

# Impacts of legacy discounts in the market for national television advertising

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## Abstract

Advertising is an important input in the production of many final products sold to consumers, and national television ads still command the majority of ad dollars spent in the U.S. Yet, firms face different costs when accessing the market for national television ads. Industry practices suggest that (legacy) firms with long histories of participation in the market benefit from favorable prices to reach the same audiences. We seek to confirm empirically whether there are important differences in firms' costs to advertise nationally. Contracts between advertisers and networks are considered trade secrets, so we combine data on national ad placements, program viewership demographics, and average ad prices for each program airing to perform our analysis. We find model-free evidence that firms that have longer relationships with broadcasters face lower prices in these networks.

## 1 Introduction

Advertising accounts for roughly two percent of Gross National Product (GNP) in the U.S., and has important implications for society. Demand for advertising may impact the nature and quality of media programming on ad-supported platforms, and can affect the nature of competition in advertisers' product markets. We analyze the market for national television advertising, and document patterns that are consistent with industry reports of secret price discounts for existing customers, which relate to the length of their ad-buying relationship. We examine whether these practices have the potential to impact firms' advertising choices, and consequently the nature of competition between advertisers. Finally, we consider two classes of explanations for the use of this practice by networks: the need to charge different prices to advertisers with different unobserved demand, and the desire to soften competition between networks.<sup>1</sup>

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<sup>1</sup>These practices may also affect the nature of the content produced by television networks; we leave this topic for future work.

Pricing practices in the market for advertising on national broadcast television are unusual, although they share features with practices in other input markets.<sup>2</sup> Ad inventory on national broadcast television is sold in two markets: the ‘upfront’ and the ‘scatter.’<sup>3</sup> The scatter market sells ad slots close to the air date of a program. Prices are determined by the market, with little or no price discrimination between advertisers. The majority of broadcast television ad slots are sold through the upfront market. The upfront market dates to the 1960s and involves selling national advertising for the upcoming season in advance. Each spring, networks organize events to preview and sell ad inventory for their programming for the upcoming television season, beginning in the fall.

Unlike the scatter market, networks selling inventory in the upfront market honor firm-specific discounts, in which a network offers lower prices to firms with long histories of participation in the upfront market. The price determination process differs between new clients and returning business. New clients negotiate prices during the first year in which they advertise in a network. All returning advertisers face prices that evolve as a percentage change from their ‘base rate’ (the price they paid in the previous year). Lower prices are maintained for legacy advertisers because negotiated prices for new businesses have been consistently higher each year than the prices paid by returning businesses.

We refer to the lower costs faced by legacy firms as a ‘legacy discount.’ Price differences due to legacy discounts in the upfront market are so significant and prevalent that the industry refers to advertisers as being either ‘good money’ (new participants who pay high prices) or ‘bad money’ (legacy advertisers who receive grandfathered low prices).<sup>4</sup>

A challenge in studying the inter-firm contracts in this market is that firms consider these contracts to be trade secrets, and data on the terms of the contracts are rarely available. No source exists for documenting the individual prices paid by firms. To address the impacts of these unobserved legacy discounts, we combine institutional knowledge of contracting practices with data on firms’ ad placements, average prices, and historical ad-purchase behavior. Our goal is to identify the value of continued relationships in the national market for television advertising.

We rely on information on television viewership and ad placements, combined with ad-pricing data at the level of an individual telecast (or program airing) over a three-year period (January 2011 - December 2013). In order to infer the length of a relationship of a firm in the upfront market, we supplement the ad placement and pricing data from 2011 - 2013 with historical information on firm-level advertising expenditures going back to 1967. This allows us to track the length of

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<sup>2</sup>The broadcast networks in the U.S. are ABC, NBC, CBS, FOX, and CW. We refer to other networks as cable networks.

<sup>3</sup>Local advertisers may also purchase ads in specific geographic regions through local affiliates. Industry participants refer to these local markets as the ‘spot’ market. We focus exclusively on national ads sold by the national networks.

<sup>4</sup>In 2005, a media spending audit uncovered that firms pay different prices for identical time and space in the market for national television advertising. In addition, the report concludes that these “price differentials are not associated with the size of firms’ advertising budgets” (Bloom (2005)).

a firm’s presence in the broadcast advertising market. Brands that belong to the same parent company all benefit from the same base rate. Thus, we map brands to parent companies and use this information to define each brand’s relevant relationship with networks.

The empirical approach exploits new proprietary data on transaction-level upfront and scatter prices. The dataset reports the average upfront and scatter transaction prices for ad spots in a telecast. By mapping these average prices to the set of parent companies advertising in the program, we are able to infer price differentials across firms. To interpret these differentials, we project the estimates on firms’ budget size and the length of relationship in the broadcast upfront market. Results imply that, by entering the upfront market a year earlier, a firm may benefit from a 0.4% discount. For comparison, the inferred quantity discounts suggests that a 10% increase in firm’s advertising budget generates a 0.03% discount. The quantity discount estimate is not statistically significant. Next, we evaluate the implications of these discounts for advertisers, and consider networks’ strategies that may generate legacy discounts in equilibrium.

To analyze the role of legacy discounts for firms’ ad placements, we test the hypothesis that brands from legacy firms will choose to reach a disproportionately larger fraction of their viewers on broadcast (relative to cable) than non-legacy firms. Controlling for advertiser industry, total expenditure, and digital advertising strategy, we find that these patterns exist in the data. We interpret these results as consistent with the presence of legacy discounts on broadcast that influence ad-placement choices.

We quantify the importance of these discounts through the lens of efficiency gains from mergers, such as mergers between firms in unrelated product markets. Firms often invoke efficiency rationales to justify a merger; however, cost savings are hard to identify and measure, with the result that empirical evidence on cost savings from mergers is scarce.<sup>5</sup> National television advertising is an input market where a merger may decrease costs even if the firms operate in unrelated downstream markets. Industry practitioners report that for merging parties with different base rates in the upfront market, the newly-merged firm is able to purchase inventory at the lower rate. A back-of-the-envelope calculation presents a lower bound to the potential cost savings from merging with a legacy firm. Consider a merger between two firms with the same advertising budgets of \$70 million, but with different upfront entry timing: 1967 and 2013. Keeping average prices and firm advertising selections fixed, the stand-alone cost saving to the acquired firm from accessing the legacy discount is \$13 million.<sup>6</sup>

Concerns about unequal access to advertising have been considered by both academics and antitrust authorities. Porter (1976) highlights that national firms benefit from advertising nationally,

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<sup>5</sup>Ashenfelter, Hosken and Weinberg (2015) is an exception, where the authors analyze whether cost savings may offset the incentives to raise prices. A larger body of empirical work has focused instead on understanding how the change in competition following a merger influences prices or product characteristics (see Ashenfelter, Hosken and Weinberg (2014) for a survey).

<sup>6</sup>The calculation is a lower bound because a firm can also re-optimize its advertising mix. The reported cost savings are not be due to economies of scale or an improved bargaining position.

and that this competitive advantage may create barriers to entry for small local firms. Similarly, when national television advertising is an important input, a merger between two firms may have anticompetitive effects even if the firms operate in separate industries. Such a concern was raised when the FTC challenged Procter & Gamble's acquisition of Clorox in 1957. The Commission was concerned because advertising is an important competitive instrument in the market for liquid bleach. After the acquisition Clorox would be able to access national advertising at a discount relative to its competitors; therefore, the merger would discourage competition and entry in that market.<sup>7</sup> Today, antitrust authorities would likely treat such cost savings in advertising expenses in the same way as, for example, distribution efficiencies (Mensch and Freeman (1990)).

The question of which market features lead to the persistence of legacy discounts arises naturally. There are several potential rationales, most of which belong to two classes of explanations. The first class consists of demand-side rationales. For example, legacy price differentials may arise if advertisers with long-standing relationships have more elastic demand for national television advertising (e.g., if their brand reputation is better established, or if ad slots across different broadcast networks are closer substitutes for legacy firms). Relatedly, legacy firms may have less variable demand for advertising, and this reduced uncertainty may allow them to benefit from lower prices.

Networks often cite demand volatility as the rationale behind legacy pricing. Mechanisms connecting demand uncertainty and equilibrium price dispersion have been considered by Courty and Li (2000) and Dana (1999). In Courty and Li (2000) consumers (advertisers in our case) have partial private information about their valuations that is unknown to the firm (the network) at the time contracts are signed. As a result, the firm can extract a larger fraction of the surplus by sequentially offering a menu of contracts and, in effect, requiring consumers to reveal their private information about the distribution of their valuations. This strategy leads to lower prices for consumers with smaller valuation uncertainty. In a different approach, Dana (1999) shows that price dispersion may also arise in oligopoly and perfectly competitive markets. In this setup, if firms (networks) need to build costly capacity (programming content) before demand is realized, then firms will use multiple prices if they face uncertain demand.

The second class of explanations for legacy discounts consists of supply-side reasons for networks to engage in this practice. Industry practitioners suggest that networks honor grandfathered rates as a reward for maintaining consistent business, even when aggregate market demand is soft. Indeed, one of the unwritten expectations of the upfront market is that legacy firms are expected to maintain 'consistent' spending with a network in order to continue benefiting from their lower base rates (Lotz (2007)). These descriptions by practitioners evoke some of the conditional pricing practices used in other input markets, in which loyalty contracts or all unit discounts reward customers for meeting

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<sup>7</sup>During the 1950s and 1960s, firms purchased advertising by sponsoring television programming, which tended to benefit large firms. In the 1960s, broadcasters switched to selling ads according to the practices used today. Blank (1968) and Peterman and Carney (1978) show that after this change, discounts were not tied to the size of an advertiser's budget.

certain ‘conditions’ to qualify for a price discount. These contracts have the potential to induce both efficiency and anti-competitive effects; e.g., by efficiently smoothing revenues to support the production of content, or by encouraging buyers to drop inventory from competing networks. Other theoretical models examine the possibility that reducing prices for existing customers allows firms (i.e., the television networks) to soften price competition more generally. For example, Fong and Liu (2011) shows that repeat-purchase discounts facilitate tacit collusion in an fully dynamic model. The intuition is that such discounts decrease the profitability of a unilateral deviation.

