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Abstract

We address a longstanding puzzle surrounding the unbundling of services occurring over several decades in the U.S. advertising agency industry: What accounts for the shift from bundling to unbundling of services and the slow pace of change? Using Evans and Salinger's (2005, 2008) cost-based theory of bundling, we develop a simple model of an agency's decision to unbundle as a tradeoff between the fixed cost to the advertiser of establishing a relationship with an agency and pecuniary economies of scale available from providing media services. The key predictions of the model are supported by an econometric analysis of cross-sectional and pooled data from the quinquenial U.S. Censuses conducted between 1982 and 2007. Agencies are more likely to unbundle with increasing size and diversification but are less likely to do so with increasing age. Longitudinal growth in unbundling is partially explained by increases in media prices over time.

Key Words: Unbundling, Advertising Agencies

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THE UNBUNDLING OFADVERTISING AGENCY SERVICES: AN ECONOMIC ANALYSIS

1 Introduction

Advertising agencies create advertising campaigns and place advertising messages in media. Over the past three decades, the advertising and marketing services sector has undergone a number of significant changes. In the wake of innovations in information and media technology, deregulation, and globalization, clients have demanded an increased array of services (Escobar 2005) as well as greater accountability (Duboff 2007). On the supply side, advertising agencies have both "unbundled" and extended the mix of services they offer (Horsky 2006). Departing from the longstanding industry practice of positioning themselves as "full-service" providers (Pope 1983), over time agencies gradually became more willing to provide clients with a limited range of services so that now it is commonplace for an advertiser to employ one agency for creative services and another for media services.

Paralleling this unbundling, there has also been a gradual but fundamental shift in how advertisers compensate agencies (Beals 2007). Whereas agency compensation once consisted almost entirely of commissions related to the amounts clients were billed for purchases of media space and time, reliance on media commissions has declined over time and now agency income is widely derived from a fee-for-service system based on labor charges for agency personnel working on clients' accounts.

Here we analyze the unbundling of services that has occurred over the period 1982-2007 in the advertising agency industry and consider how this unbundling may be interpreted by the economic theory of bundling. Treating the market for advertising services as contestable (Baumol, Panzar, and Willig 1982), we argue that the Evans and Salinger (2005, 2008) cost-centered bundling theory provides a framework for modeling the decisions of advertising agencies to choose either a policy of bundling and commission-based agency compensation, or one of unbundling and fee-based compensation. We develop a simple model of an advertising agency's decision to unbundle its services as a tradeoff between the fixed cost to the advertiser of establishing and maintaining a relationship with an advertising agency, and pecuniary economies of scale available from supplying media services. The results from an econometric analysis of cross-sectional and pooled data collected by the U.S. Census Bureau for quinquenial censuses conducted between 1982 and 2007 support the key predictions of the model. In particular, we find that advertising agency establishments are more likely to unbundle if they are large and diversified in their service offerings, and are less likely to do so with increasing age. We also find a strong trend toward unbundling over time, a result that is partially explained by the upward trend in media prices.

The paper is organized as follows. Section 2 outlines the history of bundling and compensation practices in the advertising agency industry. Section 3 summarizes the relevant bundling theory while Section 4 presents a simple model of unbundling of advertising agency

services. Section 5 describes the longitudinal database and econometric model we employ to assess empirically the implications of the model. Section 6 presents our empirical results and Section 7 summarizes our conclusions.

2 Advertising Agency Bundling and Compensation Practices: Historical Evolution

The origins of the modern "full service" advertising agency in the U.S. may be traced back to the middle of the 19th century when "space brokers" first appeared as independent intermediaries in the developing market for newspaper advertising (Pope 1983, Chapter 4). By the turn of the century, U.S. advertisers were demanding additional know-how and services.[1] Pope notes: "The evolution from space broker to advertisement creator to marketing advisor was quite swift" (p. 143) and "between the 1890's and the 1920's independent agencies became the suppliers of advertising services to virtually all important national advertisers" (p. 147). This broadening of the scope of agency services meant that advertisers, rather than suppliers of media, were the focal clients of advertising agencies. Despite this change and as discussed further below, agencies continued to be compensated primarily on the basis of the volume of media space and time they purchased on behalf of advertisers.

Pope emphasizes how a set of institutional arrangements that developed within the industry contributed to the sustained dominance of independent full-service agencies. The "recognition system" as it came to be known, involved an interrelated set of trade practices that Pope characterizes as an "alliance of convenience" between agencies and publishers. Among other things, the system supported standards relating to the granting of credit and a fixed commission rate (15 percent) by publishers to agencies, and served to dissuade agencies from rebating or splitting commissions with advertisers.

While these practices helped stabilize the advertising business, they also effectively prevented advertisers from establishing in-house agencies or otherwise buying space and time directly from media suppliers. At the same time, these practices restricted price competition among agencies, and facilitated bundling by independent full-service agencies. Not surprisingly, the recognition system and especially media-based compensation became the subject of a contentious debate between advertisers on the one hand, and agencies and publishers on the other; this controversy recurred periodically for several decades (Young 1931; Haase 1933; Haase, Lockley, and Diggest 1934; and American Association of Advertising Agencies 1935). On two occasions, federal antitrust authorities undertook investigations of the recognition system on grounds that it constituted a conspiracy in restraint of interstate commerce under the Sherman Act. The first complaint was dismissed in 1930 but the second resulted in the signing of a consent decree in 1956 by five trade

[1] McFall's (2004, pp. 110-118) study indicates that the evolution of full-service agencies in the U.K. followed a similar path of development to that Pope (1983) found in the U.S.

associations representing magazine and newspaper publishers plus the American Association of Advertising Agencies, all of whom had been active in administering industry trade practices for their members (Pope 1983).

One might plausibly expect that abandonment of the commission-based agency compensation and the unbundling of advertising services would have followed soon after the signing of the 1956 consent decree that has been credited with effectively dismantling the recognition system's operating system that resided in trade associations (Holland 1981). However, individual media remained free to grant commissions to independent agencies and withhold it from in-house agencies and advertisers (Klaw 1956). The complaint singled out "national" (as opposed to "local") advertising in print media (newspapers and magazines) which in 1956 accounted for 35 percent of U.S. national advertising and 21 percent total U.S. advertising expenditures (national plus local). It bears noting that other national advertising media were not mentioned in the complaint; the major omissions being direct mail and broadcast advertising, which represented 24 and 20 percent, respectively, of U.S. national advertising in 1956.

In light of the above, it was less than surprising that the signing of the consent decree apparently had little or no immediate effect on agency compensation (Wood 1958, pp.470-471) and indeed, media commissions persisted as the most widely utilized mode of agency compensation for several decades. Nonetheless, by the early 1970's, reports in the advertising trade press indicated that bundling and the 15 per cent commission compensation were again under attack (Loomis 1972). Clients pressured agencies to unbundle their services and reduce their commissions. Several agencies responded by offering creative and media services on an "a la carte" basis while others resisted this change, provoking a full-scale debate of the merits of alternative policies (Pulver 1979 and Bloede 1983).

As Pope (1983, p. 116) observed: "Paradoxically, although the functions of the advertising agency have changed almost beyond recognition, the commission method of compensation has survived unending controversy and sporadic campaigns to abolish it."

The survival of media commissions as the dominant mode of agency compensation has long remained a puzzle (Weilbacher 1991, p. 18). Reliance on commissions in compensating agencies was commonplace among advertisers for more than two decades after the 1956 consent decree. Tracking studies conducted by the Association of National Advertisers (ANA) show that as late as 1982, seventy-one percent of the *largest* U.S. national advertisers surveyed utilized commission-based compensation (Beals 2007).

Over the ensuing decade, that share eroded slowly to sixty-one percent in 1994, while labor fee-based compensation grew steadily from eight percent in 1982 to thirty-one percent in 1994. Since then, compensation practices have shifted substantially from commissions to labor-based fees, such that as of 2003, only ten percent of large national advertisers reported relying on commissions, while seventy-four percent used fees, and eight percent a combination of commissions and fees (Beals 2007).

