expenditures in 2003 were just over three times higher than in 1995. The decline in overall marketing expenditures in 1994 reflects the shift in marketing strategies associated with Marlboro Friday, specifically the move away from price promotions initially used to reduce price to a reduction in wholesale prices. Trends in marketing activities vary by type of activity. For traditional image-oriented advertising, real expenditures have fallen over time, with per pack real expenditures in 2003 less than half of their levels in 1990. In contrast, price-related marketing expenditures have become increasingly important over time, with their share of over-all cigarette marketing expenditures rising from less than one-fourth of the total in the early 1980s to nearly 95% of the total in 2003. These increases have been particularly rapid in recent years, with per pack real price-related marketing expenditures more than tripling between 1997 and 2003. Price discounts account for the vast majority of these – about 71% of total marketing expenditures in 2003. Many of the price-related marketing expenditures are for activities that closely resemble price discrimination (since they are offered selectively in different markets) and the categoriza-tion as an advertising/marketing activity may give anti-trust immunization.[2]

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[2] The Clayton Act of 1914 outlaws price discrimination if it reduces competition.

Some of these changes are the result of the constraints on cigarette marketing contained in the November 1998 Master Settlement Agreement (MSA) that resolved litigation brought by the states against the tobacco industry. These constraints include a ban on most outdoor and transit advertising, restrictions on sponsorship, a ban on product placement in movies and television shows, and others. As seen in Figure 1, the post-MSA changes in marketing expenditures continue and accelerate the pre-MSA trend away from image-oriented advertising towards price-related promotions.

III. Manufacturing and Retail Cigarette Distribution

In this section we briefly sketch some of the post-MSA changes in the retail and manufacturing structure of the cigarette industry. We cover manufacturing, imports, and wholesale and retail distribution; most of the data presented below are obtained from the 1997 and 2002 Economic Census.

1. THE MASTER SETTLEMENT AGREEMENT AND RELATED LEGISLATION

There were four initial signatories to the MSA in November 1998: Philip Morris, Brown & Williamson, R.J. Reynolds and Lorillard, collectively referred to as the original participating manufacturers or OPMs. In the last full year prior to the MSA (1997), these four firms accounted for nearly 97% of cigarette sales in the United States. Brown & Williamson merged with RJ Reynolds in 2004.

Companies that signed on to the MSA after the OPMs are known as Subsequent Participating Manufacturers or SPMs. In June of 2005, there were 35 extant SPMs (this number excludes SPMs that produce only roll-your-own tobacco) and the three remaining OPMs.[3] In addition to the OPMs and SPMs, a number of other firms are active in the cigarette market but have not signed on to the MSA. These firms are known as Non-Participating Manufacturers, or NPMs.

The MSA includes various provisions related to the NPMs that are designed to create a more level playing field for the OPMs, SPMs, and NPMs. Specifically, the MSA calls for the settling states[4] to adopt escrow provisions that require NPMs to pay an amount into escrow equivalent

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[3] This figure comes from a list compiled by the National Association of Attorneys General.

[4] The MSA was signed by 46 states (MS, TX, FL, and MN reached individual settlements prior to the MSA), the District of Columbia, the Commonwealth of Puerto Rico, Guam, the U.S. Virgin Islands, American Samoa, and the Northern Marianas; settling "states" refers to all of these.

to the amount they would have paid had they signed on to the MSA (the so-called "model statute" contained in exhibit T of the MSA). States that failed to adopt the model statute would see sizable reductions in the payments they receive under the MSA; given this, every settling state adopted the model statute relatively quickly (NAAG, 2003).

It soon became apparent, however, that at least some NPMs were successfully avoiding making the required escrow payments. Part of this resulted from a provision in the model statute that allowed NPMs to sell their cigarettes in a state for up to 16 months before the state could take action to enforce the "model statute" as well as other challenges to enforcing the statute among non-compliant NPMs.[5] This led to additional legislation in many settling states designed to increase NPM compliance with the "model statute". While the details of this "complementary legislation" vary from state to state, the basic provisions are similar; in general, the "complementary legislation" prohibits tax stamps from being applied to cigarettes from companies that are not in compliance with the MSA where compliance implies that a company is either a participating manufacturer or, for NPMs, is in compliance with the "model statute" (NAAG, 2003). The first of these statutes was adopted in 2001, but it wasn't until 2003 that most settling states had some form of "complementary legislation" in place.

While the combination of the "model statute" and the "complementary legislation" was somewhat successful in leveling the playing field for NPMs and OPMs/SPMs, a loophole in the MSA made it possible for compliant NPMs to gain a significant MSA-induced cost advantage over participating manufacturers. Specifically, the MSA (under the "cap release" provision in exhibit T) required a state to refund the difference between what an NPM paid in escrow to the state (which is based on its sales in that state) and what the state would have received from the NPM had it been an SPM instead (which is loosely related to the state's share of overall cigarette sales, among other factors). A simple example will help illustrate the impact of the "cap release" provision. Suppose an NPM sells all of its cigarettes in a single settling state and that state's share of total MSA payments is 5%. To the extent that the escrow payment per cigarette is identical to the per cigarette cost this NPM would have faced had it been an SPM, the NPM would receive a refund amounting to 95% of the total escrow payments it made to the state.[6] As a result, a fully compliant NPM that sells most of its cigarettes in a single state or a small number of states could gain a significant cost advantage over participating manufacturers selling in the same state(s).

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[5] Some states have since adopted legislation requiring NPMs to make escrow payments quarterly.

[6] The actual calculations are a bit more complicated, but the end result is similar.

The potential advantage created by the "cap release" provision of the MSA led states to adopt further legislation again aimed at leveling the playing field for participating and non-participating manufacturers. The new legislation, known as the "allocable share" legislation, does away with the potential refund of escrow payments so that NPMs that are not selling nationally are unable to gain a significant cost advantage over participating manufacturers (typically as an amendment to the state's "model statute"). The first of these policies was adopted in 2003; by 2004, most settling states had some form of "allocable share" repeal in place.

An additional approach to raising the costs of NPMs has emerged in the settling states more recently. In 2004, Alaska, Michigan and Utah adopted an "equity assessment" on NPMs (effectively a per pack tax or fee imposed only on NPM cigarettes); the "assessment" is 35 cents per pack in Michigan and Utah and 25 cents per pack in Alaska).[7] Similar legislation has been proposed in other states, often with the support of at least some of the OPMs; in at least some cases, the proposed legislation has failed because it is perceived as treating the NPMs inequitably.[8]

2. CIGARETTE MANUFACTURING AND RETAIL DISTRIBUTION

In 1997 there were nine cigarette manufacturers in the United States with 13 separate establishments or plants. Indeed the number of manufacturing facilities in the U.S. had been very steady over time: it was 12 in 1982 and rose to 13 in 1987 and remained at that level until 1997. In 2002, the number of companies increased to 13 and the number of plants to 15. Three of these 15 facilities had less than 20 employees and only nine facilities had more than a 100 employees. The total number of production workers employed by U.S. cigarette manufacturers fell from 15,096 in 1997 to 9,906 in 2002.

In 2005, there were 35 SPMs, three OPMs, and numerous NPMs but only 13 manufacturing companies in the Economic Census of 2002. In the context of the MSA, "tobacco product manufacturer" is a legal term that is broader than the usual economic definition. As defined in the MSA a manufacturer includes a company that "manufactures cigarettes anywhere that such manufacturer intends to be sold in the states, including cigarettes intended to be sold in the states through an importer" and also "the first purchaser anywhere for resale in the states of cigarettes manufactured anywhere that the manufacturer does not intend to be sold in the states." The

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[7] Minnesota, one of the four states that settled its lawsuit prior to the MSA, had adopted a similar fee on NPMs (35 cents per pack) in 2003.