The data allow us to examine evidence for mechanisms that lead to differences in volatility spending across firms. We seek to test the following questions: Do legacy firms have less volatile advertising expenditure? Do data patterns support the unwritten expectation that firms maintain consistent spending on broadcast? These rationales are closely related to explanations received by industry practitioners. The analysis does not address other mechanisms for price discrimination.<sup>8</sup> We are considering how best to empirically analyze these rationales, but do not yet report empirical evidence on the importance of these incentives.

First, we document that observed spending by legacy firms is in fact less volatile. Using historical information on firms’ broadcast spending, we construct a coefficient of variation for the ad expenditures of each parent company. Results show that over the 1995-2016 period, legacy firms have less volatile annual spending on broadcast networks.

These patterns, however, may not uncover the rationale behind the difference in spending volatility. In addition to inherent differences in the advertising demands across firms, these patterns may also reflect an equilibrium response to the expectation that firms maintain ‘consistent’ spending with a network to preserve legacy discounts. As a result, we look for further support for the supply-side hypothesis.

The next set of tests compare broadcast spending volatility to spending volatility in other media. If practices in the upfront market drive the results, then we expect to find that the relationship holds only for broadcast spending. Instead, we find that legacy firms have less volatile expenditures across most reported media outlets: network television, cable, magazine, display advertising; the exception being digital spending. These findings support the demand-side hypothesis; however they do not reject supply-side incentives. That is, the counterfactual broadcast spending of legacy firms might have been more volatile without the expectations to maintain consistent budgets. To evaluate this option, we compare firms’ coefficients of variation on broadcast to that on other media outlets. If legacy firms aim to maintain stable budgets on broadcast, then the ratio of volatility measures is expected to be lower for legacy firms. We find support for this hypothesis.

These analyses provide valuable information on overall firm-level advertising volatility. Patterns in the data are consistent with both mechanisms, that is, spending volatility that may be driven

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<sup>8</sup>On the demand side, we do not test whether demand elasticities may be driving the price differentials between legacy and non-legacy firms. On the supply side, we cannot test the hypothesis of tacit collusion using the data available.

by both intrinsic demand differences, or by the incentives to maintain preferential prices.

The rest of the paper is structured as follows: Section 1.1 surveys the related literature. Section 2 describes the market for national television advertising. The novel data sources used in this analysis are presented in Section 3. Section 4 exploits average prices to infer information about legacy discounts, and in Section 5 we test whether the legacy status of a firm may have equilibrium effects on brand advertising choices. Section 6 analyzes the potential mechanisms that support legacy deals. Section 7 concludes.

## 1.1 Previous literature

Inter-firm contracts may affect competition in both upstream and downstream markets, and in turn, total welfare. Commonly, firms that compete in a downstream market also face the same competitors in their input markets. Theoretical work has analyzed how differences in input costs may affect market competition, firms' entry and investment decisions, and merger incentives (Tirole (1988)). For example, DeGraba (1990) shows that variable input markets affect firms' choices of long-run production technology. Generally, a vast literature on price discrimination investigates the welfare effects of offering inputs at different prices to competitors downstream (Stole (2007)). These analyses suggest that the practice that legacy firms face lower prices for national television ads may confer a competitive advantage in their respective product markets. Theoretical analyses have also explored firms' incentives to limit competitors' access to an input of production (Esó, Nocke and White (2010)). In the television market, Dukes and Gal-Or (2003) develop a model to rationalize exclusive contracts between an advertiser and a network. We do not consider exclusive contracts because upfront purchases are not typically subject to exclusivity arrangements.

Advertising itself may have strategic implications for shaping market competition (see Bagwell (2007) for a survey). The effect of advertising on market structure and welfare depends on the way advertising influences consumers: whether it provides information ('informative advertising') or it affects consumers' utility derived from the product ('persuasive advertising'). Furthermore, differences in firms' costs to advertise can affect the nature of competition between advertisers. Doraszelski and Markovich (2007) shows that the cost to advertise influences industry structure when advertising is persuasive. Sutton (1991) proposes a model in which incumbents endogenously invest in advertising, with the result that they maintain concentration in the market as it grows. In our setup, the structure of the market for national television advertising solidifies the advantages of incumbent firms with long-standing relationships in the market.

Most empirical studies of advertising focus on determining how consumers respond to advertising (examples include Akerberg (2001), Dubé, Hitsch and Manchanda (2005), and Shapiro (2018)). Researchers have also used data from firms' advertising choices to infer information about competition. Vilcassim, Kadiyali and Chintagunta (1999) tests different modes of conduct with respect to price and advertising competition. Dubé and Manchanda (2005) finds that advertising has different

effects on price competition depending on market size. Scott Morton (2000) and Ellison and Ellison (2011) study whether firms use advertising as an entry deterrent in the pharmaceutical industry. Qi (2013) exploits market dynamics after the cigarette advertising ban of 1971 and concludes that such restrictions lead to a more concentrated industry structure. Chandra and Weinberg (2018) uses a merger in the U.S. brewing industry to analyze empirically the relationship between market structure and firms' advertising expenditures. Earlier empirical cross-industry analyses of the association between advertising and entry are summarized in Bagwell (2007).

The nature of the market connects this project to the literature studying two-sided markets. Television networks connect viewers' demand for programming on one side, and advertisers' demand for audiences on the other side. The literature carefully studies consumers' choice and the incentives of media companies in balancing the two sides of the market. However the advertising side of the market has received less attention empirically. Theoretically, Rochet and Tirole (2003) and Armstrong (2006) provide a framework for analyzing pricing incentives in two-sided markets. Anderson and Gabszewicz (2006) surveys the literature on advertising in media markets and provides a framework for analyzing equilibria in two-sided media markets and the social welfare implications of advertising. Anderson and Coate (2005) provide a theory of the provision of ad-supported programming when viewers incur nuisance costs from advertising.

Empirically, two-sided media industries are analyzed in the context of network effects of Yellow Pages (Rysman (2004)), entry of radio stations (Berry and Waldfogel (1999), Berry and Waldfogel (2001), Sweeting (2010)), newspaper consolidation and competition (Fan (2013), Gentzkow and Shapiro (2010), and Gentzkow, Shapiro and Sinkinson (2014)). In the market for national television advertising Wilbur (2008) finds that advertisers' preferences influence networks' choice of programming more strongly than viewers' preferences. Goettler and Shachar (2001) and Goettler (1999) analyze television networks' strategic scheduling choices. These studies provide a careful analysis of the consumer and media side of the problem, while using only aggregate demand for advertising.

## 2 Market for national television advertising

National broadcast television advertising inventory is sold in two markets: the 'upfront' and the 'scatter.'<sup>9</sup> The scatter market sells ad slots close to the air date of a program. Prices are determined by the market, with little or no price discrimination between advertisers. The scatter market is relatively small, with broadcast networks (ABC, NBC, CBS, FOX, and CW) selling about 20% of their ad inventory in this market. Advertising inventory for popular shows may sell out before the scatter market occurs.

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<sup>9</sup>Firms may also purchase ads in specific geographic regions through local affiliates. These ads are typically sold to local advertisers, such as car dealers, professional services, local retailers, or political candidates in state or local elections. Industry participants refer to these local markets as the 'spot' market. We do not observe local advertisements, and our focus throughout is on the national ads sold by the national networks.

The majority of broadcast television ad slots are sold through the upfront market. The upfront market dates back to the 1960s and involves selling national advertising for the upcoming season in advance. Each spring, between March and June, networks organize events to preview and promote their programming for the upcoming Fall television season. Important benefits to purchasing in the upfront relate to the availability of programming, discounts relative to purchasing in the scatter market, and the use of firm-specific legacy discounts.<sup>10</sup>

Cable networks differ from broadcast networks in several ways. Some cable networks are primarily supported by viewer subscriptions (e.g., HBO), and have a much smaller presence in the advertising market. Large ad-supported cable networks (e.g., ESPN, USA, TNT, TBS, and Fox News) entered the upfront market in the 1990's. Unlike broadcast networks, however, they sell more than half of their inventory through the scatter market (Bollapragada et al. (2008)). The inventory that the ad-supported cable networks sell through the upfront market is sold at much lower prices than broadcast networks, without the legacy pricing deals used by broadcasters.<sup>11</sup>

In practice, most advertisers work with ad agencies to create advertising campaigns for their products, determine advertising budgets, and recommend a programming mix. Ad agencies also negotiate on behalf of their clients in the upfront market. The upfront typically proceeds in two steps. First, agencies negotiate each client's 'program mix' allocation in a network.<sup>12</sup> The programming-mix negotiations are over blocks of ad slots that reach audiences with similar demographic profiles, rather than at the level of the individual commercial in a specific television show.

Once the programming mix is established, agencies negotiate prices. Prices are described as 'cost per mille' (CPM), or the cost to reach one thousand viewers. CPM rates vary by audience size and viewer demographics, by seasonality, by day of the week, and by advertiser. The price determination process differs between new and returning business. In the case of new accounts for a network, the agency negotiates a CPM, which becomes the advertiser's base rate for the following year's upfront. For all returning business, agencies negotiate a uniform percent increase (or rarely a decrease) that is applied to each firm's base rate to determine its price. Thus, a base rate reflects the price a firm paid in the previous upfront. For example, if Proctor & Gamble's (P&G) base rate with ABC in 2011 is \$10, and ABC secures a 10% increase in prices in 2012, then P&G will pay a CPM of \$11 in the 2012 upfront market. The difference between legacy and non-legacy prices has been maintained over time because negotiated prices for new businesses have been consistently higher than the prices paid by returning businesses.