The ANA's tracking of changes in agency compensation is incomplete in that it reflects only the behavior of the *large national advertisers* who constitute the membership of the ANA. Data reported by the Census Bureau covers the sources of *agency* income for the

industry as a whole for the period 1977-97, thereby including agencies of all sizes. Table A1 in Appendix A summarizes that information. The major shifts in agency compensation evident from Table A1 are the *decline* (from 70 to 59 percent) in the share of agency income derived from media commissions and markups on purchases of advertising materials and services accompanied by the *increase* (from 30 to 41 percent) that occurred between 1992 and 1997 in the shares of income from fees, public relations services, and "other sources". Also noteworthy are the *decreases* in the commission rate received on media billings and the markup charged on purchases of advertising materials and services from 14 and 16 percent in 1977 to 11 and 12 percent in 1997, respectively. Overall, changes in agency compensation evident in the Census data for the advertising agency industry as a whole are of smaller magnitude but similar with respect to direction and timing relative to those of large national advertisers covered by the ANA studies.

Several factors encouraged advertisers to reconsider their policies on bundling and agency compensation in the post-1970's era. Achenbaum (1990) provides an informed account of other developments affecting advertisers' policies on bundling and agency compensation in the wake of the 1956 consent decree. First, he notes that several agencies introduced compensation arrangements that departed from the traditional 15 percent commission granted by media suppliers to agencies on purchases of space and time made on behalf of their clients. Agencies used these funds to finance other client services, rather than charge clients directly for them. One approach was to provide clients additional services beyond those normally covered by media commissions such as working on new products during their period of development and before media commissions were available (Frey and Davis 1958). Thus, media commissions served to cross-subsidize additional services beyond the traditional ones of creative development and media buying. Profitable accounts also sometimes effectively cross-subsidized unprofitable accounts within the same agency (McDonald 1989). Novel compensation methods included a "cost plus fee" plan from Ogilvy and Mather (Wilson, Hennessy, and Page 1969) and a "profit protection and sharing" arrangement from BBDO (McVeigh 1979).

A second development occurred over the decade 1977-87 when media prices rose annually at rates that substantially exceeded general inflation. As may be seen from Figure 1, during that ten year period, the median annual increase in Universal McCann's media unit cost index for national and local advertising was 9.1 % while that for the GDP Implicit Price Deflator was 6.1 %. Advertisers perceived agencies to be realizing a windfall profit, since the agencies' incomes grew under the commission system with inflated media prices without commensurate increases in their labor efforts or costs (McNamara 1990, pp.144-6). This experience helped fuel advertisers' cost consciousness and demand for reductions in agency compensation, particularly as sales in many product categories matured and prospects for growth appeared dim.

INSERT FIGURE 1 HERE

A third development that aroused advertisers' displeasure with agency finances was the wave of mergers that began in the mid-1980's (Millman 1988). Many clients were surprised at the sale prices and personal enrichment of agency top executives. Moreover, the mergers

and acquisitions often violated client conflict norms and policies and disrupted the morale of agency personnel while offering few apparent benefits to clients.

Overall, these developments appear consistent with the timing of changes in compensation and bundling policies discussed earlier. Whereas the bundling of agency services occurred rapidly in the early stages of the U.S. advertising industry, unbundling is a more recent phenomenon that has evolved only gradually. Not surprisingly, agency bundling and compensation practices are highly interdependent and reflect the structure of vertical market relations among advertisers, agencies, and media suppliers.

A special feature of the advertising agency industry is its longstanding adherence to the norm that a single agency should not service competing clients in the same business category (American Association of Advertising Agencies 1979). As will be discussed in Section 4.2.2, this phenomenon, commonly referred to as "conflict policy" has an important bearing on the effects of bundling by full-service agencies (Silk and Berndt 1994) and the growth and diversification of holding companies in the advertising and marketing services industry (Silk and Berndt 2004).

It is interesting to note that the recognition system also played a critical role in the evolution of the advertising industry in the United Kingdom. It consisted of essentially the same institutions and practices as those found in the U.S., but emerged somewhat later (McFall 2004, Chapt. 5). The unwinding of the recognition systems in the two countries followed different regulatory paths and appears to have occurred more abruptly in the U.K. than in the U.S.(Fletcher 2008, Chapts. 2 and 5; Nevitt 1982, pp. 153-155 and 194-197). A formal recognition system was first proposed in the U.K. in 1930, but wasn't enacted until 1941 Thereafter, it "reigned supreme," molding "the shape and structure of British advertising agencies and of the advertising industry" for more than three decades (Fletcher 2008, p. 21). In 1976, the Restrictive Practices Act was extended to cover service industries. After 1979, all contracts between agencies and the media had to be negotiated individually rather than on the basis of industry-wide standards, thereby rendering the recognition system "obsolete" (Fletcher 2008, p. 112) and removing a major barrier that had impeded the growth of specialized media buying agencies. The latter had established a foothold by placing television advertising for small agencies and gaining recognition from television broadcasters in 1973 (Fletcher 2008, pp. 108-112. Media buying agencies subsequently grew rapidly, their share of U.K. billings increasing from 4 percent in 1976 to 20 percent in 1985 (Fletcher 2008, pp. 112 and 183). Full-service agencies unbundled their creative and media services and media buying underwent consolidation through mergers and acquisitions, including those undertaken by holding companies Tungate 2007, Chapt. 10).

3 Bundling and Tying Theory

We now briefly survey the economic literature on bundling and tying, paying particular attention to the small part of the literature that addresses bundling in highly competitive markets, or more precisely in contestable markets. In line with the evidence discussed above, we suggest that the assumption of contestability is a reasonable approximation to competition in the advertising services industry.

The existing economic literature on bundling focuses primarily on situations where firms have considerable market power. This emphasis arises because bundling becomes more important and less transparent when used as a device for increasing economic profits by leveraging market power from one product to another or by using price or quantity of the second good as a means of effectively price discriminating in the primary market where the seller has market power. The implications of these considerations are important for industrial organization economics and regulatory policies. While the former, tying, is an anticompetitive practice prohibited by law, the latter, price discrimination, is not necessarily considered predatory behavior and may even increase market efficiency (Varian 1989).

Thus, the principal concern of the economic literature on bundling and tying has historically been to specify the conditions under which the effects of bundling may be anticompetitive rather than price discriminatory. In general, the conclusion reached is that there is no reason a firm with a monopoly for one product would also wish to bundle a complementary competitive product (Director and Levi 1956; Posner 1979; Schmalensee 1982; and Whinston 1990). Rather, the literature focuses primarily on how tying arrangements can be viewed in a context apart from an extension of monopoly power or foreclosure in the tied good market and turns to price discrimination as the main motivation for tying (Burnstein 1960; Stigler 1968; Adams and Yellen 1976; Schmalensee 1984; McAfee, McMillan and Whinston 1989).[2] Other reasons for tying have been suggested, such as economies of scale and scope and risk management (Palfey 1983). Here again, the models typically have been concerned with explaining tying by firms that can exercise considerable market power.

Surprisingly, even though bundling (and tying) may occur for such straightforward reasons as achieving cost savings in packaging and marketing, compatibility of components, and scale economies in producing complementary goods, those aspects of bundling have received relatively little attention.[3] These considerations can, however, explain the most common cases of bundling, especially bundling in competitive markets such as the bundling of electronic goods and batteries, and eyeglass frames and lenses.