[8] For example, a proposal to impose a 30 cent per pack equity fee in Tennessee that had strong support from R.J. Reynolds was vetoed by the governor in 2005.

apparent discrepancy between the Economic Census count and the number of manufacturers counted as OPMs, SPMs, and NPMs under the Master Settlement Agreement is partly accounted for by firms that are primarily cigarette importers. There has been a sharp rise in imported cigarettes since 1997. In 1995, 3,212 million cigarettes were imported into the United States; five years later, in 2000, 12,319 millions cigarettes were imported, an increase of 284%. In 2004, imports jumped to 22,678 million, an increase of 84% from the year 2000 and of over 600% from 1995.[9] This 2004 total was over 6% of total U.S. cigarette consumption.

In 1997, the four major retail sources of tobacco products (primarily cigarettes) were: food and beverage stores, gasoline stations (including stations that operate convenience stores), tobacco stores and discount stores. Gasoline stations, a category that includes gas stations that operate convenience stores, have the largest share of the retail market. This is followed by food and beverage stores, which include grocery stores and supermarkets as well as liquor and convenience stores. Among food and beverage stores supermarkets have the largest share, followed by convenience stores while convenience stores derive the largest share of their total revenues from sales of tobacco products.

These four categories of retail establishments remain the major sources of tobacco products in 2002. There are, however, some changes that are worth noting. Discount stores' share of tobacco sales rose from 12.3% in 1997 to 13.7% in 2002, an 11% increase. This increase is driven by the increase in the number of so-called "discount super-centers." The number of discount super-centers increased from 1490 in 1997 to 2734 in 2002 and their share of tobacco sales increased from 9.6% to 12.7%. Second, tobacco stores are much more important in 2002 than in 1997. From 1997 to 2002, the number of tobacco stores jumped from 3884 to 6184, a 59% increase. The share of retail tobacco products sold in tobacco stores increased from 7.2% to about 11.1%. Anecdotal evidence suggests that both types of establishments, discount super-centers and tobacco shops, offer a greater variety of tobacco brands, particularly discount and deep discount brands, and primarily sell cigarettes by the carton. These changes in the pattern of retail distribution, particularly the increase in the number and importance of tobacco stores and discount super-centers, may facilitate growth in the shares of discount and deep discount cigarettes brands (Table II).

IV. Data

Our data are quarterly data for 50 U.S. markets, from the fourth quarter of 1994 through the second quarter of 2002 obtained from A.C. Nielsen's

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[9] Statistics from the U.S. Bureau of Alcohol, Tobacco and Firearms, U.S. Department of Treasury.

scanner database. The markets consist of groups of counties centered on a major city (similar to metropolitan statistical areas). These data include detailed, UPC-level data for cigarette sales in each quarter in each market; these data allow us to identify, by brand, the product type (e.g. length, soft versus hard pack, filter versus non-filter, menthol versus non-menthol, and number of cigarettes per unit). The transactions price, including any retail price and other promotions connected with the sale, is also provided. Finally, the dataset also includes the quantity of each brand/type sold. For example, Marlboro 100, non-menthol, non filtered hard pack sold as cartons, with a free cigarette lighter, in Buffalo, appears as a line item in our data along with the price and quantity sold of this product. Similarly, Marlboro 100, non-menthol, non filtered hard pack sold as cartons, without a free cigarette lighter, in Buffalo, also appears as a separate line item in our data along with price and quantity sold of this product. Similarly disaggregated data are provided for the numerous other combinations of brand/type and promotion; for example, price and sales data for buy-one-get-one-free promotions for a given brand/type are reported separately from buy-two-get-one-free and other multi-pack promotions; likewise, price and sales data for on-package coupon promotions are reported separately for each brand/type. The data do not directly flag price discounts that are done through buy-downs and other methods that show up in the FTCs promotional allowance category (and, since 2002, in the price discount category); to the extent that these promotions result in lower retail prices, they are captured in our data.

These data do not provide complete market coverage. The stores that are included are stores that have adopted the UPC scanning technology at the checkout – primarily large supermarkets, pharmacies and mass merchandiser. Some firms may not share their scanner information with A.C. Nielsen (Wal-Mart dropped out of the A.C. Nielson sample in 2003). Transactions data from stores that had not adopted the checkout scanners historically (e.g. "tobacco only" stores, gas stations and convenience stores) are not included in the database; as noted above, these stores account for a significant part of the retail cigarette market. Some estimate that close to one-quarter of all cigarettes are purchased in "tobacco only" stores alone.[10] The exclusion of these stores implies that sales of discount and deep discount brands are likely to be under-reported in our data, particularly in recent years. Put differently, our data are likely to be skewed towards premium brands.

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[10] In 2002, tobacco stores share of retail sales of tobacco products was about 11%; if such sales are heavily weighted by deep discount cigarettes, then sales quantity may be higher than 11% for tobacco stores.

Table II. Retail distribution of cigarettes by type of retail outlet, 1997 and 2002

	NAICS code	1997 Number of establishments	2002 Number of establishments	Dollar share of cigarettes distributed 1997 (percent of total sales)	Dollar share of cigarettes distributed 2002 (percent of total sales)	Change in percentage points	Percentage change in share
Product Line 20150: Tobacco and tobacco products							
Retail	44-45	234,100	221,173	100	100	.	.
Food and beverage	445	97,112	90,126	35.92	26.48	−9.43	−26.26
Drug stores	44611	21,181	17,731	5.06	2.99	−2.07	−40.93
Gasoline	4471	95,784	94,897	36.96	43.60	6.64	17.97
Newsstands	451212	1,382	991	0.28	0.13	−0.15	−54.27
Tobacco stores	453991	3,884	6,184	7.20	11.16	3.96	55.03
Discount stores, Warehouse clubs & supercenters	452112 plus 45291	5,660	4,330	12.33	13.69	1.36	11.04
Addendum							
Warehouse clubs & supercenters	45291	1,490	2,734	9.60	12.68	3.08	32.10
Gasoline stations with convenience stores	44711	74564	86152	32.51	41.59	9.08	27.93

Notes: The subcategories here do not add up to 100%, but slightly over 98%; number of establishments is the number of retail outlets that carry the merchandise line (sell tobacco products). NAICS is the North American Industry Classification System that the U.S. Census Bureau currently uses to categorize business activity, replacing the Standard Industrial Classification (SIC) system.

Table III. Average cigarette prices, by price tier, 1994-IV through 2002-II

	Premium price	Discount price	Deep discount price
1994-IV	$1.69	$1.30	$1.13
1995-I	$1.69	$1.32	$1.13
1995-II	$1.71	$1.33	$1.14
1995-III	$1.73	$1.34	$1.15
1995-IV	$1.73	$1.34	$1.14
1996-I	$1.74	$1.34	$1.15
1996-II	$1.77	$1.38	$1.18
1996-III	$1.78	$1.38	$1.18
1996-IV	$1.77	$1.38	$1.16
1997-I	$1.79	$1.39	$1.17
1997-II	$1.83	$1.42	$1.19
1997-III	$1.84	$1.42	$1.17
1997-IV	$1.92	$1.48	$1.22
1998-I	$1.94	$1.49	$1.23
1998-II	$2.02	$1.55	$1.29
1998-III	$2.08	$1.61	$1.34
1998-IV	$2.22	$1.75	$1.39
1999-I	$2.59	$2.08	$1.72
1999-II	$2.60	$2.05	$1.74
1999-III	$2.67	$2.09	$1.77
1999-IV	$2.81	$2.24	$1.82
2000-I	$2.87	$2.33	$1.85
2000-II	$2.93	$2.33	$1.80
2000-III	$2.98	$2.32	$1.71
2000-IV	$3.01	$2.34	$1.65
2001-I	$3.06	$2.42	$1.67
2001-II	$3.17	$2.47	$1.69
2001-III	$3.25	$2.50	$1.66
2001-IV	$3.23	$2.46	$1.60
2002-I	$3.25	$2.47	$1.63
2002-II	$3.31	$2.52	$1.65

Source: A.C. Nielsen scanner data and authors' calculations.