In 2005, an auditor of media spending, Media Performance Monitor America (MPMA), analyzed actual prices paid by major U.S. advertisers.<sup>13</sup> The report documents the presence of price variation across firms for identical time and space in the upfront (Bloom (2005)). The findings show that

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<sup>10</sup>On average, scatter rates are about 15 percent higher than average upfront rates (Lotz (2007)).

<sup>11</sup>Industry analysts cited a 3:1 CPMs ratio in between broadcast and cable in the 2014 season.

<sup>12</sup>"Some clients are more involved and request to see mixes as the agency negotiates with the network." (Lotz (2007))

<sup>13</sup>At the time, MPMA's clients accounted for \$3 billion in advertising expenditure.

so-called ‘legacy’ firms, who have long histories of participation and ‘old’ base rates, may pay prices that are as much as 50% lower than the prices faced by firms on the other side of the distribution (i.e., new entrants). The report further reveals that these deals are not associated with the size of the firm or the identity of the firm’s media-buying agency.

The contracts in the market for national television advertising are further complicated by audience guarantees, firm and optionable buys, and multi-year arrangements. First, all upfront purchases are granted network guarantee audience delivery. If a program’s viewership is lower than the contracted expected viewership, then the network provides additional ad spots – potentially during other time slots or shows. Alternatively, if a program’s viewership is larger than predicted, then the advertiser captures these gains at no additional cost. To fulfill these audience guarantees, networks typically reserve some inventory in advance, which may affect inventory availability and prices in the scatter market. Second, advertisers have some flexibility to adjust their upfront commitments. Typically, advertiser commitments for the fourth quarter of the current year are considered ‘firm’ buys, whereas advertisers may cancel about 25% of their upfront commitments for the first quarter of the following year, and 50% for the second and third quarters. Historically, advertisers have not aggressively exercised this option. Cancellations run between 10% and 15% (Wang, Stabler and Mukherjee (2009)). Last, multi-year contracts may be used in the case of sporting events and other event sponsorships. These practices do not directly affect the price determination process in the upfront market.

### 3 Data

The data for the project come from five sources: Rentrak Corporation, SQAD, and three sources that report historic information on advertising spending: Kantar Media’s Ad\$pender, AdSummary periodicals, and Leading National Advertiser periodicals.<sup>14</sup> The data from Rentrak Corporation and SQAD cover a three-year period (January 2011 - December 2013).

In the television market, Rentrak collects viewership (i.e., ratings) data from over 13 million households and 29 million set-top cable boxes.<sup>15</sup> The demographic detail covers over 100 standard demographic variables for all members of each household (for example, gender, race, education, income, etc.). Rentrak combines these viewership data with information on ad placements. The information about each advertisement is extensive, describing the advertiser, industry, product, ad copy, timing, and placement of each ad. For example, an observation describes that Coca-Cola Co ran the 30-second “Let the World Come to Your Home” ad for Coca-Cola during the 9:00pm showing of “Modern Family” on ABC, on October 16, 2013. The Rentrak data also contain information on the corporate relationships across advertisers, identifying parent companies for brands across

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<sup>14</sup>Rentrak was acquired by ComScore in February 2016. SQAD is owned by Clarion Capital Partners, LLC.

<sup>15</sup>Unlike the Nielsen Company, which tracks 25,000 households using a ‘PeopleMeter’ to monitor which member of a household is viewing a telecast, Rentrak collects data for a much larger population at the level of each ‘tune-in’ of a remote control, but does not identify which household member is viewing a given telecast.

products in different industries.

Prices of ad spots are closely guarded by industry participants and are notoriously difficult to observe. SQAD is the sole provider of data on the prices that result from these transactions.<sup>16</sup> These transaction-level data, which SQAD calls ‘NetCosts,’ report the average transaction price for an ad spot in a specific telecast (for example, “Modern Family” on ABC, shown at 9:00pm on October 16, 2013). The data contain information on reported prices separately for the upfront and scatter markets.

Brands that belong to the same parent company all benefit from the same base rate. Thus, data from Rentrak that map brands to parent companies are used to define a brand’s relevant relationship with networks. In order to infer the length of a relationship between a parent company and a network, the Rentrak and SQAD data are supplemented with three additional data sources. Each source reports information on advertising expenditures across multiple media outlets: broadcast television, cable television, online display advertising, radio, magazines, and newspapers. The distinction between the sources is that they cover different time periods. Kantar Media’s AdSpender reports monthly advertising expenditures for more than 3 million brands for the 1995-2018 sample period. Next, AdSummary books publish annual expenditures for the top 1,000 parent companies from 1974 to 1995. For the 1967-1973 period, data are collected by hand from Leading National Advertiser publications. The data include information on advertising expenditures starting in 1967, allowing us to track the length of a parent company’s presence in the broadcast advertising market.

### 3.1 Sample

The final sample includes three years of pricing and detailed advertising data: January 2011 - December 2013 with the associated advertising histories of each firm. We focus the analysis on 30 networks for which we observe average prices and ad placements. These networks include the five broadcasters (ABC, CBS, CW, FOX, and NBC), and 25 cable networks. The cable networks are grouped into conglomerates according to their ownership structure during the sample period: Disney-ABC (ABC Family), ESPN (ESPN), Hearst Corporation/Disney-ABC (A&E, History, Lifetime), AMC Networks (AMC), Comcast (Bravo, MSNBC, Syfy, USA), Discovery Communications (Animal Planet, Discovery, TLC), Fox Entertainment Group (FX, Fox News), Scripps Networks (Food Network, HGTV, Travel Channel), Time Warner (CNN, TBS, TNT, TruTV), Viacom (BET, MTV, Spike).

The analysis is applied to data on primetime prices and advertisers’ input-sourcing choices. Primetime refers to the 8-11:00p.m. block of television programming; most television viewership and advertising expenditures are concentrated in primetime. The analysis is applied to these programs because primetime advertising reflects firms’ ad-placement choices, while ad placements

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<sup>16</sup>In order to solve the information revelation problem, the transaction prices are reported as an average transaction price for telecasts for which advertisers from at least two agencies purchased a spot.

in non-prime time may be the result of audience deficiency guarantees. SQAD reports upfront prices for 44,131 unique primetime telecasts and 16,330 scatter prices for the set of 30 networks. Table 1 summarizes reported prices. Average upfront CPMs are \$8.65 and these are, on average, 20% lower than reported scatter prices.

Large advertisers are the main participants in the upfront market. As a result, we focus on ad placements by large advertisers. The set of 319 parent companies used in the analysis account for 80% of national television primetime ad revenues during the sample period. For the five broadcast-ers, the set of parent companies capture 87% of primetime ad slots and smaller firms (and firms with unidentified brands) account for 13%. Results are similar for cable companies: we track 77% of national ads.

Parent companies are described by their advertising budgets, brands, and legacy status. We track 507 brands produced by these 319 parent companies. For example, the parent company Toyota Motor Corp owns three advertisers in the data: Lexus, Scion, and Toyota. Advertising budgets for the 2011-2013 sample period are obtained from AdSpender. The average firm budget for an advertising firm across the five broadcast networks is \$69.9 million, while cable companies capture \$62.8 million per firm. The analysis focuses on primetime advertising, which constitutes 62% of advertisers' annual spending on broadcast television. During the sample period, national television advertising constitutes, on average, 70% of firms' total advertising spending, which includes online display advertising, radio, newspapers, and magazines.<sup>17</sup> We evaluate the match between our data sources by comparing the annual primetime spending reported in AdSpender with primetime spending constructed using average prices from SQAD and ad placements from Rentrak. The correlation between the two variables is 0.98, which confirms the match between our data sources.

The variables that track the length of parent company participation in the upfront market are constructed using parent company annual advertising expenditure from 1967 to 2013. Two separate variables are constructed: one each for the broadcast and cable markets. For the broadcast market, the variable construction assumes that a firm enters the upfront market in the first year in which the parent company advertises on broadcast television, assuming that: (i) there are no gaps in spending greater than a year, and (ii) the broadcast spending by the company accounts for at least 0.01% of total broadcast revenues in that year. Ideally, the analysis would check whether a firm receives a lower price from a specific network when it has a longer historic relationship with that network. However, the historic advertising expenditure sources aggregate spending information across networks to the level of 'broadcast spending' and 'cable spending.' The legacy variable using cable spending data follows the same rules. However cable spending is only observed in the data starting in 1984.

The legacy status of a firm is created at the level of a parent company, as base rates in the upfront market are the same for all brands of a parent company. Based on broadcast television

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<sup>17</sup>The online spending reported in AdSpender includes only display advertising; search and broadband video are not included.

Table 1: Summary statistics

	mean	sd	med	min	max
cpm (upfront)	8.65	6.28	6.82	0.06	38.56
cpm (scatter)	9.62	6.97	7.62	0.11	103.39
<i>Annual firm spending (\$ 1,000s)</i>					
total spending	190728	257571	95272	448	2524224
broadcast spending	69914	102721	28339	0	687556
broadcast primetime spending	43318	68599	14879	0	480695
cable spending	62860	80779	32549	30	854871
digital spending	21671	39876	6941	0	320396
newspaper spending	2928	8500	190	0	113704
magazines spending	31294	81577	7742	0	939652
<i>Annual brand spending (\$ 1,000s)</i>					
total spending	100838	131561	53628	4	1241152
broadcast spending	40379	68763	16024	0	687523
broadcast primetime spending	25211	47270	9052	0	480695
cable spending	34219	38769	21147	0	330715
digital spending	10119	22231	2661	0	227115
newspaper spending	1376	4075	0	0	52635
magazines spending	13641	27301	3759	0	284341
<i>Firm non-legacy status</i>					
legacy (broadcast)	20	16	16	1	47
legacy (cable)	18	9	19	2	29
number of brands	1.76	2.21	1.00	1.00	26.00

Advertiser spending (in millions) estimates and length of relationship are obtained from AdSpender. The other variables are constructed using Rentrak and SQAD data.

spending, data suggest that 51 parent companies have established relationships with a broadcaster in 1967, and the data track the entry of the remaining companies. The legacy variable in table 1 reports the year of entry in the upfront market prior to 2014. On average, firms entered the upfront market in 1994 (legacy=1 for firms that enter in 2013, 2 for firms that enter in 2012, etc.).