The lack of attention to cost savings or efficiency increases in research on bundling appears to be due to the view that the underlying incentives are unimportant and/or that significant efficiency losses do not arise. Even in Davis and Murphy (2000) who consider the

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[2] However, recent work shows that under more complex assumptions and circumstances, a monopolist can extend its monopoly power to other markets. Whinston (1990) has shown that tying can indeed increase monopoly power and profitability when the tied market is characterized by economies of scale and imperfect competition. Carlton and Waldman (2002) have demonstrated that when dynamic models are considered, the monopolist can use tying and foreclosure to deter the entry of efficient firms into its primary market or newly emerging markets. Spector (2007) shows that tying and bundling can facilitate collusion when the market for the tied complementary good is oligopolistic.

[3] The exceptions include Baron and Besanko (1992, 1999); Gilbert and Riordon (1995); Salinger (1995); and Evans and Salinger (2005, 2008).

welfare increasing aspects of bundling in the case of highly complementary software, the firms involved are assumed to have significant market power as monopolists or duopolists.

By contrast, in this study of the highly competitive advertising services industry, our focus is on cost savings or efficiency increases that may arise from unbundling and how changes in the input costs of the bundled services can alter these savings and thus bundling practices. More specifically, our interest here is in explaining the fundamental structural shift in bundling and compensation practices that has occurred in the U.S. advertising services industry over the past three decades.

4 A Cost-Based Model of Bundling and Unbundling of Advertising Agency Services

We now develop a simple cost-based model of an advertising agency's decision to bundle or unbundle its services. We simplify this decision by treating an advertising campaign as consisting of two complementary service components, (i) creative (development and production of advertising messages) and (ii) media (planning and buying media space and time to disseminate advertising messages to target markets).

4.1 *Theoretical Framework*

Here we adopt the cost-based theory developed by Evans and Salinger (2005, 2008) to explain bundling in competitive markets. Evans and Salinger show how cost savings from bundling and preferences for different components determine the choice among unbundling, mixed bundling, and pure bundling in contestable markets. They conclude that pure bundling is the likely outcome when the fixed costs of distinct product offerings are large and/or when demand for the individual components is insufficient to make it profitable to offering them separately.

In the case of advertising services, both the creative and media components are essential inputs in producing an advertising campaign. The tradeoff facing the agency is between the savings in fixed and variable costs that an advertiser may realize by purchasing both creative and media services from a single full-service agency as opposed to purchasing each service separately from two specialized agencies. In other words, our analysis evaluates whether and when the bundling or the unbundling of creative and media services results in more efficient production.

The only prior study known to the present authors that has addressed the bundling of advertising services is that of Horsky (2006), who models an advertiser's decision to select bundled or unbundled advertising services, including the choice between in-house and outsourced suppliers. In a cross-sectional analysis, she finds that advertisers with large advertising budgets unbundle to take advantage of media discounts obtained by specialized media services.

The present model resembles Horsky's formulation in that it partitions an advertising campaign into complementary creative and media components and recognizes that ultimately, it is the advertiser who chooses between bundled or unbundled advertising campaigns. However, our model differs from Horsky (2006) in several key assumptions and

implications. First, we focus on the behavior of advertising agencies rather than advertisers. Second, we investigate how advertising agency organization structure, specialization and compensation methods are affected by increases in media prices relative to other costs (Figure 1). Our model implies that advertising agencies react differently to this exogenous change depending on the scale of their media services. Thus we endogenize the advertising agency's choice of its compensation methods and internal organizational structure, which depend on input prices and transaction costs. Third, our analysis yields empirically testable predictions pertaining to how changes in an advertising agency's compensation methods are related to changes in media prices and the scale of an agency's media services operations.

4.2 *Basic Assumptions of the Model*

Under bundling, the full-service advertising agency supplies both creative and media services, but is compensated solely by commissions on media billings. In the unbundling scenario, one agency provides the creative services and directly charges fees for those services, while a second agency performs the media function and is separately compensated for those services. The model rests on three key assumptions: (1) contestability; (2) the presence of scale and scope economies in the production of advertising campaigns; and (3) limited susbstitutability between the two main inputs to an advertising campaign, message and media. We discuss each assumption below.

4.2.1 Contestability

We assume that the market for an advertising campaign is contestable (Baumol, Panzar, and Willig 1988).The assumption of contestability is consistent with the considerable body of evidence available on the salient characteristics of the advertising services industry. On the supply-side, fixed costs are low (payroll-related expenses account for two-thirds to three quarters of agency costs), and the minimum efficient size of an agency is small (Silk and Berndt 1993).[4] Entry and exit barriers are minimal and agency turnover is relatively high (Arzaghi 2005).[5]

By virtue of advertisers' power of the purse, agency-client relations are notoriously asymmetric in favor of clients, as evidenced by the substantial rate at which advertisers switch agencies (American Association of Advertising Agencies 1997; Baker, Faulkner, and Fisher 1998), such that the longevity of agent client relations varies widely, from months to decades (Gleason 1997). U.S. demand for advertising is cyclical (Silk, Klein, and Berndt 2002, Tellis and Tellis 2009 and the references cited therein) and arises from several

[4] Silk and Berndt (1993) found that of the approximately 10,000 firms comprising the industry in 1987, only 200-250 agencies had domestic gross incomes as large or larger than the estimated minimum efficient size of a U.S. advertising agency.

[5] Examining entry and exit rates computed from U.S. Census data, Arzaghi (2005), found that, on average, a single unit agency remained in business for about seven years; over a five year period, the birth rate was more than 50 percent. Moreover, agency personnel are highly mobile over the course of their careers, moving to and from client organizations as well as between agencies (Broschak 2004).

thousand heterogeneous clients consisting of national and local advertisers operating in geographically dispersed locations.[6]

The agency business has long been recognized as a highly competitive industry with a heterogeneous and unconcentrated firm size structure (Silk and King 2010). Analyzing data on industry demand and supply for the period 1972-87, Jung and Seldon (1995) conducted a test for market power in the advertising market using the method developed by Bresnahan (1982) and found the estimated index of market power to be small and not significantly different from zero. Silk and King (2010) calculated several measures of concentration in the advertising agency industry from published Census data for the period 1977-2002. While the level of concentration rose in 1997 and 2002, the size distribution of firms and establishments has remained relatively unconcentrated and notably diverse, with the Herfindahl-Hirschman Index (HHI) for firms and establishments in 2002 being only 195 and 10, respectively.[7] The latter are well below the threshold value HHI=1,000 used by the Department of Justice and the Federal Trade Commission to delineate between "unconcentrated" and "moderately concentrated" industries.[8]

Small agencies have continued to play a major role as indicated by the 2002 Economic Census which reported that single unit firms accounted for 96.4 percent of all firms (NAICS 54181), 41.7 percent of total industry receipts, and 47.4 percent of total industry employment.[9] It may further be noted that Silk and Berndt (1994) argued that the advertising agency industry conforms to the conditions MacDonald and Slavinsky (1987) showed were required for a competitive industry with free entry to sustain an equilibrium with multiproduct firms.[10]

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[6] National advertising accounted for 55 percent of total U.S. advertising in 1977 and 66 percent in 2007. See Table 1 in Silk and King (2010) for trends in several indicators of demand for agency services and advertising in the U.S. over the period, 1977-2002

[7] HHI was calculated using the MINL method recommended by Schamalensee (1977).Several large mergers and acquisitions involving holding companies occurred in the 1990's and are a likely source of the rise in concentration .For further discussion, see King, Silk, and Ketelhohn (2003).

[8] See: U.S. Department of Justice and Federal Trade Commission, "Horizontal Merger Guidelines," Revised April 8, 1997. Accessed at: http://www.usdoj.gov. The maximum possible value of the Herfindahl-Hirschman Index is 10,000.

[9] U.S. Bureau of Census, *Establishment and Firm Size 2002,* Economic Census, Professional, Scientific, and Technical Services Subject Series, November 2005, Table 3, p. 104.