These data are used to construct the market shares of premium, discount and deep discount cigarettes for each market in each quarter. In addition, variables representing premium, discount, and deep discount market shares lagged one quarter were created to account for persistence in
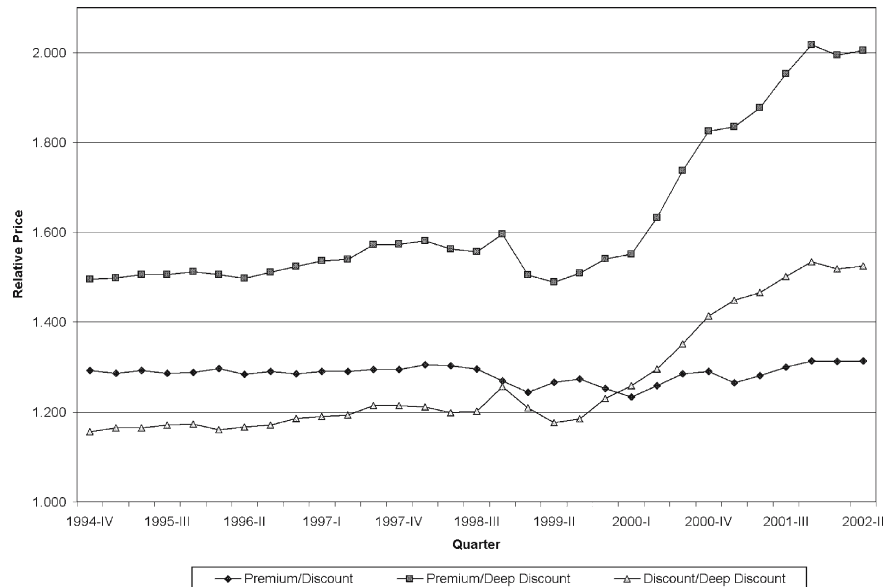
Figure 2. Relative prices of premium, discount, and deep discount cigarettes 1994-IV through 2002-II. *Source:* A.C. Nielsen scanner data and authors' calculations.

brand choice in the models estimated below. Many of the brands were designated premium, discount or deep discount on the basis of the Maxwell reports which identify various brands as premium, discount, or deep discount brands (SpecComm International, Inc., various years). Other brands were assigned to price tier based on their price relative to the prices of brands in each category for brands included in the Maxwell reports. Table III contains average, sales weighted nominal prices across all markets for each price segment (premium, discount and deep discount).

As shown in Figure 2, the price of deep discount brands relative to premium and discount brands was relatively stable from 1994 through 1998. After 1998, however, the prices of both premium and discount brands rose sharply relative to the prices of deep discount brands. This is most likely attributable to new entry in the deep discount segment of the cigarette market following the Master Settlement Agreement, the factors discussed above related to the implementation of the MSA (particularly with respect to the NPMs), and to the significant run up in major firms' wholesale cigarette prices. On the other hand, the relative price of premium to discount brands remains fairly constant over time, with premium prices about 30% higher than discount prices during much of this time.

The relative shares of premium and non-premium brands do not vary much across our sample period (see Figure 3). Given that the relative price of premium to discount brands does not fluctuate much and that the share
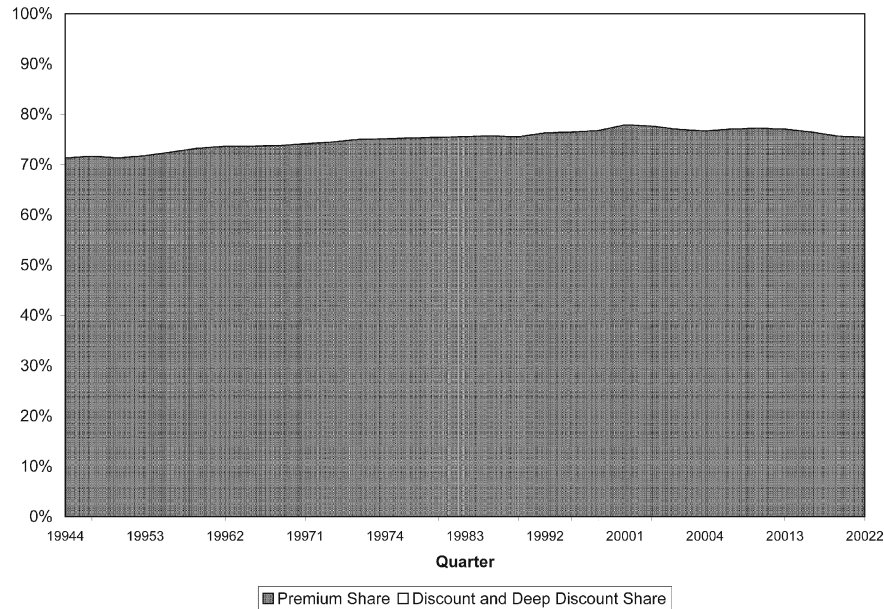
Figure 3. Shares F premium and discount/deep discount cigarettes, 1994-IV through 2002-II. *Source:* A.C. Nielsen scanner data and authors' calculations.

of deep discount brands is relatively small, this is not surprising. In addition, as discussed above, our scanner data are likely to under-represent the discount and deep discount segments of the market. Nevertheless, these data do show some decline in the most recent years in the market share of premium versus discount/deep discount cigarettes.

Within the non-premium segment (as captured by our data) there is more movement in relative shares. Figure 4 shows the relative share of discount and deep discount cigarettes within the non-premium market segment. Over the last two years of our sample period, the deep discount share of the non-premium segment rises sharply. In the fourth quarter of 1994 it is just over 13% of the non-premium market; by the second quarter of 2002, the share of deep discount cigarettes in the non-premium market stands at almost 23%. The obvious explanation for this change is the fall in the prices of deep discount brands relative to the prices of discount brands.