For cable companies, we infer that 84 firms have been consistently advertising in cable companies since 1985; and 72 of these firms have entered the broadcast upfront market prior to 1985. For the remaining firms, 113 have longer uninterrupted relationships in the broadcast advertising market; the inferred entry is the same for 68 firms; and 34 firms enter the cable market before the broadcast upfront. The correlation between the cable and broadcast legacy variables is 0.77.

For the 2011-2013 sample, legacy firms advertise more in both broadcast and cable programming than non-legacy firms. Table 2 reports the correlation between legacy status and average annual advertising expenditure. Column (1) constructs the correlations at the parent-company level, while column (2) uses spending at the brand level. The correlation between broadcast legacy status and broadcast budget is 0.49, and 0.46 for cable budget. At the brand level, the correlation between the legacy status of the parent company and the annual brand budget on broadcast is 0.13. These patterns suggest that legacy firms have higher budgets and a larger number of brands. The correlation between total broadcast budget and number of brands produced by the company

Table 2: Correlation between spending and legacy status

	(1)	(2)
	parent company	brand
total spending	0.47	0.11
broadcast spending	0.49	0.13
cable spending	0.46	0.06
digital spending	0.25	-0.00
newspaper spending	0.13	-0.06
magazines spending	0.29	0.14

Reported correlations are constructed using average annual expenditure at the parent company level for column (1) and average brand spending for column (2).

is 0.32.

AdSpender aggregates historical advertising expenditures for each firm across all broadcasters and across all cable networks; thus, we can only infer when a parent company purchases ads from any broadcaster (or cable network), rather than the exact identities of the networks. This requires an implicit assumption that if a company’s spending is significant for the broadcast (or cable) market, then the company purchases ads in the upfront and it advertises in all broadcast (or cable) networks. We can confirm the plausibility of this assumption for the observed sample period using Rentrak data. On average, parent companies advertise in 23 of the 30 networks in a year. For the set of companies that advertise on broadcast, data show that, on average, they place ads in 4.2 of the 5 broadcasters, where the variation is created by the choice of whether to advertise on CW. For the three main broadcasters, ABC, CBS, and NBC, we observe that 95% of firms advertise in all three networks, 4.7% advertise in two of the networks, and 0.3% of parent companies advertise in only one of the broadcasters. We interpret this as support for the assumption that if a company spends on broadcast, then it advertises in the three main broadcasters. For cable companies, we test the hypothesis at the conglomerate level. On average, firms advertise in 9 out of 10 separate cable conglomerates. For the 2011-2013 sample period 46% of the parent companies advertise on all cable conglomerates.

#### 4 Quantifying legacy discounts

Contracts between advertisers and networks are considered trade secrets, so our first empirical task is to confirm the industry narrative that prices for new businesses are, on average, higher than prices paid by legacy firms with established relationships in the upfront market. The strategy will also allow us to quantify the size of these discounts. The data contain average prices in each telecast (reported by SQAD) and the universe of firms advertising in each telecast (reported by Rentrak). With this information, we construct price differentials across parent companies and project these differentials on parent companies’ characteristics, including the length of their relationship in the broadcast upfront market.

A stylized example showcases the strategy. Suppose that there are two telecasts with average upfront prices  $p_1^u$  and  $p_2^u$ , and reported scatter prices  $p_1^s$  and  $p_2^s$ . Only two advertisers ( $a$  and  $b$ ) show ads in these telecasts and their discounts relative to scatter prices are  $\delta_a$  and  $\delta_b$ . These firm-specific discounts are the same across the two telecasts. If firm  $a$  advertises in both telecasts, and firm  $b$  shows an ad only in telecast 1, then average upfront prices are constructed as

$$p_1^u = \frac{p_1^s * \delta_a + p_1^s * \delta_b}{2} \quad \text{and} \quad p_2^u = p_2^s * \delta_a. \quad (1)$$

Rearranging, we get

$$\frac{p_1^u}{p_1^s} = \frac{\delta_a + \delta_b}{2} \quad \text{and} \quad \frac{p_2^u}{p_2^s} = \delta_a \quad (2)$$

and the firm-specific discounts can be backed out as

$$\delta_a = \frac{p_2^u}{p_2^s} \quad \text{and} \quad \delta_b = 2 * \frac{p_1^u}{p_1^s} - \frac{p_2^u}{p_2^s}. \quad (3)$$

The empirical analysis proceeds in two steps. First, price ratios,  $p_j^u/p_j^s$ , are regressed on a matrix identifying the presence of a parent company in that telecast

$$\frac{p_j^u}{p_j^s} = \delta_{in} X_j + u_j, \quad (4)$$

where  $X$  is a matrix of firm-network specific fixed effects, weighted by the number of ads shown in each telecast. From this regression, we recover estimates of firm-specific discounts at network  $n$ , denoted  $\hat{\delta}_{in}$ . If firms pay the same prices in the scatter market, then the  $\delta$  parameters will capture only differences between upfront and scatter prices. To interpret these discounts, we project these estimates onto parent company budget and legacy information as

$$\hat{\delta}_{in} = \text{constant} + \beta(\text{parent budget, legacy status}) + \epsilon_i. \quad (5)$$

We estimate a separate discount parameter for each firm-network pair,  $\hat{\delta}_{in}$ . We do not allow firm-specific discounts to change over time. The implicit assumption is that scatter prices capture movements in demand and supply for a given telecast, which leaves the relative discount of each firm in the network unchanged. When comparing discounts across firms, the practice of uniform percent changes each year is consistent with stable differences in price discounts across firms. For example, let P&G's base rate at ABC be \$10 and Netflix' base rate be \$20 in 2011. If ABC secures a 10% increase in CPMs, then this percent increase is applied to all of its returning advertisers. This implies that the updated price for P&G is \$11, which is again 50% lower than Netflix' price of \$22. The uniform price adjustments across all clients suggest that the price differentials across firms persist over time.

Our main identifying assumption is that the variation in price ratios (between the upfront and

scatter markets) across telecasts is driven by the discounts secured by each firm.<sup>18</sup> Scatter prices account for 79% of the variation in upfront CPMs, and by using the price ratio, we control for telecast unobservables due to viewership, day of the week, and network or programming unobservables. If we did not control for scatter prices, then price differences across shows could arise from telecast-specific unobservables. For example, a naive regression of upfront prices on  $X$ , without controlling for differences in telecasts,

$$p_j^u = X_j \gamma_{in} + u_j, \tag{6}$$

would impose the strong assumption that a parent company is facing the same CPMs across shows within a network. As a result, the parameter estimates would only inform us of the types of shows in which firm  $i$  advertises: a high  $\gamma_{in}$  implies that firm  $i$ 's advertising portfolio in network  $n$  consists of telecasts with higher-than-average prices.

The error term in equation 4 may be generally attributed to two sources. The first relates to telecast unobservables that are not captured by scatter prices. We rely on scatter prices to control for unobservables that may influence both prices and ad placements; however, upfront and scatter prices are determined at different times (i.e., in late spring versus close to the telecast air date). Therefore, the error term accounts for changes in demand conditions or expectations for telecast performance. This may cause a concern if, for example, legacy advertisers have a better ability to predict telecast performance, which leads them to purchase ads in telecasts that “over perform.” Section 2 describes that in the upfront markets advertisers rely on media-buying agencies for selecting the blocks of shows in which to advertise. The implicit assumption is that agencies share the same advice about expected telecast performance across their clients, which leads to uniform information spread during the upfront.

The second source of error in equation 4 relates to sampling variation in the SQAD data and sample construction. SQAD reports average upfront prices if at least two media-buying agencies disclose transaction costs. We cannot identify the parent companies SQAD uses to construct reported averages; instead, we assume that the prices reflect an average across all 298 parent companies with inferred upfront presence during the 2011-2013 sample period. As a result, the matrix of parent companies may include firms that are not relevant to the observed SQAD price. Conversely, by focusing only on firms with large advertising expenditures, it is possible that the sample excludes some parent companies that report upfront costs to SQAD. This second mechanism is of less concern because the sample of parent companies accounts for 87% of broadcast spending during the sample period.

The three major broadcasters (ABC, CBS, and NBC) established the upfront market in the

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<sup>18</sup>Our data do not include information on the identities of media-buying agencies employed by each parent company. As a result, the evidence provided below assumes that differentials across firms are not driven by the identity of the agency used during the upfront negotiations. Industry participants report that the various agencies all secure similar percentage increases (or decreases) during the upfront market.

1960s. FOX entered the broadcast (and upfront) market in 1986, and CW in 2006. We adjust the legacy variable for these two networks to begin at 1986 and 2006 respectively. Although legacy discounts are an important characteristic of the market for broadcast advertising, they are of less importance for national cable advertising. The analysis below focuses on legacy discounts in the broadcast market; results for cable prices are included for completeness.

Table 3 reports the results from the two-step analysis described in equations 4 and 5. The first stage explains about 27% of the variation in price ratios. Reported estimates and standard errors take into account errors introduced in the first stage of the regression. Firm-specific discounts are parametrized using the log of total annual advertising budget by the parent company and the non-legacy variable. The second-stage  $R^2$  statistic does not take into account sampling error from first stage analysis.