[10] See MacDonald and Slavinsky (1987, footnote 1) for a brief discussion of the relationship of their model to that of Baumol, Panzar, and Willig 1988) on contestable markets. See Eaton and Lemeche (1991) for a generalization of the MacDonald and Slavinsky model. Silk and King (2010) found that although concentration levels for firms in 1997 and 2002 varied widely across nine sectors that delineate the scope to total Advertising and Marketing Services Industry, all were within the range generally considered as indicative of a competitive industry. At the level of holding companies, Silk and King estimates that the four largest holding companies captured between a fifth and a quarter of total U.S. industry revenues and this share remained quite stable over the period, 2002-2006.

Collectively, these conditions imply that an advertising agency will provide any combination of the services (bundled, unbundled, or mixed) that an advertiser prefers at the agency's minimum total costs.[11] Thus**,** the bundling decision depends on what arrangement is cost-preferred by the advertiser**.** The total costs of an advertising campaign paid by an advertiser includes the coordination and information costs of dealing with agencies, costs for services (creative, production, and media planning and placement) directly charged to the client by the agencies, plus the net cost of media space and time and other advertising materials and services purchased by the agency and billed to the client.

4.2.2 Scale and Scope Economies

Economies of scope are realized when an advertiser deals with a single full-service agency for all advertising services, thereby lowering information, search, monitoring, and coordination costs. In contrast, additional costs arise from addressing principal-agent problems (Spake, D'souza, Crutchfield, and Morgan 1999) when employing two or more specialized agencies rather than a single full-service agency. The fixed (informational) costs of initiating and monitoring relations with a second agency, a media services agency, combined with the costs of coordinating activity with a separate agency performing creative services can be avoided if the advertiser employs a single full-service advertising agency to handle both components of a campaign.[12] However, the benefits of working with a full-service agency may come at a higher cost of service provision. Thus, the determining factor in advertiser's choice between bundling and unbundling is the tradeoff between the differences in fixed costs and variable costs associated with employing separate specialized agencies for creative and media services rather than a single full-service agency for both services.

There are two distinguishable types of scale economies that arise in this context: (a) pecuniary economies realized as a result of the availability of volume purchase discounts from media suppliers and the bargaining power and negotiating skills of the media buyer; [13]and (b) non-pecuniary economies that result from fuller utilization of lumpy resources used in media planning and buying such as research, decision-support systems, and specialized personnel (Drexler 2002).

Empirical evidence supporting the presence of scale and scope economies in the overall operations of full-service agencies has been found in cross-sectional studies of agency cost data (Schmalensee, Silk, and Bojanek 1983; Silk and Berndt 1993). However, the evolution of the advertising services industry indicates that specialized media agencies have an

[11] For simplicity, we exclusively model costs of delivering an advertising campaign. Clearly, any efficiency gain in production can be interpreted as a reduction in the overall costs and can be included in the total cost function.

[12] These fixed (informational) costs are essential to making bundling a viable choice (Evans and Salinger, 2005).

[13] It has been suggested that over time, the advantage in media prices obtained by media services over full-service agencies has diminished (Anderson 1999 and Reinhard 2001).

advantage over full-service agencies in capturing size-related economies relating to the purchase of media services.

The early specialized media services were independent firms who first established a significant position in the U.S. market in the late 1980's, a time when advertisers' media options were proliferating. These firms promised cost savings and efficiency gains in media buying (especially for spot television and radio) beyond those available from full-service agencies (Goldring 1986)—advantages arising from their ability to pool demands from numerous advertisers and leveraging their negotiating skills and relationships with media suppliers as well as their investments in research and systems (Rigg 1990).

Initially a large share of the revenues obtained by independent media services came from small and medium-sized full-service agencies who found it uneconomical to operate their own internal media groups and turned to outsourcing of this function (Pfaff 1987; Mandese 1994). Full-service agencies responded to the competition from independent media services in several ways. Some unbundled their media services, spinning the media units off as separate profit centers and actively pursuing media-only accounts (Mandese and Wells 1992). Other agencies established customized media units, dedicated to a particular client in order to address client concerns about conflict policy (Mandese 1995)

Viewing the full-service agency as a multiproduct firm when an agency's mix of services is defined in terms of the set of different media used in the campaigns it produces, Silk and Berndt (1994) hypothesized that bundling by full-service agencies in combination with the restrictions on agency growth imposed by the industry norm of not serving competing accounts, induces agencies to diversify their media mixes more extensively than would otherwise be cost justified. Product categories or industries differ in the use of alternative media. A pair of firms competing in the same industry is more likely to use similar mixes of media than is a pair of firms operating in different industries. If an agency could serve a competitor of an existing client, it could exploit scope economies with respect to mix of media used in that industry. However, since serving competing accounts is customarily prohibited, an agency seeking to grow must add a client in a different industry and adjust its media mix accordingly. This implies that under the strictures imposed by compliance with client conflict norms, the larger the size of a full-service agency, the more likely it is to expand its mix of media beyond that which is strictly cost justified. Silk and Berndt (1994) estimated media-specific scale and scope economies for a cross-section of full-service agencies and found that for each of nine media categories, substantial numbers of large agencies operated with *diseconomies* of scope. In line with the hypothesis of "excessive" diversification, media-specific scope economies were shown to be *negatively* related to full-service agency size.

Over time, agency-client relations have evolved in ways that have led to modifications in industry norms on serving competing accounts and enabled specialized media services to gain an advantage over full-service agencies with respect to capturing pecuniary and non-pecuniary economies related to media services. The preeminent development has been the growth and success of global holding companies. Through aggressive pursuit of globalization and diversification, holding companies attained double-digit growth rates during the 1990's, accomplished to a considerable degree by completion of a multitude of mergers and

acquisitions.[14]. The holding company concept was first introduced as a means of circumventing the longstanding industry norm that prohibits an advertising agency from serving competitors in the same market. After finding that the major holding companies all realized *positive* scope economies through diversification of either lines of business or market coverage, Silk and Berndt (2004) suggested that the sub-optimal excessive diversification imposed on full-service agencies as a result of bundling and conflict policy had been obviated by the holding company form of organization.

Large multi-brand advertisers seeking cost savings and other benefits have consolidated their media buying across brands and markets with specialized media services, especially those that are members of holding companies (Fine et al. 2005, pp. 60-63). As media options continued to expand, client demand for specialized capabilities offered by media services with respect to negotiating expertise, media research, measurement of effectiveness, and optimization has also grown. At the same time, several waves of mergers and acquisitions have reduced the number of options available to clients, particularly those seeking a consistent global presence. In this changed environment, clients have exhibited greater willingness to relax somewhat their demands for exclusivity (Sampey 2005) and holding companies have found ways to alleviate client concerns about violating traditional norms relating serving competing accounts, such as by structuring several separate agency networks within the same holding company (Chura and Wentz 2004). In 2007, the four leading holding companies owned 13 of the 15 largest media agencies operating in the U.S. Nonetheless, issues of exclusivity continue to arise (Fitzgerald 2004) and can lead to shifts of major media buying accounts among media agencies (Neff 2005).

The availability of size-related economies in media planning and buying is consistent with the level of concentration in this sector (NAICS 54183). The concentration ratios for the 4, 8, and 20 largest of the nearly 900 firms comprising this sector in 2002 accounted for 30, 39, and 50 percent of total sector income, respectively (Silk and King 2008, Table 4). National advertisers tend to be the principal clients served by large media planning and buying services, with the purchasing of local media for local advertisers remaining the domain of small and medium-sized full-service or in-house agencies (Mandese 2002). Major advertisers are reported to pay fees equivalent to 1 to 2 percent of media spending for media services (Johnson 2005).[15]

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[14] Whereas independent agencies were, with only rare exceptions, privately held businesses, holding companies are public corporations. Von Nordenflycht (2009) argues that a key advantage that holding companies enjoy over independent agencies is access to external capital markets. That advantage enables holding companies to acquire independent agencies at lower prices than their true value but greater than the independent agencies could otherwise realize.

[15] For some evidence on how media service compensation varies by medium and by the size of client advertising expenditures, see Beals (2007, pp. 27-31 and 52-54).