While these summary data and figures suggest that there is modest variation in the data, a different picture emerges when examining variation across markets. Five markets were randomly chosen from the sample of 50. Prices and market shares were compared across cities. Figures 5 through 7 provide some illustration of the relative price differences across markets for each of the three price segments.
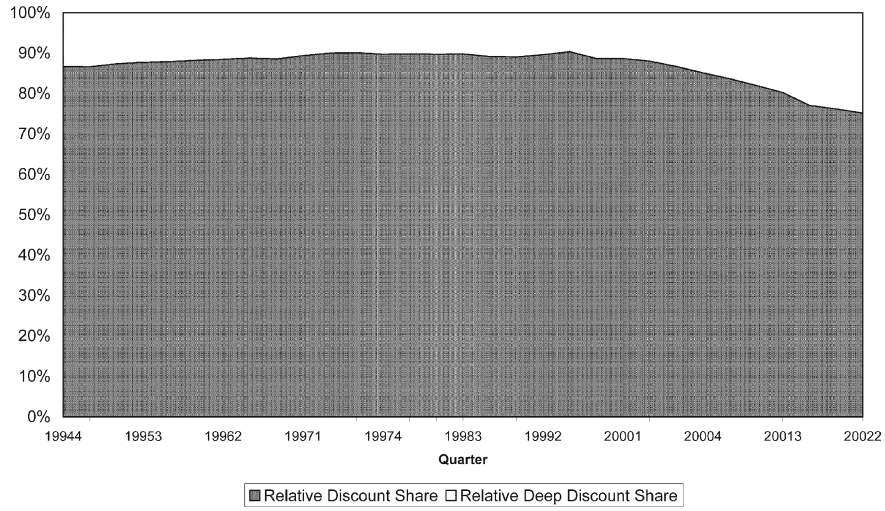
Figure 4. Relative shares of discount and deep discount cigarettes, 1994-IV through 2002-II. *Source:* A.C. Nielsen scanner data and authors' calculations.
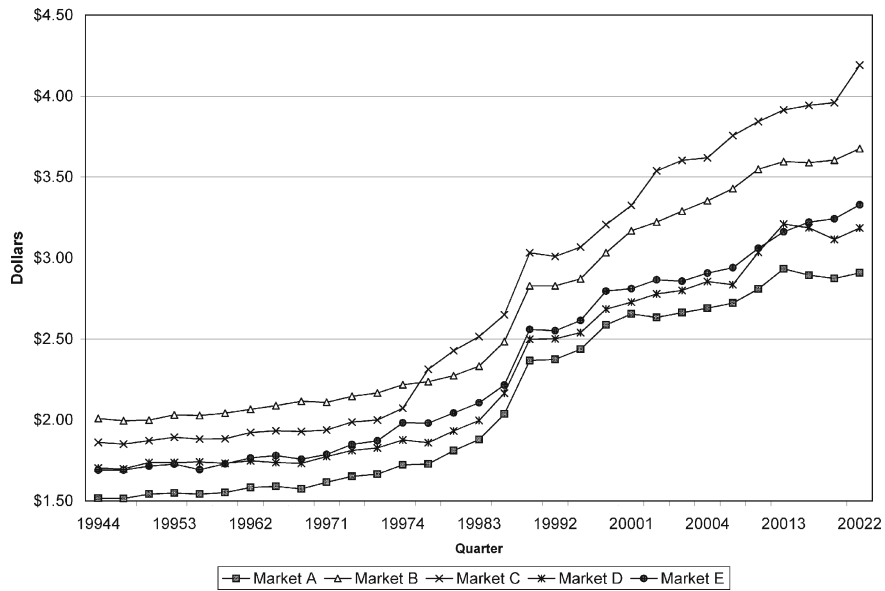

Figure 5. Average premium price per pack for five markets, 1994-IV through 2002-II. *Source:* A.C. Nielsen scanner data and authors' calculations.
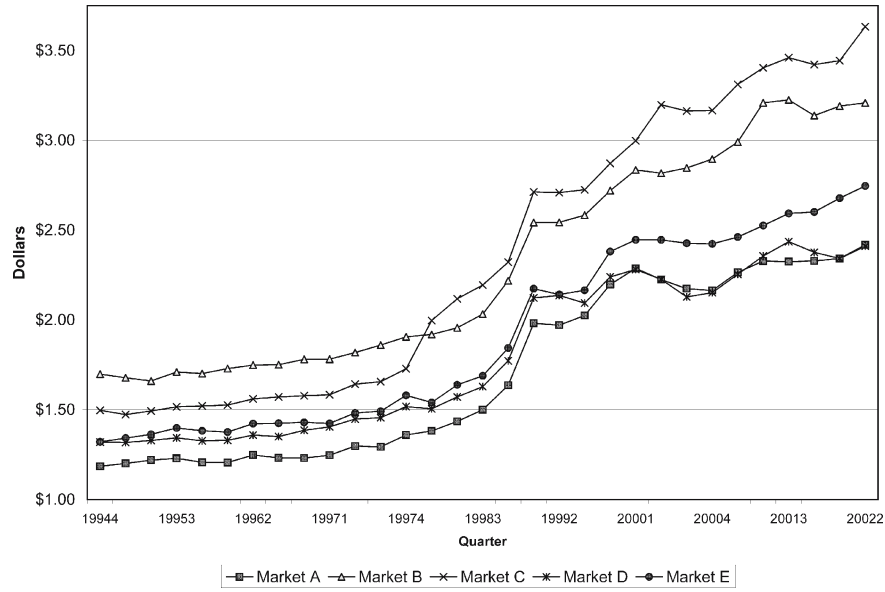
Figure 6. Average discount price per pack for five markets, 1994-IV through 2002-II. *Source:* A.C. Nielsen scanner data and authors' calculations.
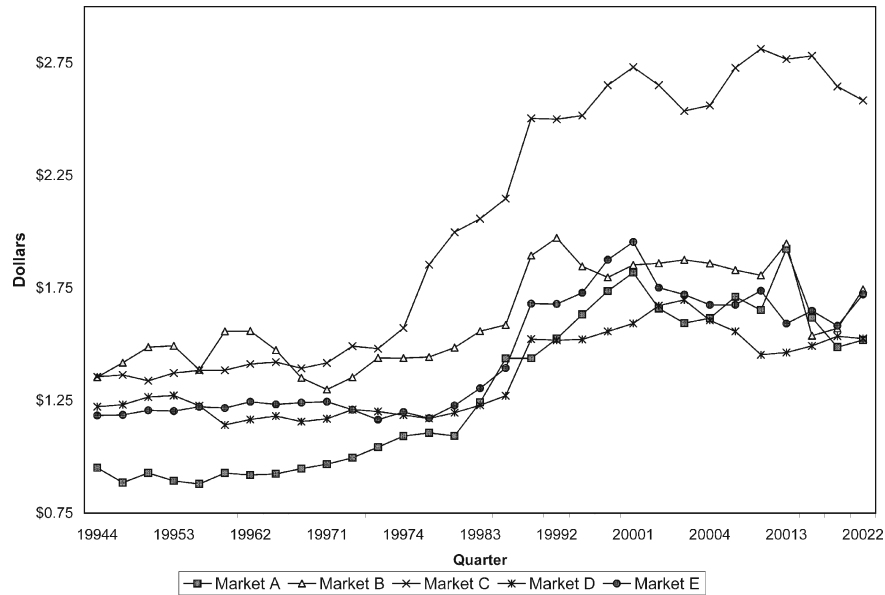

Figure 7. Average deep discount price per pack for five markets, 1994-IV through 2002-II. *Source:* A.C. Nielsen scanner data and authors' calculations.
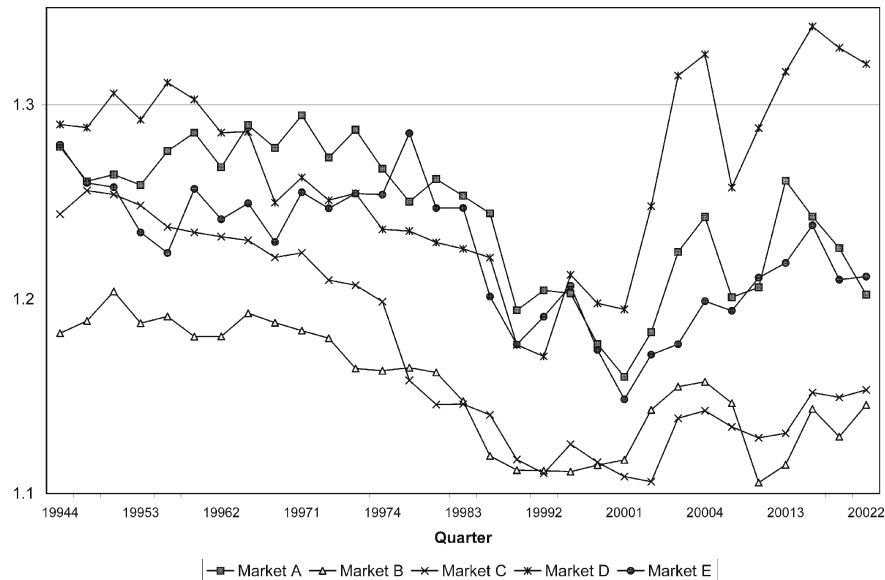
Figure 8. Relative price of premium to discount price for five markets, 1994-IV through 2002-II. *Source:* A.C. Nielsen scanner data and authors' calculations.