The first column reports estimates of legacy and quantity discounts that do not vary across the five broadcast networks. The estimates are consistent with grandfathered preferential rates. The results from this regression are directly interpretable. For example, the 0.004 estimate implies that a firm that enters in 1967 may benefit from a 19% discount relative to the cost of a new entrant ( $0.19=0.0042*(2013-1967)$ ). Columns (2) and (3) allow that these discounts vary by network. The results across networks show different strategies across broadcast networks; estimates in column (3) are consistent with legacy discounts for all networks but ABC. Results for CBS suggest that firms benefit from a discount of 0.6 percentage points for entering the market one year earlier. In comparison, the quantity discount is 0.4 percentage points for a 10% increase in broadcast expenditure.

The last column of table 3 shows estimates if we regress upfront prices on a matrix identifying the presence of a parent company in a telecast. This regression does not control for differences in CPMs across telecasts. Unsurprisingly, the budget estimates suggest that firms with larger budgets pay higher average prices, because they advertise in more popular telecasts. Given these concerns, we do not interpret the rest of the estimates as indicative of practices in this market. We use this as an example to showcase the importance of controlling for scatter prices.

For completeness we repeat the analysis using prices and ad placements of primetime cable telecasts and report the results in table 4. In this case, the first stage estimates firm-conglomerate specific discounts,  $\hat{\delta}_{i,\text{conglomerate}}$ , rather than firm-network specific discounts.<sup>19</sup> The independent variables in the second stage reflect logged cable expenditures and legacy status for the cable market. Column (1) imposes that the legacy discount is the same across cable networks, and results suggest that, on average, cable networks do not offer such incentives. Results are similar

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<sup>19</sup>We do not estimate a parameter for ESPN because contracts to advertise on sports events are further complicated by sponsorship and multi-year deals. The cable networks are grouped into conglomerates according to their ownership structure during the sample period: Disney-ABC (ABC Family), ESPN (ESPN), Disney-ABC/Hearst Corporation (A&E, History, Lifetime), AMC Networks (AMC), Comcast (Bravo, MSNBC, Syfy, USA), Discovery Communications (Animal Planet, Discovery, TLC), Fox Entertainment Group (FX, Fox News), Scripps Networks (Food Network, HGTV, Travel Channel), Time Warner (CNN, TBS, TNT, TruTV), Viacom (BET, MTV, Spike).

Table 3: Legacy discounts results

	(1) $p^u/p^s$	(2) $p^u/p^s$	(3) $p^u/p^s$	(4) $p^u$
budget	-0.003 (0.010)			
budget ABC		0.037* (0.020)	0.002 (0.021)	3.016*** (0.271)
budget CBS		-0.049*** (0.015)	-0.038** (0.016)	5.028*** (0.173)
budget NBC		0.033 (0.022)	0.028 (0.023)	4.829*** (0.310)
budget FOX		0.041 (0.027)	0.083*** (0.028)	4.939*** (0.521)
budget CW		-0.011 (0.030)	0.023 (0.032)	-6.698*** (0.651)
legacy ABC	-0.004*** (0.001)	-0.004*** (0.001)		
legacy ABC			0.002 (0.002)	-0.279*** (0.020)
legacy CBS			-0.006*** (0.001)	-0.178*** (0.014)
legacy NBC			-0.003** (0.001)	-0.240*** (0.021)
legacy FOX			-0.020*** (0.003)	0.440*** (0.075)
legacy CW			-0.075*** (0.027)	6.789*** (0.500)
ABC	0.146 (0.170)	-0.580 (0.363)	-0.145 (0.375)	-43.618*** (4.792)
CBS	0.087 (0.170)	0.930*** (0.262)	0.791*** (0.271)	-85.284*** (3.006)
NBC	0.087 (0.171)	-0.575 (0.405)	-0.522 (0.410)	-79.672*** (5.508)
FOX	0.023 (0.174)	-0.799 (0.499)	-1.207** (0.505)	-88.607*** (9.086)
CW	0.017 (0.177)	0.163 (0.552)	0.088 (0.553)	81.515*** (11.200)
observations	4167	4167	4167	11083
first-stage $R^2$	0.27	0.27	0.27	0.67

Number of observations tracks the price ratios used in the first stage of the regression analysis:  $p^u/p^s$  or  $p^u$ . The number of observations in the first three models is lower due to the lower number of scatter prices in the data. The results show the projection described in equation 5, where first stage discount estimates are regressed on parent company characteristics. Reported estimates and standard errors take into account errors introduced in stage one of the analysis.

Table 4: Legacy discounts results

	(1) $p^u/p^s$	(2) $p^u/p^s$	(3) $p^u/p^s$	(4) $p^u$
budget	-0.306*** (0.001)			
budget A&E		-0.017** (0.008)	-0.003 (0.008)	0.892*** (0.097)
budget ABC-WD		0.125* (0.073)	-0.139* (0.083)	-4.606*** (0.583)
budget AMC		-0.311*** (0.001)	-0.311*** (0.001)	7.716*** (0.619)
budget Comcast		0.037*** (0.012)	0.080*** (0.013)	5.223*** (0.166)
budget Discovery		0.025 (0.070)	0.022 (0.076)	-1.924*** (0.105)
budget Fox Entertainment		-0.156 (0.110)	-0.024 (0.121)	-0.112 (0.141)
budget Scripps		-0.016*** (0.005)	-0.012** (0.005)	0.080* (0.047)
budget Time Warner		0.009 (0.016)	-0.012 (0.021)	1.855*** (0.144)
budget Viacom		0.026 (0.038)	-0.079* (0.047)	-0.617 (0.497)
cable legacy	0.004*** (0.000)	0.004*** (0.000)		
cable legacy A&E			-0.003** (0.001)	-0.038*** (0.013)
cable legacy ABC-WD			0.095*** (0.014)	0.285*** (0.066)
cable legacy AMC			0.004*** (0.000)	0.790*** (0.077)
cable legacy Comcast			-0.008*** (0.002)	-0.074*** (0.027)
cable legacy Discovery			0.005 (0.010)	0.208*** (0.014)
cable legacy Fox Entertainment			-0.035** (0.015)	-0.077*** (0.017)
cable legacy Scripps			0.002*** (0.001)	0.040*** (0.006)
cable legacy Time Warner			0.008*** (0.003)	0.200*** (0.018)
cable legacy Viacom			0.023*** (0.005)	0.802*** (0.053)
Hearst Corp	5.457*** (0.010)	0.259* (0.143)	0.146 (0.145)	-15.493*** (1.649)
ABC-WD	5.478*** (0.019)	-2.341* (1.324)	0.239 (1.379)	74.784*** (9.932)
AMC	5.542*** (0.009)	5.633*** (0.009)	5.634*** (0.009)	-158.765*** (10.419)
Comcast	5.426*** (0.010)	-0.778*** (0.210)	-1.281*** (0.225)	-93.794*** (2.778)
Discovery	5.599*** (0.018)	-0.405 (1.271)	-0.376 (1.305)	28.575*** (1.816)
Fox Entertainment	5.610*** (0.025)	2.910 (1.973)	1.439 (2.055)	0.094 (2.402)
Scripps	5.450*** (0.010)	0.285*** (0.093)	0.269*** (0.093)	-2.094*** (0.798)
Time Warner	5.534*** (0.010)	-0.153 (0.297)	0.128 (0.345)	-38.836*** (2.390)
Viacom	5.569*** (0.014)	-0.461 (0.688)	1.017 (0.793)	-5.626 (8.313)
observations	11201	11201	30631	
first-stage $R^2$	0.21	0.21	0.67	

Number of observations tracks the price ratios used in the first stage of the regression analysis:  $p^u/p^s$  or  $p^u$ . Reported estimates and standard errors take into account errors introduced in stage one of the analysis.

when we allow for budget-conglomerate and legacy-conglomerate interactions reported in columns (2) and (3). Most estimates imply positive coefficients, with the exception of A&E, Comcast, and Fox Entertainment Group. This is consistent with industry narratives that legacy discounts are not as important in the cable upfront market. We do not find evidence of quantity discounts in the cable primetime upfront market. The last column shows that there is no clear relationship between firm budget and average upfront prices for the cable market.

Table 5: Cost differentials within a product category

	mean	sd	med	min	max
mean legacy	29	11	27	10	47
st. dev legacy	13	6	15	0	20
max diff non-legacy	35	15	42	0	46
ave brand budget (1000s)	53604	60715	34834	1413	319120
ave cost savings (1000s)	8117	9673	4793	0	48506

The cost savings estimates reflect ave

To evaluate the size of the legacy discounts on broadcast, we perform a simple partial equilibrium calculation to quantify the dollar value of a legacy discount. The exercise keeps average prices and firm programming mix fixed and calculates the cost savings to a firm if it changes its status from a new entrant to the upfront market to having the full legacy discount of a firm that advertised in the first year of the upfront. This type of adjustment may happen if, for example, a non-legacy firm merges with a legacy firm. In that case, the merged firm will face the lower price. Consider the average firm that spends \$70 million on broadcast annually. A back-of-the-envelope calculation implies that such a firm that enters the upfront market in 2013 would save \$13 million annually if it had access to the legacy discount of a firm that began purchasing in the upfront market in 1967. In the case of a merger, this would be interpreted as a cost efficiency.

Table 5 repeats the back-of the envelope calculation by product category. The first row reports the average legacy status of a firm within a category. The variable shows that there is variation in the composition of firms across categories. For example, ‘Dating Services’ category is the newest category in the market with an average upfront entry of 2004 (legacy=10), while all major advertisers in ‘Cold Cereal’ enter the market in 1967. Examples of categories with average legacy status of about 29 are the ‘Wireless Telecom Providers’ and ‘Beer and Wine’ categories. This suggests that there may be important cost differences across categories.