4.2.3 Substitutability

That the effectiveness of an advertising campaign is the joint product of message content ("What you say to whom") and media volume ("How large an audience is reached with what frequency") has long been recognized in advertising practice and theory (Rao 1970, Chapter 6) and demonstrated in market experiments. See Tellis (2009) and Wind and Sharp (2009) for reviews. Gross (1972) drew attention to the substitutability of the creative and media components of advertising campaigns through his provocative analysis of the allocation of advertising budgets between outlays for the creative development of advertising messages and those for media space and time. Gross argued that *underspending* on creative development was commonplace and that under the media commission method of agency compensation, advertisers did not directly control the allocation of funds to message development and media exposure. He called for abandonment of both commission-based agency compensation and reliance on full-service agencies in order to exploit the advantages of diversity by employing multiple independent creative services. By the mid-1990's, several advertisers had adopted the latter policy (Dilenschneider 1992; Gleason and Petrecca 1996) and acceptance by both advertisers and agencies of the unbundling of creative and media services steadily grew (Mandese and Wells 1992 and Mandese 1994).

Clearly, creative and media inputs are not perfect substitutes inasmuch as both are essential to produce an advertising campaign. Unfortunately, however, we are aware of no studies estimating the elasticity of substitution between the two inputs. To assess the plausibility of the assumption of limited substitutability, we examined data on advertising agencies relating to changes over in time in: (a) the share of agency revenue represented by labor costs; (b) mean payroll expense per employee; and (c) cost of media time and space. Agency services are labor-intensive customized client projects, and salaries and related expenses are the largest component of agency costs. Hence, to the extent that creative and media inputs are substitutable, we would expect changes in labor (b) and media (c) costs to effect changes in the share of agency revenue represented by labor costs (a).The percent changes in these three series over the five periods between Censuses conducted from 1997 to 2002 are presented in Table 1, along with changes in the GDP Implicit Price Deflator.[16]

INSERT TABLE 1 HERE

Referring to Table 1, we see that between 1977 and 1982 and between 1982 and 1987, media unit costs increased more rapidly than average wage per employee and in each case, the share of agency revenue represented by labor costs fell slightly; this is contrary to what

[16] The three underlying series are reported in Appendix A, Table A2 along with details as to their definitions and sources .Note from Table 1 that, increases in media costs exceeded the increases in the GDP Implicit Price deflator in all but one of the 5 year intervals falling within the period 1982-2002, the exception being the 1982-87 change. Similarly, increases in average labor costs were greater than those for the GDP Implicit Price Deflator, except in the case of the 1977-82 changes.

would occur if the two inputs were highly substitutable. In both the 1987-92 and 1992-97 intervals, the increases in average wage (21.3% and 25.2 %, respectively) exceeded the increases in media unit costs (18.0% and 22.2%, respectively), while labor cost's share of agency revenue declined only moderately in the former period (-2.6%) but then increased (6.9%) in the latter period; again this is consistent with limited substitutability. Finally, between, 1997 and 2002, the increase in average wages was substantially greater than that in media costs (24,8% vs.13.7%), and again labor cost's share of agency revenue increased (1.6%). This set of changes also run counter to what would occur were creative and media inputs highly substitutable inputs. In summary, during those time periods when media unit cost rose more rapidly than average wages, labor cost share fell, and during periods when average wages rose more rapidly than media unit cost, the labor cost share increased, the exception being the 1987-92 change. Although by no means conclusive, this evidence is generally consistent with our assumption of limited substitutability between creative and media as inputs to campaign production.

4.3 *Advertising Agency Production Function and Costs*

In this section we introduce a simple production function for an advertising campaign that captures the key feature of limited substitutability between the creative and media components of an advertising campaign and facilitates analysis of the costs of an advertising campaign under conditions of bundling and unbundling.[17] The quantity of creative services utilized, V, generates advertisements designed for a specific medium (e.g. a commercial to be run on television). The quantity of media space and time, W, purchased is based on a schedule for the placement of advertisements in selected media vehicles. We assume that both inputs V and W are necessary (strictly positive) in producing Y, an advertising campaign, which, in turn, is measured as the number of quality adjusted messages delivered to some target audience over a given time period. We assume the technology relating V, W, and Y is Leontief fixed-coefficient; in Appendix B we generalize our results to a constant elasticity of substitution production function and dual cost function. The quality dimension of creative services is captured by a multiplicative term Q_c, a production function shifter reflecting the effectiveness of the advertising messages (Gross, 1972). Thus, the production function for an advertising campaign is:

$$Y = Q_c \text{Min}\{\alpha W, \beta V\} \qquad (1)$$

where α and β are fixed input-output coefficients. Without loss of generality, we assume that creative services and media space and time are scaled such that both fixed coefficients equal unity. Specifically, with this normalization, for any non-zero prices of creative services and media space and time, the optimal (cost minimizing) combination of inputs must satisfy:

[17] In this section, we assume the inputs are perfect complements (i.e., Leontief production function with constant input coefficients and zero elasticity of factor substitution). This assumption simplifies the analysis of the (linear) cost function under both the bundling and unbundling scenarios. However, we have shown in Appendix B that the main predictions of this section are valid for Cobb-Douglas production functions (unitary elasticity of substitution) and for CES production functions with limited or mild substitutability (elasticity of substitution ≤ 1).

$$W = V \tag{2}$$

On the cost side, we assume volume price discounts, d_M , are offered by media suppliers on purchases of advertising space and time as a non-decreasing function of the total quantity of media purchases, *M*, made by the full-service advertising agency or the media services agency on behalf of all the accounts and clients it serves.[18] This captures pecuniary economies of scale in media buying activities. If the advertiser buys creative and media services from a full-service (i.e., multiproduct) advertising agency, the above production function represents the advertising agency's production function for the account. Otherwise, the advertiser purchases each component separately at the service provider's average cost (since markets are contestable), and uses the above technology to produce an advertising campaign. Thus either way, the total variable production cost of an advertising campaign is:

$$T = T_c + T_m + (1 - d_M)P_m W \tag{3}$$

where T_c is the cost of creative services, T_m the cost of media services, and $(1 - d_M)P_m W$ is the discounted cost of media space and time (passed through by the agency from media suppliers to the advertiser).

On the production side, media services are subject to non-pecuniary scale economies. The variable costs of media services are given by: $T_m = \delta P_m W$ where δ

$(0 < \delta < 1)$ is a fixed share of media expenditure volume. The costs of creative services, $T_c = P_c Q_c V$, include the price of creative services, P_c, applied to a quality adjusted quantity of services, $Q_c V$. Given our normalization in (2), without loss of generality, this reduces to:

$$T = (P_c Q_c + (\delta + 1 - d_M)P_m)W \tag{4}$$

Note that any fixed costs of initiating and maintaining contacts with agencies and possible coordination costs paid by the advertiser from working with multiple agencies are not included in the above variable cost function for an account. We address those cost elements below.

We assume that specialized media buying agencies can capture greater pecuniary and non-pecuniary economies of scale in media services than can full-service agencies. As was discussed earlier in Section 4.2.2, this advantage arises from the specialized media service provider's ability to consolidate the media buying activities of more and/or larger accounts and thereby achieve greater scale with respect to media services than can comparable independent full service advertising agencies whose media volume is constrained by the number and size of clients it provides with both creative and media services.

[18] In other words, $M = \Sigma W$ for the agency.