These three figures suggest that there are significant differences across markets at a given point in time in the prices of cigarettes in the premium, discount, and deep discount segments of the market. The differences in average prices for a given price tier across markets are largely due to differences in state or local excise taxes. The differences, particularly in the deep discount segment, also result from differences in the brands sold in each market at a given point in time, which largely results from the local or regional nature of many of the NPMs. More compelling is the dispersion of relative prices across markets, as well. This is shown in Figures 8 and 9; both clearly show that there is significant variation in relative prices both across markets as well as within a given market over time.

Figures 10 through 13 provide some illustration of the variability in premium, discount, and deep discount market shares, both across markets and within markets over time. As these figures clearly illustrate, deep discount brands account for a significant share of cigarette sales in some markets while accounting for very little in other markets. In some markets, the deep discount share has grown significantly over time, while in others is has remained constant or declined at times. As with the price differences observed across and within markets, some of the variation will be accounted for by the local or regional nature of many NPMs.

In addition to the price and market share variables constructed from the A.C. Nielsen data, five segment-specific promotion variables were constructed for each of the three price segments. The first indicates the
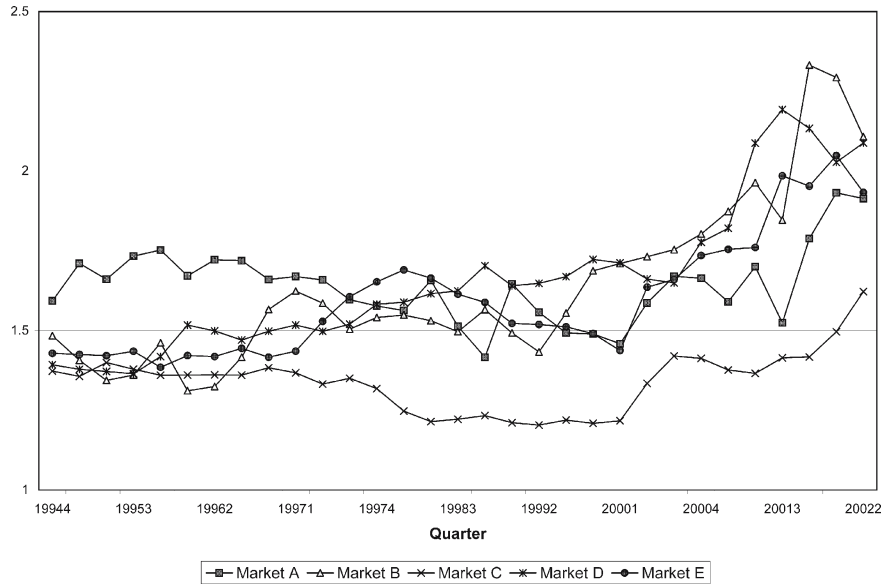
Figure 9. Relative price of premium to deep discount price for five markets, 1994-IV through 2002-II. *Source:* A.C. Nielsen scanner data and authors' calculations.
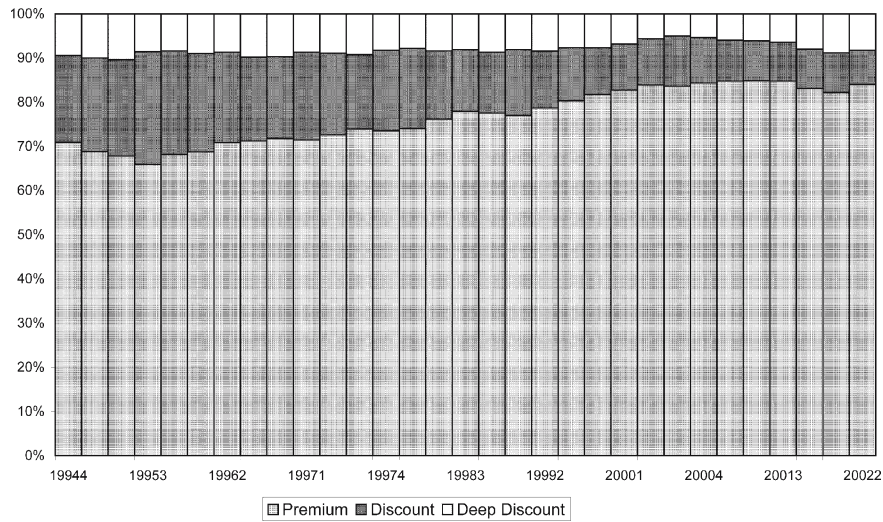

Figure 10. Premium, discount, and deep discount market shares. Market F, 1994-IV through 2002-II. *Source:* A.C. Nielsen scanner data and authors' calculations.

Figure 11. Premium, discount, and deep discount market shares. Market G, 1994-IV through 2002-II. *Source:* A.C. Nielsen scanner data and authors' calculations.
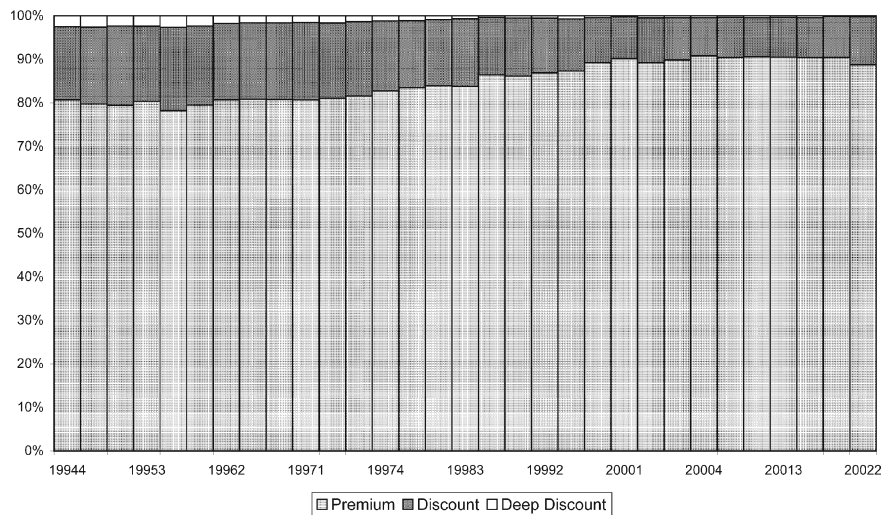
Figure 12. Premium, discount, and deep discount market shares. Market H, 1994-IV through 2002-II. *Source:* A.C. Nielsen scanner data and authors' calculations.
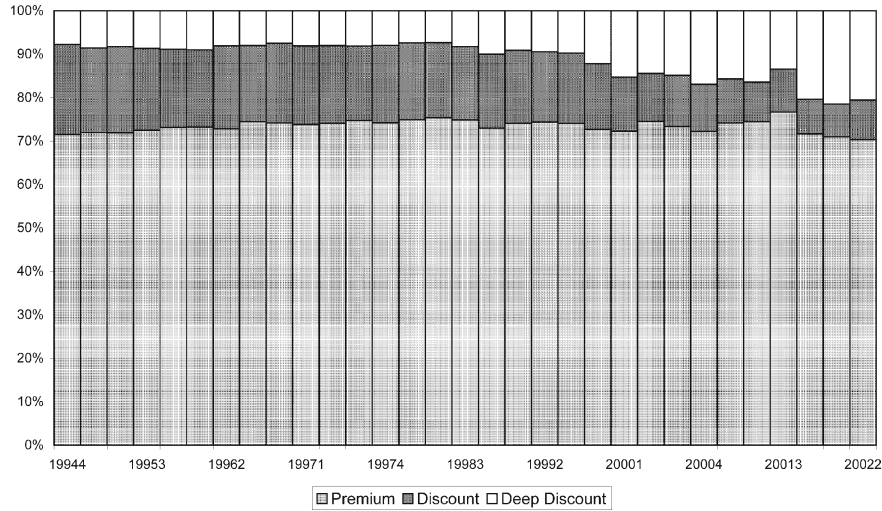
share of sales in a given segment that were sold at a special "cents-off" price promotion (including on-package coupons) as identified in the scanner data. As noted above, this measure is likely to significantly understate the share of cigarettes sold at a reduced price given that it does not include most of the price promotions that are provided directly to retailers through buy-downs and other promotional allowances. The second promotion vari-