Cost differences may influence product-market competition if these differences occur within a product category. The second row in table 5 summarizes the standard deviation of legacy status within a product category. Next, we calculate the maximum difference in legacy status within a category. On average, there is a 35 year difference in upfront entry timing within a product category. To calculate potential cost differences, we interact the maximum entry difference with average brand budget within the category and the estimated 0.4 percentage point discount. Potential cost savings for the newest entrant in a product category are \$8.1 million, on average. As a result, cost differences related to grandfathered preferential rates matter both within and across categories.

Another way to characterize these benefits is to calculate the additional impressions (non-unique views) that a new entrant may purchase without increasing its budget, if it had access to the full legacy discount. We use the average CPMs and ratings and calculate the additional impressions that a brand may reach with \$8.1 million. This exercise suggests that the cost savings of the full legacy discount correspond to 76 additional ads on broadcast television each reaching on average 9 million viewers, for a total of 680 million additional impressions.

Note that this gain is not due to economies of scale or an improved bargaining position of the firm. The calculation presents a lower bound to such cost savings, as we do not allow the firm to re-optimize its advertising mix given the new prices. Despite its simplicity, the exercise shows the potential for important efficiency gains in the market for television advertising.

## 5 Firm advertising choices

A key fact, supported from the pricing analysis, is that broadcast networks, by adhering to legacy discounts, sell ads differently than cable networks. Legacy pricing clearly facilitates price discrimination by broadcast networks in favor of older firms. This may confer cost advantages to incumbent advertisers in their respective product markets.

In this section, we check for data patterns that would suggest that legacy discounts influence firms' equilibrium advertising placements. In particular, we ask the following question: do companies with longer relationships with broadcasters advertise disproportionately more on broadcast than on cable networks?

Grandfathered rates depend on the parent company (e.g., Proctor and Gamble, or P&G) rather than the brand. However, each brand may have a different advertising objective. For example, P&G's brands span cleaning products, hair products, non-prescription drugs, and other categories (e.g., Tide detergent, Head & Shoulders shampoo, Dayquil cold medicine, etc.) These brands may target customers with different demographic profiles, while facing a single price in the upfront market.

Given these brand-level differences and shared pricing at the parent-company level, it's helpful to analysis advertising decisions at the 'parent-brand' level. This allows us to control for differences in the target audiences across product categories that may be related to the legacy status of a firm. In the analysis that follows, we define the outcome of interest to also vary across months, as different product categories may advertise differently over time. Thus, we define our unit of observation at the 'parent-brand-month' level.

The next set of analyses uses information from all 118,641 telecasts tracked by Rentrak during the three-year sample period. We measure advertising intensity on broadcast as the fraction of primetime viewers reached on broadcast networks. For each firm, the variable tracks the total number of primetime ads (weighted by ratings) shown on broadcast divided by the total number

of primetime ads purchased in any of the tracked networks for the month. Table 6 shows that, on average, 36% of a firm’s viewers are reached on broadcast programming.

If we find that the brands of legacy firms place a larger share of their ads on broadcast than non-legacy firms, these differences can be attributed to several factors:

1. the relative cost of advertising on broadcast networks is lower for legacy firms,
2. the relative value of the viewers reached on broadcast networks is higher for brands produced by legacy firms,
3. the relative value of broadcast advertising depends on total advertising spending (and is correlated with the legacy status of the firm),
4. the relative value of broadcast advertising depends on firm ‘strategies’ between television and digital advertising (and is correlated with the legacy status of the brand).

To assert that the first explanation is driving the results, we must take into account the other confounding factors. The reduced-form analysis compares firm input-sourcing choices in prime time to isolate comparable advertising inputs. However, advertising on broadcast and cable primetime programs may be imperfect substitutes because these media reach different audiences. To address this concern, we include brand-category fixed effects. The analysis compares brands’ advertising choices within a category, separating brands by the legacy status of their parent companies. That is, we allow for category-specific unobserved benefits of reaching a viewer on broadcast (rather than cable). For example, the benefits from advertising on broadcast might differ between cleaning products and non-prescription drugs. These controls will also account for the possibility that legacy and non-legacy firms may represent different industries.<sup>20</sup>

Next, we control for parent-company advertising expenditure, using the log of total advertising spending across all media outlets from AdSpender. This variable controls for the possibility that firms with large advertising expenditures may have different payoffs from advertising on broadcast vis-a-vis cable. The control also captures the possibility that parents with large advertising expenditures may negotiate lower base rates irrespective of year of entry. Last, firms may have different strategies between television and digital advertising, so we include the share of digital advertising (as a fraction of total advertiser spending) as a control.

The confounding factors above raise the concern that brands from legacy firms are different from non-legacy ones. If such unobservable differences are correlated with brands’ returns to advertising on broadcast relative to cable in a way that is not captured by brand category, advertising budget,

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<sup>20</sup>We considered using telecast demographic information to control for differences in targeted demographic profiles. That is, repeating the analysis testing whether legacy brands reach a larger fraction of viewers (described by age, gender, income, and race) on broadcast than non-legacy firms. The correlation between these constructed dependent variables is  $> 0.98$ , so this analysis did not provide additional information beyond the baseline results reported in the paper.

Table 6: Reduced-form variables

	mean	sd	med	min	max
<i>dependent variables</i>					
viewers reached on broadcast (fraction)	0.36	0.30	0.39	0.00	1.00
<i>controls</i>					
share of digital adv.	0.09	0.14	0.04	0.00	1.00
brand expenditure (1000s)	9807	12916	5206	0	148697
parent expenditure (1000s)	36846	49404	19464	8	245883

Advertiser spending estimates and length of relationship are obtained from AdSpender.

Table 7: Brands' advertising decisions

	(1)	(2)	(3)	(4)	(5)
legacy	0.003*** (0.000)	0.004*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
log budget			0.009** (0.003)	0.009** (0.003)	0.007 (0.005)
share of digital				-0.274*** (0.024)	-0.294*** (0.041)
constant	0.319*** (0.016)	0.252*** (0.075)	0.125 (0.086)	0.149 (0.086)	0.149 (0.084)
month & year FE	yes	yes	yes	yes	yes
brand category FE	no	yes	yes	yes	yes
observations	13182	13182	13182	13182	4435
adjusted $R^2$	0.045	0.273	0.274	0.283	0.282

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

An observation is defined at the parent-brand-month level. The dependent variable in all regressions is the fraction of all television viewers that were reached on broadcast television.

and digital spending, then the results presented below will be biased. **For example, one may be concerned that firms select into entering the broadcast upfront if they have high returns to advertising in that media market. The correlation between upfront entry on broadcast and cable is 0.77, which suggests that unobservables that affect the broadcast entry decisions also influence returns to advertising on cable.** The identifying assumption is that any remaining unobservable benefits to advertising on broadcast are independent of the length of relationship of a parent company in the broadcast market.<sup>21</sup>

The analysis asks whether the proportion of viewers reached on broadcast versus cable networks varies with the legacy status of the parent company. Table 7 shows that non-legacy firms reach a smaller fraction of viewers on broadcast. The estimates do not change across specifications, as we add each control one at a time in column (2) to (4): category fixed effects, parent advertising

<sup>21</sup>Another concern arises because firms make input-sourcing choices based on expected viewership, while our data track the actual demographic profile of a telecast. We assume that such differences affect all advertisers in the same way and these are not correlated with the legacy status of the firm.

expenditure, and share of digital advertising. The main specification is included in column (4) and it includes all controls. Results highlight that it is important to control for the total budget of the firm. We find that brands from firms with larger budgets reach a larger fraction of viewers on broadcast. This pattern can be explained by different advertising strategies or different prices that depend on quantity discounts. Interestingly, brands with higher shares of digital advertising spend less on broadcast than on cable networks.

The last column in table 7 repeats the analysis using data only for the last quarter of each year (September to December). In the upfront market, firms purchase advertising portfolios in advance for the following season (purchase in June for advertising beginning in September). As a result, the contracts allow that some of the buys for January-August in the following year are ‘optionable.’ Finally, we analyze advertisers’ decisions separately for each broadcast network in table 8. Estimates show that non-legacy firms reach a smaller fraction of viewers on broadcast networks.

Table 8: Brands’ advertising decisions by broadcaster

	broadcasters	ABC	CBS	CW	FOX	NBC
legacy	0.003*** (0.000)	0.002*** (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
log budget	0.009** (0.003)	-0.006* (0.002)	-0.003 (0.002)	0.004*** (0.001)	0.011*** (0.002)	0.010*** (0.002)
share of digital	-0.274*** (0.024)	-0.175*** (0.017)	-0.254*** (0.019)	-0.004 (0.004)	-0.048*** (0.011)	-0.079*** (0.018)
constant	0.149 (0.086)	0.054 (0.037)	0.205* (0.089)	-0.075*** (0.008)	-0.009 (0.084)	-0.000 (0.053)
month & year FE	yes	yes	yes	yes	yes	yes
brand category FE	yes	yes	yes	yes	yes	yes
observations	13182	13085	13102	13196	13133	13124
adjusted $R^2$	0.283	0.222	0.232	0.185	0.173	0.165

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

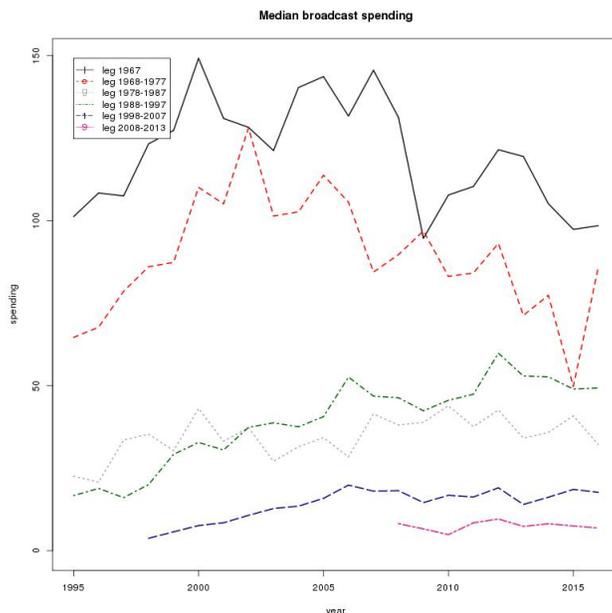
The dependent variable in all regressions is the fraction of viewers reached on all broadcasters or a specific broadcast network. An observation is defined at the brand-month level.