4.4 *Bundling Scenario*

In the bundling scenario, the advertiser pays the fixed information costs (costs of searching for an agency, learning about it, and initiating and maintaining the relationship) for an advertising campaign (account), which we denote as T_r. The advertising agency purchases the media space, W, on behalf of the advertiser for the account at a price net of the volume discounts, $(1\text{-}d_M)P_m$. Given the above variable production cost function, the total cost to the advertiser is:

$$T_B = T_r + \left(P_c Q_c + (\delta + 1 - d_M)P_m\right)W \tag{5}$$

The commission on media purchases, $r(1-d_M)P_m W$, compensates the agency for both the creative and media services it provides. This rate, r, is equivalent to the familiar commission rate traditionally used as the basis for agency compensation.[19] Under the assumption that the market for advertising services is contestable, the agency's commission is equal to its costs. Thus, it is readily shown that this commission rate turns out to be:

$$r = \frac{P_c Q_c + \delta P_m}{(1-d_M)P_m} \tag{6}$$

Note this rate, r, equals the ratio of the agency's cost of creative and media services to costs of the media space and time it purchases for the advertiser's campaign, net of the volume discounts obtained from media suppliers and passed on to the advertiser.

As expected, r increases with increases in: (i) the quality of creative services, Q_c; (ii) the price of creative services, P_c (i.e., from an increase in wages); (iii) the unit cost of media operations, δ; and (iv) with decreases in the media price discount, d_M (the volume discount is smaller when the total media buying volume of the agency, M, is smaller); and (v) with a decrease in the price of media space or time, P_m.

4.5 *Unbundling Scenario*

The production technology of an advertising campaign is identical in the unbundled and bundled scenario. The advertiser must bear higher information costs to establish and organize relationships separately with both a media buying and a creative agency. In addition, an advertiser may incur coordination and integration costs for purchasing the two complementary inputs to an advertising campaign from separate firms. We capture these additional unbundling costs, $2T_r$, by assuming that the advertiser must pay duplicate fixed information costs when it purchases services for an account from two firms, as compared to the bundling case where only one input supplier is employed.[20] The advertiser also needs to

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[19] The commission rate, r, is ratio of commission received by the agency over the cost of media space purchased for the advertiser. That is, the "gross billings" set by the media and passed on to the advertiser by the agency includes the agency's commission as well as charges for media time/space purchased by the agency on behalf of the advertiser.

[20] Our analysis and results would not change qualitatively as long as the fixed information costs in the unbundling scenario are larger than in the bundling scenario. The fixed cost saving is the necessary condition for bundling ever to occur (Evans and Salinger 2005). One can interpret the information cost, or the cost of establishing a relationship with an agency for a campaign,

pay for creative services separately, T_c. In return, the advertiser can benefit from a lower unit variable cost for its media space and time purchases. That is, specialized media buying agencies can aggregate volume and bargain more effectively for lower prices (higher discounts) from media suppliers, and also have lower overhead costs for media buying operations (in general, larger pecuniary and non-pecuniary economies of scale in media activities). Hence, denoting the unbundled terms with a prime (‘), the specialized media service can exploit scale economies to the fullest such that $d_{M'} \geq d_M$ and likely that $\delta \leq \delta'$. Thus, the total costs to the advertiser facing the unbundled agency are:

$$T_U = 2T_r + \left(P_c Q_c + (\delta' + 1 - d_{M'})P_m\right)W \tag{7}$$

The media commission rate charged by media buying agencies turns out to be:

$$r' = \frac{\delta'}{\left(1 - d_{M'}\right)}. \tag{8}$$

4.6 *Advertiser Choice*

The advertiser’s choice of bundled or unbundled services depends on which scenario minimizes total production costs, given that advertising agencies pass on their costs to the advertiser in this contestable market. Therefore, bundling is preferred if T_B in (5) is less than T_U in (7). That is,

$$\left(\delta - \delta' + d_{M'} - d_M\right)P_m W < T_r . \tag{9}$$

To simplify notation and without loss of generality, we assume $\delta = \delta'$ [21] so as to focus on the interplay between changes in the media price and agencies’ pecuniary scale economies, and their effects on unbundling decisions. Thus, the condition for bundling to be less costly becomes:

$$\left(d_{M'} - d_M\right)P_m W < T_r . \tag{10}$$

Comparative statics analysis of the inequality (10) provides a set of testable implications for advertising agencies unbundling/bundling practices.

First, we assume the supply of media buying services is a competitive activity, where media service establishments are sized optimally to exploit economies of scale and capture available volume discounts, $d_{M'}$.[22] Thus *ceteris paribus*, the odds that accounts at full-

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as the search cost for finding an adequate match. In that case, the advertiser pays the search costs once in the bundling scenario, and twice in the unbundling scenario, but it will attain a better overall match in the unbundling situation (i.e., better price for media buying activities).

[21] This assumption is not necessary for any of the following comparative statics analysis. All the comparative statics results derived from (10) can be derived from inequality (9).

[22] See the discussion in section 4.5. In general, a specialized media buying agency can consolidate the media buying activities more freely, and *ceteris paribus,* reach a larger media scale, $M'>M$. Thus, it can enjoy a larger pecuniary scale economy, $d_{M'}>d_M$.

service advertising agencies will be bundled is related to their ability to compete with specialized media services, as indicated by how close d_M is to $d_{M'}$. If the full service agency has a large media billing volume (i.e., benefits from large pecuniary economies of scale), its accounts are more likely to be bundled, as the advertisers prefer their bundled services to unbundled. Thus, the larger is the media volume of a full service agency, the smaller are the odds of having unbundled accounts.

Second, we expect that increases in the media price, P_m, (compared to other costs, specifically the information costs, T_r) magnify differences in media buying discounts and increase the pressure on both small and large agencies to unbundle. As media prices increase, the shift toward unbundling is therefore expected to be weaker and occur later for agencies with substantial volumes of media purchases. In other words, the threshold volume of media purchases needed for full-service agencies to be competitive with specialized media services increases as media prices increase. This effect can readily be shown inasmuch as the second partial derivative of the left-hand side of (10) with respect to both M and P_m is negative $\left(\frac{\partial^2 LHS}{\partial P_m \partial M} < 0\right)$, since $\frac{\partial d_M}{\partial M} > 0$.[23] Hence, the interplay of the media price increases and an agency's media volume yields the prediction of a negative effect on the odds of providing unbundling services from their (multiplicative) interaction, as represented in (10).

Third, increases in the media price, P_m, tip the balance toward unbundling accounts for a given full service agency. However, this effect is mitigated for agencies with large media volumes, as discussed above.

In addition to above three implications, comparative statics also indicate that the tendency toward unbundling increases: (a) as the size of the client's advertising campaign, W, increases; (b) as the size of the agency decreases because d_M is lower for smaller agencies; and (c) as the fixed information cost of establishing a working relationship with an agency for an account, T_r, decreases.

4.7 *Econometric Model Specification*

In an ideal world, for purposes of estimation, we would exploit data at the level of individual accounts (advertising campaigns) and the agencies serving those accounts, enabling us to employ binary choice models to test predictions of our model. However, the Economic Census data available to us are at the agency establishment level where we are unable to observe prices and volumes for individual client campaign accounts. Heterogeneity in accounts and client characteristics will generate a mixture of bundled and unbundled accounts within a given advertising agency. We therefore aggregate client bundling decisions into a measure of the share of an agency's total revenue arising from unbundled services. The details of our unbundling measure, *shunb*, and other variables are explained in section 5.2. Since we estimate the model at the agency establishment level, variations in decisions at the

[23] We show in Appendix B that the main predictions of this section are valid for Cobb-Douglas (unitary elasticity of substitution) and for CES production function with limited substitutability (elasticity of substitution ≤ 1) or even moderate substitutability.

account level not captured by agency characteristics, such as scale and scope variables, are absorbed into the error structure.

Thus, our econometric specification for the share of agency *i*'s total revenue at time *t* obtained from fee-based and other direct compensations is given by:

$$\text{shunb}_{it} = \beta \mathbf{x}_{it} + (\gamma_0 + \gamma_1 \text{M}_{it})\text{P}_{mt} + \eta_t + \varepsilon_{it} \qquad (11)$$

where $\mathbf{x}_{it}$ is a vector of advertising agency characteristics, including advertising agency establishment size, scope, age, media billings, holding company affiliation, and number of establishments in the parent firm.