Figure 13. Premium, discount, and deep discount market shares. Market I, 1994-IV through 2002-II. *Source:* A.C. Nielsen scanner data and authors' calculations.
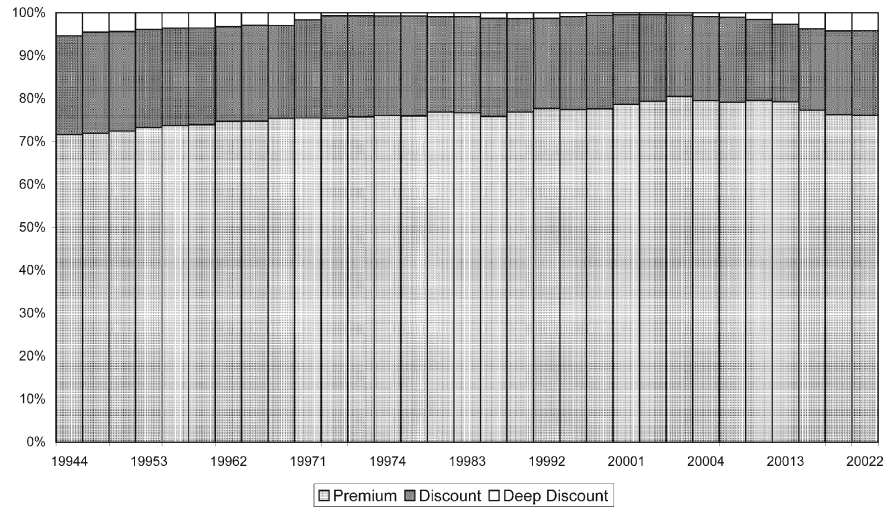
able reflects the share of sales in a given segment that were sold through a promotion involving free cigarettes, such as a buy-one-get-one-free promotion. The impact of both of these types of promotions on price is already captured by the price variables which reflect the actual transactions prices; these variables will capture any additional impact of the promotions on market shares (e.g. the "buzz" that's created by the signage, displays, and other efforts to bring attention to the lower prices). The third promotion variable reflects the share of sales in a given segment that were sold as part of a retail value added promotion that involved a "gift' with the purchase of cigarettes (e.g. a free lighter, baseball cap, or other gift). The last two variables are aggregations of these variables, with the first the share of sales accounted for by either a special "cents-off' or free cigarette promotion, and the second the share of sales accounted for by any of the three promotions.

Several market specific independent variables were constructed and merged with the scanner data to control for other factors thought likely to affect cigarette market share. County level personal income data from the U.S. Department of Commerce Bureau of Economic Analysis in conjunction with county level population estimates from the U.S. Census Bureau were used to create quarterly market level per capita income estimates by taking a population weighted average of the income measure for the counties comprising each market. To account for changes in relative income over time, the per capita income measure was deflated by the national Consumer Price Index published by the Bureau of Labor Statistics (1982–1984 = 100). We also merged a market specific unemploy-

ment rate with the scanner data. The unemployment rate is a population-weighted average of the unemployment rate in the counties that make up each market. The county level unemployment data were obtained from the Bureau of Labor Statistics. Several other market level variables were constructed from data obtained from the U.S. Census Bureau including: the percent of the population that is male (female – omitted reference category); the percentage of the population that is Black, Hispanic, or Other Race (white – omitted reference category); and the percentage of the population that is aged between 0–14, 15–24, 25–34, 35–44, 45–54, and 55–64 (aged 65+ omitted reference category). Finally dichotomous indicators for each market (less one), year (less one), and quarter (less one) are created. These "fixed effects" are intended to capture unobserved differences across markets, time, and seasons that may affect cigarette market share.

V. Empirical Strategy

We estimate a three equation model of cigarette market share. The three equations correspond to market share functions for premium, discount, and deep discount cigarettes.[11] Since the disturbance in the premium market share equation is likely to be correlated with the disturbances in the discount and deep discount market share equations, we employ a seemingly unrelated regression technique (SUR) developed by Zellner (1963). The SUR estimates the three equations simultaneously while taking into account the correlation of the disturbances across market share equations to obtain unbiased, consistent, and efficient estimates of the three equation system. Breusch–Pagan Tests support the use of SUR methods by rejecting the null hypothesis that the residuals in the three equations are independent in both of the model specifications described below (Breusch and Pagan, 1980). Finally, we added three constraints on the coefficients.[12] First we constrained the premium cigarette price coefficient in the premium market share equation to equal the negative sum of the premium price coefficients from the discount and deep discount price equations. Second, we constrained the discount cigarette price coefficient in the discount market share equation to equal the negative sum of the discount price coefficients from the premium and deep discount price equations. Finally, we constrained the deep discount cigarette price coefficient in the deep discount market

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[11] Less than 1% of the cigarettes sold in our data are unidentified by AC Nielsen. These unidentified cigarettes are deleted from our sample prior to estimation. We conducted separate sensitivity analysis including the unidentified cigarettes as a fourth equation in our model. The estimates for the premium, discount, and deep discount equations are very similar to those presented in this paper and are available upon request.

[12] The unconstrained system estimates are very similar to the constrained estimates and are available upon request.

share equation to equal the negative sum of the deep discount price coefficients from the premium and discount price equations. These constraints reflect the fact that a change in the market share of one price segment in response to a change in the price of one segment will be offset by comparable changes in market shares in the other two segments in response to that price change.

VI. Results

Tables IV and V contain estimates from alternative market share specifications. Table IV contains estimates from a limited specification that includes the following regressors: real own-price, real prices of the other two price tiers, own lagged market share, unemployment rate, real per-capita income, year fixed effects, market fixed effects, and quarter fixed effects. Table V contains estimates from comparable specifications that add several additional covariates: percentage of the population that is male (female – omitted reference category); percentage of the population that is Black, Hispanic, or Other Race (white – omitted reference category); and percentage of the population that is aged between 0–14, 15–24, 25–34, 35-44, 45–54, and 55–64 (aged 65+ omitted reference category). Finally, columns 2, 3, and 4 of each table correspond to market share equations for premium, discount, and deep discount cigarettes, respectively.

1. OWN-PRICE

The real own-price of cigarettes in a given price segment has a negative and significant impact on market share for that segment in each of the equations that were estimated. The average short-run own-price elasticity of market share across the two alternative specifications for premium, discount, and deep discount cigarettes are −0.19, −0.56, and −0.63, respectively. These estimates indicate that holding all other factors constant a 10% increase in the own-price of cigarettes will, in the short run, reduce the market share of premium, discount, and deep discount cigarettes by approximately 1.9%, 5.6%, and 6.3%, respectively. These estimates imply that market shares for discount and deep discount cigarettes are three or more times as responsive to own-price changes as are premium market shares. The relative inelasticity of market share with respect to price, particularly in the premium segment, is not surprising given the considerable brand loyalty that exists for cigarettes.