## 6 Mechanisms supporting legacy deals

In this section, we evaluate different explanations for the persistence of legacy deals. We seek to test the following questions: Do legacy firms have less volatile advertising budgets? Do data patterns support the unwritten expectation that firms maintain stable budgets in the broadcast market? Even though these data patterns will not allow us to reject a mechanism, they will allow us to evaluate the plausibility of different narratives.

The analysis exploits parent companies’ advertising spending for the 1995-2016 sample period reported by AdSpender. The dataset includes information on advertising spending in different

Figure 1: Annual broadcast spending by firm cohort



media outlets: broadcast television, broadcast prime time, cable television, cable prime time, magazines, newspapers, and digital advertising. In addition to budget size, Ad\$ponder reports the number of advertisements placed in each media. These values are not weighted by ad reach, length, or size so we only use them as a robustness check.

Figure 1 plots broadcast annual advertising expenditure by firm over time. To facilitate the visual comparison of spending patterns across parent companies, the legacy variable is categorized into groups of ten-year periods. Firms with inferred entry of 1967 are plotted separately. Each series reflects the median spending for each group. For example, the solid line tracks the median spending of parent companies with inferred upfront entry of 1967, the dashed line reports the median values for firms entering between 1968-1977, and so on. The spending variable is in millions of nominal dollars. We use spending data for the years after a firm is inferred to have entered the upfront market. For example, if a firm is inferred to have entered the upfront market in 2010, we report its advertising expenditure from 2010 to 2016.

Across firms, we see that median expenditures on broadcast are higher for firms with earlier upfront entry; the exception to this pattern is the reversal between firms entering in 1978-87 and firms entering in 1988-97. For completeness, these patterns may be compared to spending trends in other media plotted in figure 2. Firms that entered within the first decade of the first upfront market look different from firms that arrived later for cable and magazine spending; they do not look different for newspaper or digital spending. The correlations between annual expenditure across media outlets are reported in table 9. Expenditures on broadcast, cable, and magazines are highly correlated with total spending, with correlations of 0.90, 0.84, and 0.79 respectively. During the sample period, newspapers and digital budgets do not co-move closely with the other variables.

Figure 2: Annual spending by firm cohort

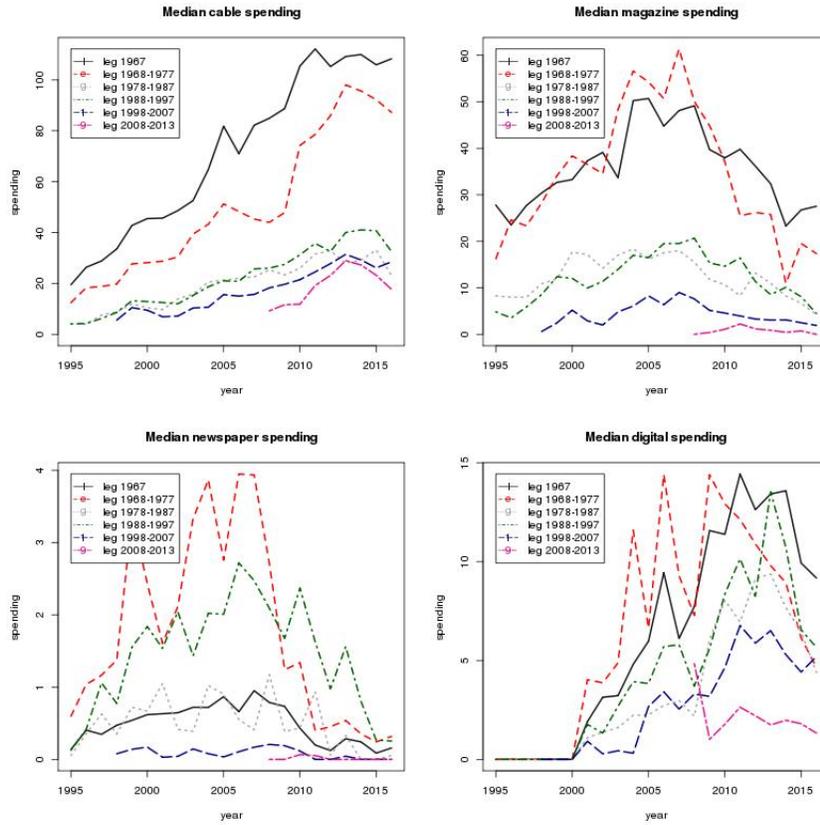


Figure 3: Percent change in broadcast spending by firm cohort

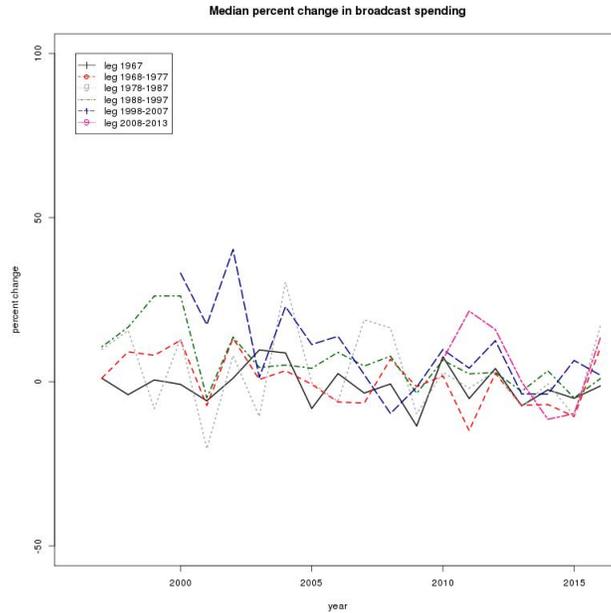


Table 9: Correlation table for annual spending across media outlets

	total	broadcast	broadcast prime	cable	cable prime	magazines	newspapers	digital
total spending	1							
spending in broadcast	0.902	1						
spending in broadcast prime	0.893	0.951	1					
spending in cable	0.838	0.630	0.646	1				
spending in cable prime	0.829	0.639	0.662	0.966	1			
spending in magazines	0.790	0.563	0.581	0.622	0.589	1		
spending in newspapers	0.390	0.305	0.360	0.260	0.283	0.253	1	
spending in digital	0.409	0.232	0.269	0.360	0.390	0.172	0.313	1

Correlations are constructed using data on annual spending by parent company.

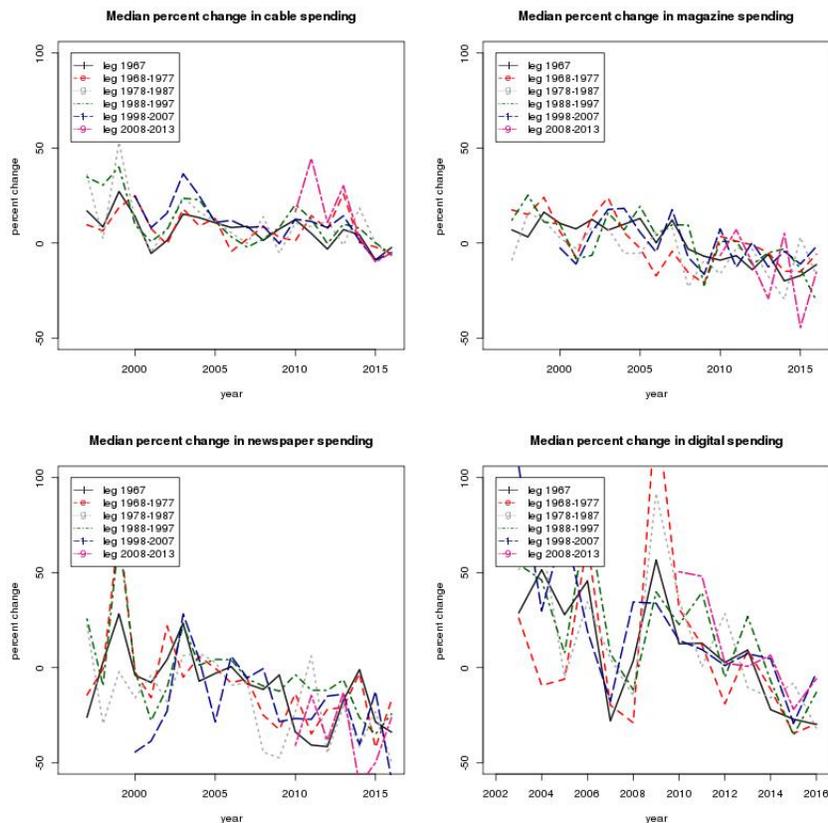
To evaluate spending volatility across firms, figures 3 and 4 plot percent changes in firms' spending over time. Similarly to above, each series reports median values for each group of firms. One cannot conclude from this plot that legacy firms have more or less stable expenditures over time than newer firms. Therefore, we test whether legacy firms have less volatile budgets during the sample period. For each parent company  $i$ , volatility is measured with the coefficient of variation of its expenditure,  $cv_i^m = \frac{\text{st. dev}(\text{annual spending}_i^m)}{\text{mean}(\text{annual spending}_i^m)}$ , where the statistic is constructed for each media outlet  $m$ . We use coefficients of variation instead of standard deviations to facilitate the comparison of spending dispersion across parent firms with large differences in advertising expenditures.