As shown in the previous section, we expect the partial influence of media price on unbundling, $(\gamma_0 + \gamma_1 M_{it})$, to be positive but decline in magnitude the greater the volume of advertising agency's total media billings, *M*. Hence, we expect γ_0 to be large and positive but γ_1 to be negative. That γ_1 is negative is the distinguishing implication of our model that we test empirically via the interaction term which captures the effects of the interplay between agency media volume and media prices on unbundling. Time dummies η_t control for overall shifts in market conditions over time, such as changes in media suppliers' discount schedules, and election year/Olympic year demand surges. Note that media prices, P_{mt}, may vary over time but are common to all agencies. Thus, although we expect positive effects from changes in media prices over time via the product, $\gamma_0 P_{mt}$, any variation in media prices and/or the terms of the media buying alternatives that are common to all advertising agencies are absorbed in the time indicator variables. Under these assumptions, we delete the term $\gamma_0 P_{mt}$ from (11) and our econometric specification becomes:

$$\text{shunb}_{it} = \beta \mathbf{x}_{it} + \gamma_1 \text{M}_{it}\text{P}_{mt} + \eta_t + \varepsilon_{it} \qquad (12)$$

5 Database and Estimation

5.1 *Data Sources and Cross-Sectional Samples*

The establishment level data for advertising agencies analyzed in this study are drawn from the U.S. Census Bureau's Economic Census of Service Industries (CSR) conducted at five year intervals over the period 1977 – 2007.[24] The data are a census of all private employers. Our universe includes all active advertising agency establishments in the continental U.S. with positive payroll for Standard Industrial Classification (SIC) code 7311 in the case of censuses conducted between 1977 and 1997, and North American Industrial

[24] The Census reports data at the level of both "firms" and "establishments." A "firm" is defined as a "business organization or entity consisting of one domestic establishment (location) or more under common ownership or control." An "establishment" is "a single physical location at which business is conducted and/or services are provided." See: U.S. Census Bureau, *2002 Economic Census, Subject Series*, p. A-1.

Classification System (NAICS) code 54181 for censuses conducted from1997 onward.[25] As shown in Table A1of Appendix A, the number of establishments (with payroll) grew from 8,089 in 1977 to about 14,000 in 2007.

The source of our advertising media price data is the report of "Media Cost Indices" prepared by MagnaGlobal, a division of the Interpublic Group, New York. The indices measure the year-to-year changes in media unit costs, indexed to the period 1982-1984. We use their "composite media unit index for national and local advertising budgets," which includes advertising in newspapers, magazines, network television, cable television, spot television, network radio, spot radio and direct mail (MagnaGlobal 2008).

Our interest is in the details of advertising agencies' services and compensations, which limits the size of the samples available for analyses to establishments that report relevant data on the Economic Census long form. Attrition may occur for several reasons. First, the Census Bureau mails questionnaires to all establishments that belong to firms with two or more establishments (multi-unit firms), all single-unit employers with payroll above a cutoff level, and to a stratified sample of small single-unit employers. This sample of establishments is known as the Economic Census "mail universe". The payroll cutoffs vary by kind of business. For example in 2002, the payroll cutoffs were defined at the eight digit NAICS product code level, and for different services industries ranged from a total firm payroll of $15,000 to $1,000,000 (Hovland and Gauthier 2006).[26] After including multi-unit and large single-unit firms with certainty in 2002, Census selected an approximate 9.5 % stratified sample of the remaining small single-unit firms. Data for single unit firms in the non-mail universe are obtained from administrative records of other federal agencies.

A second factor affecting sample size is that the "long form" of the questionnaire that includes detailed questions on sources of sales receipts is sent to a subset of establishments in the mail universe. For example**,** in 1997 the long questionnaire was sent to a little over half of service establishments in the mail universe, and the short questionnaire to the remainder. Third, there is a considerable level of non-responses for industry specific questions included in the long form, such as gross media billings, media costs, media commissions, billings and costs of advertising materials and services provided by third parties, and agency service fees. Fourth, numerous inconsistencies arise in the reports from agency respondents on the long

[25] The Census Bureau converted the Economic Census from the SIC to the NAICS industry classification system in 1997. The 1997 Economics Census was a bridge year including both classifications. SIC 7311 maps into NAICS 54181 directly. Advertising agencies "are primarily engaged in creating advertising campaigns and placing such advertising in …media" and "provide a full-range of services (i.e., through in-house capabilities or subcontracting), including providing advice, creative services, account management, production of advertising material, media planning, and buying" (U.S. Census, "Establishment and Firm Size," *1997 Economic Census, Professional Scientific, and Technical Services, Subject Series*, October 2000, Appendix B., p. B10.

[26] A one million payroll might appear large. However, at an average annual salary of $25,000 per worker, this would result in firms with 40 or more employees being included in the certainty sample. For the 1997 census, the cutoff for services was defined so as to include single-unit firms with ten or more employees in the certainty sample. In the 1992 census, the cutoff included single-unit firms with more than 3 employees.

form.[27] For example, about half of the agencies that responded to the long form in 2002 reported commissions and markups that are larger than their total revenues. Finally, partial or incomplete reporting occur such as when media billings are provided without accompanying information on media costs, or vice versa. Table A3 in Appendix A shows how resulting sample sizes vary from just over a thousand for 2007 to more than five thousand for 1992. We return to a discussion of potential selection issues due to item non-response in Section 5.3.1 below.

5.2 *Variable Definitions*

Replacing the vector of $\mathbf{x}_{it}$ is a vector of advertising agency characteristics with measures thereof, our basic specification (12) becomes:

$$\begin{aligned} \mathrm{SHUNB}_{it} = \alpha + \beta_1 \cdot \mathrm{LINC}_{it} + \beta_2 \cdot \mathrm{SCPS}_{it} + \beta_3 \cdot \mathrm{LEST}_{it} + \beta_4 \cdot \mathrm{HCD}_{it} + \beta_5 \cdot \mathrm{LAGE}_{it} + \beta_6 \cdot \mathrm{SUD}_{it} \\ + \beta_7 \mathrm{LMBL}_{it} + \gamma_1 \cdot \mathrm{LMBL}_{it} \cdot \mathrm{MPI}_t + \eta_t + \varepsilon_{it} \end{aligned} \quad (13)$$

Variable definitions and summary statistics are presented in Table 2. The matrix of pairwise correlations among the variables in (13) is given in Table A2, Appendix A.

INSERT TABLE 2 HERE

Table A3 (Appendix A) shows the shares of agency revenue derived from four sources: (i) commissions on media billings, (ii) markups on purchases of advertising materials and services, (iii) fees for advertising services, and (iv) direct compensations for other services for various census years.[28] We combine the first two components, (i) plus (ii), and define "share of income from bundled services" as:

$$SHBUN_{it} = \frac{commissions\ on\ media\ +\ markups\ on\ materials\ and\ service}{revenue} \quad (14)$$

We then define the dependent variable in Eq. (14), $SHUNB_{it}$ as the share of establishment i's revenue at time t contributed by fees for creative and other services, such as public relations, where:

[27] In 2002 and 2007, the attrition is even larger because the long form did not directly ask for the media commissions and markups on advertising materials and services As discussed later, we calculated those quantities using other reported information.

[28] For most years, commissions on media and markups on materials and services are reported directly on the questionnaires. For 2002 and 2007, these were calculated as billings minus costs, which presented some data availability and consistency issues that resulted in a larger sample attrition. In 1977, the billings on media and advertising materials and services, rather than commissions, are reported as a part of the revenue/receipts lines. Thus, the reported shares of revenue are not usable as commission shares.

$$SHUNB_{it} = 1 - SHBUN_{it} \quad (15)$$

Note from Table A3 that the share of agency income arising from fees and other direct compensations almost doubled between 1987 and 1997, growing from 23 percent to 45 percent while that from commissions and markups declined commensurately.