2. CROSS-PRICE EFFECTS

As expected, our estimates indicate that cigarettes from different price segments are substitutes for one another. The real prices of discount cigarettes

Table IV. Market share equations – limited specification

Independent variable	Dependent variable		
	Market share of premium cigarettes	Market share of discount cigarettes	Market share of deep discount cigarettes
Real price premium cigarette	−1.8392 (−12.91)	1.7337 (12.71)	0.1055 (1.23)
Real price discount cigarette	1.9163 (13.46)	−2.0092 (−14.84)	0.0929 (1.10)
Real price deep discount cigarette	0.1410 (2.72)	0.2824 (5.65)	−0.4234 (−13.27)
Lagged market share	0.8659 (99.76)	0.8657 (99.70)	0.8676 (100.72)
Unemployment rate	−0.1061 (−2.15)	0.0722 (1.53)	0.0335 (1.12)
Real per-capita income	0.0003 (0.20)	0.0018 (1.27)	−0.0021 (−2.28)
1996	0.0028 (2.74)	−0.0027 (−2.71)	−0.0002 (−0.24)
1997	0.0042 (3.76)	−0.0035 (−3.34)	−0.0006 (−0.98)
1998	0.0036 (2.83)	−0.0050 (−4.05)	0.0014 (1.77)
1999	0.0038 (2.00)	−0.0080 (−4.40)	0.0043 (3.70)
2000	0.0041 (1.84)	−0.0096 (−4.41)	0.0055 (3.99)
2001	0.0078 (3.06)	−0.0158 (−6.37)	0.0080 (5.08)
2002	0.0068 (2.27)	−0.0142 (−4.86)	0.0074 (3.93)
Quarter 2	−0.0004 (−0.60)	0.0005 (0.64)	0.0000 (−0.03)
Quarter 3	−0.0008 (−0.97)	0.0002 (0.29)	0.0005 (1.12)
Quarter 4	−0.0010 (−1.19)	−0.0013 (−1.57)	0.0022 (4.41)
Intercept	0.1220 (11.89)	−0.0026 (−0.33)	0.0147 (2.88)
Breusch-Pagan test of independence		1256.15 (0.0000)	
Own price elasticity	−0.1785	−0.5548	−0.6363
Cross price elasticity – premium	—	0.5882	0.2394
Cross Price elasticity – discount	0.1513	—	0.1716
Cross Price elasticity – deep discount	0.0091	0.0634	—

All equations also include market fixed effects. t-statistics are in parentheses. The critical values for the t-statistics are 2.58 (2.33), 1.96 (1.64), 1.64 (1.28) at the 1%, 5%, and 10% significance levels, respectively, based on a two-tailed (one-tailed) test.

Table V. Market share equations – full specification

Independent variable	Dependent variable			
	Market share of premium cigarettes	Market share of discount cigarettes	Market share of deep discount	
Real price premium cigarette	−2.0515 (−13.50)	1.9173 (13.25)	0.1343 (1.48)	
Real price discount cigarette	2.0073 (13.67)	−2.0603 (−14.86)	0.0529 (0.61)	
Real price deep discount cigarette	0.1207 (2.27)	0.2904 (5.71)	−0.4112 (−12.73)	
Lagged market share	0.8476 (92.55)	0.8474 (92.54)	0.8491 (93.23)	
Unemployment Rate	−0.0369 (−0.69)	0.0625 (1.23)	−0.0252 (−0.78)	
Real per-capita income	0.0003 (0.16)	0.0016 (1.04)	−0.0019 (−1.88)	
Percent aged 0–14	−0.2501 (−0.85)	0.4645 (1.67)	−0.2123 (−1.19)	
Percent aged 15–24	0.0840 (0.28)	−0.3301 (−1.15)	0.2470 (1.35)	
Percent aged 25–34	0.0213 (0.07)	−0.2919 (−1.02)	0.2699 (1.48)	
Percent aged 35–44	0.1977 (0.67)	0.0048 (0.02)	−0.1991 (−1.12)	
Percent aged 45–54	−0.1026 (−0.27)	0.4256 (1.19)	−0.3183 (−1.38)	
Percent aged 55–64	0.0132 (0.03)	0.3080 (0.78)	−0.3205 (−1.27)	
Percent black	0.0090 (0.04)	0.0672 (0.32)	−0.0746 (−0.56)	
Percent hispanic	0.0101 (0.11)	−0.0251 (−0.29)	0.0154 (0.28)	
Percent other race	0.0754 (0.65)	−0.0664 (−0.61)	−0.0082 (−0.12)	
Percent male	−1.0337 (−1.48)	0.4658 (0.70)	0.5629 (1.34)	
1996	0.0035 (1.85)	−0.0052 (−2.89)	0.0017 (1.48)	
1997	0.0057 (1.74)	−0.0087 (−2.78)	0.0030 (1.49)	
1998	0.0068 (1.45)	−0.0136 (−3.01)	0.0067 (2.35)	
1999	0.0103 (1.53)	−0.0217 (−3.37)	0.0113 (2.77)	

Table V. Continued

Independent variable	Dependent variable		
	Market share of premium cigarettes	Market share of discount cigarettes	Market share of deep discount
2000	0.0120 (1.42)	−0.0258 (−3.17)	0.0137 (2.65)
2001	0.0161 (1.61)	−0.0340 (−3.56)	0.0178 (2.91)
2002	0.0152 (1.35)	−0.0344 (−3.18)	0.0190 (2.75)
Quarter 2	0.0001 (0.14)	−0.0003 (−0.35)	0.0002 (0.31)
Quarter 3	0.0000 (0.03)	−0.0012 (−1.13)	0.0012 (1.72)
Quarter 4	0.0002 (0.16)	−0.0034 (−2.45)	0.0031 (3.57)
Intercept	0.6656 (2.08)	−0.3301 (−1.09)	−0.1824 (−0.94)
Breusch–Pagan test of independence		1264.20 (0.0000)	
Own price elasticity	−0.1991	−0.5689	−0.6179
Cross price elasticity – premium	–	0.6504	0.3048
Cross price elasticity – discount	0.1585	–	0.0978
Cross price elasticity – deep discount	0.0078	0.0652	–

All equations also include market fixed effects. t-statistics are in parentheses. The critical values for the t-statistics are 2.58 (2.33), 1.96 (1.64), 1.64 (1.28) at the 1%, 5%, and 10% significance levels, respectively, based on a two-tailed (one-tailed) test.

and deep discount cigarettes are found to have positive and significant impacts on the market share for premium cigarettes. The average cross-price elasticity estimates of premium cigarette market share with respect to discount cigarette prices across the two alternative specifications is 0.15, implying that a 10% increase in the price of discount cigarettes will increase market share of premium cigarettes by approximately 1.5%. The average cross-price elasticity for the premium market share with respect to the price of deep discount cigarettes is 0.01, implying that even sizable changes in the prices of deep discount cigarettes would have little impact on the market share of premium cigarettes. This reflects the very small market share of deep discount cigarettes and the likelihood that most substitution between brands in different price segments occurs among brands in adjacent segments.

Similarly, the real price of premium and deep discount cigarettes are found to have a positive and significant impact on discount cigarette market share. The average cross-price elasticity estimates for the discount market share with respect to premium and deep discount cigarette prices across the two alternative specifications are 0.62 and 0.06, respectively. These estimates imply that a 10% increase in the price of premium cigarettes will increase discount cigarette market share by approximately 6% and a 10% increase in deep discount cigarette prices will increase discount cigarette market share by approximately 0.6%. Again, the relatively low cross-price elasticity with respect to deep discount prices likely reflects the small market share of deep discount brands in our sample.

Finally, neither the real price of premium cigarettes nor the real price of discount cigarettes is found to have a statistically significant impact on deep discount market share, although both prices are positive in both equations.