Table 10 summarizes the variables used for the analysis. The coefficient of variation shows that there is heterogeneity in expenditure volatility across parent companies. The lower panel reports the fraction of spending attributable to each media outlet. The average parent company spends 37% of its total advertising budget on broadcast. Table 11 reports the correlation between the coefficients of variation across media outlets.

Next, we test whether the differences in coefficients of variation across firms are associated with firms' legacy status. We control for the fraction of spending attributed to the analyzed media outlet. We do not include total spending as a control due to the high correlation between broadcast and total annual expenditure.

Table 12 reports the results. The legacy variable again tracks the inferred year of entry in the upfront market prior to 2014. Column (2) adds fraction of spending on broadcast as a control. This variable shows that spending volatility decreases as the importance of the media outlet for advertising strategy increases. Column (3) shows the results using ad units instead of dollar spending. In model (4), we construct a coefficient of variation at the level of a firm-quarter pair to confirm that the results are not driven by within-year variation. In model (5), the legacy variable is categorized as above, grouping firms according to the decade of their upfront entry. The excluded group captures parent companies with inferred upfront entry of 1967. We find that the relationship between budget volatility and legacy status of the firm holds for all specifications.

Figure 4: Percent change in spending by firm cohort



The analysis does not reveal why legacy firms have more stable spending over the sample period. One explanation is that legacy firms' demand for broadcast advertising is inherently more stable over time. Alternatively, lower volatility in broadcast expenditure may be the equilibrium outcome from practices in that market, such as the expectation that legacy firms maintain stable budgets over time in order to continue receiving preferential pricing. In the second case, we expect to find that volatility differences between legacy and non-legacy firms are more pronounced on broadcast than on other media. In addition, we expect that the patterns are more pronounced for primetime advertising, which is generally purchased in the upfront. We repeat the analysis from model (2) for different media outlets in table 13. We find that the relationship holds for all media spending apart from digital. These results support the demand-side hypothesis.

The next test relies on the ratio of volatility measures across different media. If legacy firms aim to maintain stable budgets on broadcast to satisfy the expectation of consistent spending, then volatility in broadcast spending is expected to be lower than volatility in spending in other media  $m$ . That is, we expect that spending in non-broadcast media will be used by firms to absorb temporary shifts in advertising demand. Table 14 tests the relationship between legacy status of a firm and the ratio of a firm's coefficient of variation in broadcast relative to other media,  $cv_i^{\text{ratio},m} = \frac{cv_i^{\text{broadcast}}}{cv_i^m}$ , where the denominator is constructed using five different measures: all media but broadcast, cable,

Table 10: Parent company summary statistics

	mean	sd	med	min	max
<i>coefficient of variation</i>					
broadcast cv	0.59	0.31	0.53	0.11	2.16
broadcast prime cv	0.74	0.40	0.64	0.11	2.12
cable cv	0.53	0.24	0.49	0.08	1.81
cable prime cv	0.57	0.24	0.54	0.07	1.99
magazines cv	0.91	0.62	0.74	0.13	4.69
newspapers cv	1.43	0.89	1.15	0.14	4.69
digital cv	1.06	0.42	1.01	0.30	3.53
<i>spending fraction in each media</i>					
fraction in broadcast	0.37	0.17	0.38	0.00	0.92
fraction in broadcast prime	0.22	0.14	0.21	0.00	0.62
fraction in cable	0.34	0.19	0.29	0.03	0.96
fraction in cable prime	0.12	0.07	0.10	0.01	0.45
fraction in magazines	0.16	0.14	0.13	0.00	0.79
fraction in newspapers	0.02	0.04	0.00	0.00	0.20
fraction in digital	0.09	0.11	0.05	0.00	0.81

The summary statistics report coefficient of variation (cv) and average annual values for 298 unique parent companies during the sample period of 2011-2013.

magazines, newspaper, and digital spending. The analysis controls for the ratio of the fraction of spending on broadcast and the fraction of spending in each media used in the denominator.

The sign of the legacy variable is negative in all specifications reported in table 14, even though the significance of the result differs across media outlets used to construct the denominator. The negative coefficient in column (1) implies that the variation in broadcast relative to non-broadcast spending is lower for legacy firms. This relationship is consistent with the hypothesis that legacy firms may use non-broadcast media options in order to smooth its expenditure on broadcast.

Table 11: Correlation table for coefficients of variation across media outlets

	total	broadcast	broadcast prime	cable	cable prime	magazines	newspapers	digital
total cv	1.000							
broadcast cv	0.563	1.000						
broadcast prime cv	0.389	0.792	1.000					
cable cv	0.686	0.281	0.141	1.000				
cable prime cv	0.657	0.279	0.154	0.954	1.000			
magazines cv	0.246	0.228	0.258	0.114	0.103	1.000		
newspapers cv	0.036	0.084	0.160	-0.047	-0.023	0.411	1.000	
digital cv	0.120	-0.072	-0.003	0.142	0.135	0.284	0.287	1.000

Correlations are constructed using coefficients of variation constructed for each parent company.

Table 12: Volatility in broadcast spending across parent companies

	(1)	(2)	(3)	(4)	(5)
	annual spending	annual spending	annual units	quarterly spending	annual spending
legacy	-0.008*** (0.001)	-0.003*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)	
fraction in broadcast		-0.816*** (0.104)	-1.533*** (0.287)	-1.462*** (0.074)	-0.798*** (0.106)
upfront entry 1968-1977					-0.055 (0.040)
upfront entry 1978-1987					0.076 (0.043)
upfront entry 1988-1997					0.113** (0.038)
upfront entry 1998-2007					0.560*** (0.040)
upfront entry 2008-2013					0.073 (0.048)
constant	0.752*** (0.034)	0.963*** (0.051)	0.761*** (0.033)	1.370*** (0.036) (0.057)	0.813***
observations	298	298	298	1183	298
adjusted $R^2$	0.152	0.314	0.182	0.400	0.267

The dependent variable in all regressions is the coefficient of variation in broadcast television. For models (1)-(2) the variable is constructed using annual spending. Model (3) uses annual units purchased in the market. Model (4) constructs a coefficient of variation at the firm-quarter level. In model (5) we group the legacy variable according to year of upfront entry and test the relationship through a fixed effect parametrization.

## 7 Conclusion

This paper investigates the existence of input discounts in the market for national television advertising. Importantly, industry practitioners assert these discounts are independent of the size of the firm but instead are reliant upon the length of relationship between the advertiser and television network. We first present a reduced-form model that confirms the existence of discounts. Next, we use detailed data on firms' input-sourcing decisions of where and how much to advertise in order to quantify the size of the discounts. We find the discount attributed to legacy firms is 0.41% per year. This suggests that a firm that is new to the upfront market (in 2013) would save, on average, \$13 million on their current advertising strategies if it were able to capture the same legacy discount as an advertiser that entered the upfront market in 1967.

Such efficiencies in accessing an inputs market are historically hard to identify as firms guard cost information closely. Still, firms largely refer to efficiency rationales as a main justification of mergers. While efficiencies certainly exist, it is unclear how they may affect firms' decisions on entry as well as downstream market competition. Identifying these efficiencies is an important first step in understanding how advantages in the input market may affect other aspects of firms' decision making processes.

Table 13: Spending volatility across parent companies

	broadcast	broadcast prime	cable	cable prime	magazines	newspapers	digital
legacy	-0.003** (0.001)	-0.005*** (0.001)	-0.003* (0.001)	-0.002* (0.001)	-0.008*** (0.001)	-0.010*** (0.003)	0.002 (0.001)
fraction in broadcast	-0.743*** (0.104)						
fraction in broadcast prime		-1.544*** (0.142)					
fraction in cable			-0.537*** (0.085)				
fraction in cable prime				-1.107*** (0.254)			
fraction in magazines					-2.190*** (0.231)		
fraction in newspapers						-10.532*** (0.991)	
fraction in digital							-0.965*** (0.230)
constant	0.910*** (0.052)	1.164*** (0.049)	0.759*** (0.052)	0.743*** (0.055)	1.451*** (0.072)	1.909*** (0.099)	1.099*** (0.062)
observations	291	290	291	291	283	267	290
adjusted $R^2$	0.265	0.409	0.125	0.064	0.352	0.238	0.073

The dependent variable in all regressions is the coefficient of variation in the specified media market. The variable is constructed using annual budgets.

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Table 14: Ratio of spending volatility across parent companies

	$cv_i^{\text{ratio,all}}$	$cv_i^{\text{ratio,cable}}$	$cv_i^{\text{ratio,magazines}}$	$cv_i^{\text{ratio,newspapers}}$	$cv_i^{\text{ratio,digital}}$
legacy	-0.018*** (0.005)	-0.010* (0.004)	-0.004 (0.002)	-0.006*** (0.002)	-0.013*** (0.002)
frac in broadcast / frac in other	-0.407* (0.168)				
frac in broadcast / frac in cable		-0.327*** (0.075)			
frac in broadcast / frac in magazines			-0.000*** (0.000)		
frac in broadcast / frac in newspapers				-0.000** (0.000)	
frac in broadcast / frac in digital					-0.000*** (0.000)
constant	2.230*** (0.167)	2.067*** (0.185)	0.957*** (0.082)	0.692*** (0.056)	0.938*** (0.054)
observations	298	298	289	274	298
adjusted $R^2$	0.169	0.160	0.005	0.051	0.190

The dependent variable in all regressions is the ratio of coefficients of variation between broadcast and the specified media market. The variable is constructed using annual budgets.

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