3. OTHER RESULTS

As expected given the brand loyalty that exists for cigarettes, own-lagged market share is found to be a very strong determinant of current market share in each of the equations that were estimated. The magnitudes of the lagged market share coefficients imply that the long-run own price elasticities are six to seven times larger than the short-run elasticities, indicating that sustained changes in relative prices across price segments will lead an increasing number of smokers to switch to brands in other price segments.

A statistically significant inverse relationship is found between the unemployment rate and market share of premium cigarettes in both model specifications. A positive, albeit insignificant, relationship is found for the unemployment rate and the market share for discount cigarettes, while the unemployment rate is insignificant and changes sign in the two equations for deep discount cigarettes. Real per-capita income is found to have a neg-

ative and significant impact on the market share of deep discount cigarettes in the limited specification and is significant at about the 6% level in the full specification. In contrast, real income is an insignificant determinant of premium and discount market share. Together, the income and unemployment effects suggest that smokers in lower socio-economic groups are more likely to smoke deep discount and discount brands while smokers in higher socio-economic groups are more likely to smoke premium brands.

As suggested by the figures above, the market share of premium brands has been relatively stable over most of the period covered by our sample, while the market share of discount brands falls significantly in later years as the market share of deep discount brands rises significantly. As discussed above, the significant rise in the deep discount market share beginning in 1998 is likely to have resulted, at least in part, from the various provisions of the MSA and their implementation over time. There appears to be little seasonality in brand choice; the only exception is that the deep discount share is significantly higher in the fourth quarter while the discount share is significantly lower. Finally, no clear patterns emerge with respect to differences in market share and the age, gender, or racial/ethnic distribution of the market population.

4. PROMOTIONS

Table VI contains a limited set of estimates from comparable models that add measures of cigarette promotions to each model. Specifically, each model includes the percent of sales in each price segment that involved one of the three types of promotions identified in the A.C. Nielsen scanner data. Most of the estimated coefficients for the promotion variables have the expected signs (positive for own segment share and negative for other segment shares), but few of the coefficients are statistically significant. The lack of statistical significance is likely due to the facts that much of the impact of these promotions is already captured by the price variable and that the price-related promotions account for the vast majority of promotions identified in our data. In general, the inclusion of the promotion variables has little impact on the estimated coefficients for the other variables in the models.

VII. Conclusions

Our estimates indicate that changes in the relative prices of premium, discount, and deep discount cigarettes, including changes that result from the increasingly extensive promotions that reduce price, play a significant role in changing the market shares for different price-based segments of the cigarette market. The recent rise in the relative share of deep discount brands

Table VI. Market share equations – with promotion variables

Independent Variable	Dependent variable		
	Market share of premium cigarettes	Market share of discount cigarettes	Market share of deep discount
Panel A – Limited Specification			
Real price premium cigarette	−1.8924 (−12.73)	1.8154 (12.74)	0.0770 (0.85)
Real price discount cigarette	1.9268 (13.51)	−2.0332 (−15.00)	0.1065 (1.26)
Real price deep discount cigarette	0.1690 (2.94)	0.2474 (4.48)	−0.4164 (−11.85)
Percent of premium cigarettes promoted	−0.0109 (−0.43)	−0.0019 (−0.08)	0.0127 (0.81)
Percent of discount cigarettes promoted	−0.0148 (−1.28)	0.0225 (2.04)	−0.0078 (−1.11)
Percent of deep discount cigarettes promoted	0.0106 (1.51)	−0.0126 (−1.87)	0.0020 (0.46)
Own price elasticity	−0.1836	−0.5614	−0.6258
Cross price elasticity – premium	–	0.6159	0.1747
Cross price elasticity – discount	0.1522	–	0.1967
Cross price elasticity – deep discount	0.0109	0.0556	–
Panel B – Full Specification			
Real price premium cigarette	−2.0721 (−13.25)	1.9523 (13.11)	0.1198 (1.28)
Real price discount cigarette	2.0138 (13.69)	−2.0807 (−14.98)	0.0669 (0.77)
Real price deep discount cigarette	0.1402 (2.41)	0.2735 (4.91)	−0.4138 (−11.74)
Percent of premium cigarettes promoted	−0.0169 (−0.63)	−0.0035 (−0.14)	0.0203 (1.25)
Percent of discount cigarettes promoted	−0.0078 (−0.66)	0.0199 (1.78)	−0.0122 (−1.72)
Percent of deep discount cigarettes promoted	0.0075 (1.05)	−0.0070 (−1.02)	−0.0005 (−0.12)
Own price elasticity	−0.2011	−0.5745 (0.6623)	−0.6218
Cross price elasticity – premium	–		0.2718
Cross price elasticity – discount	0.1590	–	0.1236
Cross price elasticity – deep discount	0.0090	0.0615	–

All equations also include an intercept, market fixed effects, own-lagged market share, unemployment rate, real per capita income, year fixed effects, and quarter fixed effects. The Full Model also includes the age, race, and gender variables. *t*-statistics are in parentheses. The critical values for the *t*-statistics are 2.58 (2.33), 1.96 (1.64), 1.64 (1.28) at the 1%, 5%, and 10% significance levels, respectively, based on a two-tailed (one-tailed) test.

is a consequence of their falling relative price, while losses in the market shares for other segments – particularly discount brands – result from increases in their relative prices.

Most of the growth in the deep discount segment of the cigarette markets occurred after 1998. At least some of this growth is likely to have resulted from the implementation of the MSA, particularly the provisions related to non-participating manufacturers. States were relatively quick to require NPMs to pay into escrow, but were slower to adopt the "complementary legislation" that made it easier to bring NPMs into compliance. Slower still was the state reaction to the MSA loophole that allowed for the refund of a substantial portion of the escrow payments made by NPMs that operated locally or regionally, rather than nationally. These refunds made it possible for some compliant NPMs to gain a cost advantage over the participating manufacturers and likely contributed to the growing gap between premium/discount cigarette brands and deep discount brands. In addition, numerous NPMs were not fully compliant with the MSA-related provisions and enforcement actions against non-compliant NPMs were often slow, contributing further to the cost differential between NPMs and participating manufacturers.

In addition to the possible cost-differentials, some have suggested that the major cigarette companies raised their prices well beyond what would have been necessary to cover the costs associated with the MSA (National Center for Tobacco Free Kids, 2002). Wholesale cigarette price data provide some support for this, with premium brand wholesale prices (exclusive of federal excise taxes) rising by 45 cents per pack when the MSA was adopted and by an additional 67 cents per pack over the next 42 months (SpecComm International, 2004). While the impact of the wholesale price increases on retail cigarette prices was partially offset by increases in expenditures on price promotions, the net effect is likely to result in an increase in the price differential between premium/discount brands and deep discount brands. Furthermore, the calculation of MSA payments by participating manufacturers is tied to their loss of market share and may have created incentives for not responding to (or even for inducing) a loss of market share to the NPMs. This may explain some of the differences in firm-specific trends in market share since the MSA, with some firms (Philip Morris and Lorillard) losing relatively little of their market share while others (R.J. Reynolds and Brown & Williamson) have lost significant share.

Given our estimates, the various factors contributing to the growing price differential between the deep discount segment of the cigarette market and other price segments are likely to explain much of the rapid rise in the deep discount market share from 1999 through 2002. In the most recent years, however, the growth of the deep discount segment was halted and recent data suggest it has reversed (Altria, 2005). This is likely to be

the result of several factors contributing to a narrowing of the gap between deep discount and other cigarette prices. In recent years, a growing number of states have adopted "complementary legislation", "allocable share repeal' and other statutes that aim to minimize the impact of the MSA on cost differentials among NPMs and participating manufacturers. Similarly, after an almost 90% rise in net-of-tax wholesale prices between November 1998 and April 2002, major cigarette companies have not increased wholesale prices since, while continuing to increase spending on price promotions. How the relative shares of and pricing strategies in the different price segments will change in coming years will be interesting to observe.

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