Agency establishment revenue and gross media billings are collected directly by questionnaires and enter into (13) in log form as LINC and LMBL, respectively. Revenue is the establishment's operating income, including commissions and services fees. Gross media billings encompasses the total amount of media purchased by an advertising agency for all its accounts, and includes the agency's payments to media companies for advertising space and time as well as its commissions on those purchases.

Our scope variable (SCPS) is constructed as a count of the distinct service activities performed within the establishment. The number of services reported has expanded over time; in 1977 and 1982 there were five categories on the questionnaire, fifteen in 1997, and as many as twenty in 2002 and 2007. Our measure of scope was limited to the four elements listed in Table 1 which were available for all Census years, because of either their direct inclusion as items in the questionnaires for 1977-1997, or otherwise being readily calculable from information reported in the 2002 and 2007 questionnaires.

The Census Bureau routinely sends the Company Organization Survey to multi-unit firms to collect information on ownership and, more specifically, to update its listings of establishments for which a firm owns a greater than 50% share. This is the Census definition of a firm, or enterprise, often called the "alpha" in the data. Data exploration revealed that advertising agencies generally retain their own EIN federal tax ID. As a result, three tiers of ownership structure are identifiable in the Census data. The alpha is equivalent to the holding company, comprised of one or more agencies. The EIN is equivalent to the agency, which may be comprised of one or more establishments. We define a holding company dummy variable (HCD), which identifies all establishments that are member of a multi-agency (multi EIN) holding company firm (alpha). We also include the natural log of the count of the advertising agency establishments affiliated with a firm (LEST). Single unit agencies operating at only one establishment location are designated by a dummy variable (SGUD).

Considerable effort was invested in the Longitudinal Business Database (LBD) to recover longitudinal identifiers for establishments through linking records and matching names and addresses (Jarmin and Miranda 2002). The LBD includes the birth year of an establishment, defined as the first year the establishment entered the business register, which we use to calculate the natural log of establishment age (LAGE). However, the age variable is censored because 1975 was the first year of the business register and no birth year is recorded for establishments that already existed as of 1975. Thus, agency establishments born prior to 1975 are indentified by a dummy variable (BRDD equals unity) and their log age is set to zero.

5.3 Sample and Pooling Issues

5.3.1 Sample Selection

The sample sizes available for estimation purposes are shown in Table A3 and represent between 8% and 37% of the total population of all advertising agency establishments operating in a given census year, as reported in Table A1. We investigate the possibility of sampling bias in our results that may have arisen from sample selection procedures and non-response, as discussed in section 5.1.

Due to differences in Census sampling strategies over time and the large variation in the sizes of the samples of establishments for which complete information is available, we first estimate selection equations for each year separately and then combine the annual samples and estimate a pooled selection model. Our sample selection model includes all the regressors in (13) plus several additional variables described below that are not included in the unbundling share model. Thus, we do not rely on the nonlinearity of the first stage selection equation for our corrected estimates but instead rely on exclusionary restrictions for identification in the second stage share model.

In the first stage we included establishment annual payroll and employment as size controls. Payroll, along with SGUD, the single-unit indicator included in (13), capture the criteria used by Census for sample design, and our investigations show that together, they are indeed the main determinants of the sample selection. Also included are location contextual measures, specifically an indicator for rural location, and a count of other advertising agencies in the same city. Advertising establishments located in cities with many neighbor advertising establishments are more likely to specialize locally, network with other agencies, outsource and/or in the case of multi-establishment firms, distribute work across facilities.

As a consequence of variations in accounting requirements, ownership status of an organization could affect the extent and quality of internal information available for reporting to the census. Hence, we added to the selection model indicator variables for alternative forms of legal organization; namely, sole proprietorship, partnership, and corporation, plus a residual "other" category. We have no reason to expect legal form to have an independent effect on the propensity of an agency to offer a bundled contract.

We estimated Heckman (1976, 1979) selection models for each of the census year samples and for the pooled sample. In almost all case, the inverse Mills ratio terms in the second stage estimates were found to be insignificantly different from zero. The exceptions were 2002 and 2007, the years for which our estimating sample was smallest.[29] The greater sample attrition that occurred in these years can be attributed to changes in variables collected on the long form of the census questionnaire. Comparison of corrected and uncorrected 2002 and 2007 coefficient magnitudes revealed few differences. In all years, we found no meaningful differences in the estimates of the slope coefficients when compared to the uncorrected estimates. Moreover, most first stage Heckman coefficients were significant with the expected sign. As expected, larger establishments and firms were more likely to be included in the sample. Rural agencies and establishments located in cities with large advertising agglomerations were more likely to return questionnaires with some item non-

[29] The Mills ration is highly significant for 1977. The inconsistency of revenue lines in 1977 caused large attrition in the data that potentially could bias our estimations. There are additional issues with 1977 data consistency which we explore in the next section.

response. The effects of legal form of organization were not consistent across years. We conclude that the substantial levels of observed sample exclusion and item non-response do not bias our results.[30]

We are not aware of another study that has reported sample selection results using Census establishment-level micro data. Our results offer an example of the advantage of using the very large universe of establishments available in the Economic Census.

5.3.2 Inter-temporal Stability of Slope Coefficients

In constructing our pooled estimates, we investigated the inter-temporal stability of the estimated slope coefficients in (13). First, we ran separate cross sectional models for each census year and found that estimates were qualitatively robust across years. We ran further tests of statistical differences in coefficients across adjacent census years by pooling pairs of years and including a full set of second year interaction terms. In general, we found differences for coefficients across years were statistically insignificant. One exception was for the scope measure, which was consistently different across all consecutive census years. This result was expected as the scope of activities performed by advertising agencies has changed over time, as was discussed in section 2 and is evident in Tables A1 and A3. Based on these initial checks, we include in the results (Section 6) a version of the unbundling share equation where the regression coefficients for our scope measure can vary over time.

A second exception was for 1977. The wording of the 1977 questionnaire was such that advertising establishments were asked to report media billings as part of receipts. However, an improved version of this question was employed in the 1982 and subsequent questionnaires. Not surprisingly, the coefficients were clearly and statistically significantly different when the 1977 estimate was compared to those for later years. Lastly, our measure of establishment age turned out to be problematic for 1977 because an insufficient number of years had lapsed following 1975 for a meaningful measure of establishment longevity to be constructed. In light of these issues, we excluded 1977 from the pooled regressions. However, we have retained the 1977 data in Figures 1 and 2 and Tables A1 and A3 of Appendix A.

Use of panel analysis to capture establishment fixed effects was precluded by virtue of the high turnover rate among agency establishments (discussed in section 2 and 4) and other issues related to sampling procedures and non-response. About 70% of the establishments appear only once in the sample from 1982 to 2002, and an additional 20% only twice. During the same period, only 0.5% of establishments in our samples appear in all periods.

6 Results

6.1 ***Pooled Regression Results: 1982-2007***

[30] Note that these second stage estimation results are identified not through functional form, but rather through plausible second stage exclusion of variables significant in the first stage.

Figure 2 documents the trends in the mean share of agency income (both unweighted and weighted by agency income) derived from unbundled services for the five cross-sectional samples of agencies spanning the period 1977 to 2002. The weighted mean unbundling share was under 13 percent in 1977, grew steadily to 23 percent in 1987, then rose more rapidly to 45 percent in 1997 before flattening out at approximately 44 percent in 2002.

INSERT Figure 2 HERE

To investigate the determinants of the growth in unbundling share, we pooled the data for the six cross-sections collected in the censuses for 1982 to 2007 and estimated our basic model (13), plus a series of alternative model specifications to address issues discussed below. Results are presented in Table 3. With only a few exceptions noted below, the estimated coefficients are generally robust across specifications with respect to expected sign and statistical significance.

INSERT Table 3 HERE

6.1.1 Media Price, Agency Media Billings, and their Interaction

The estimates for our basic specification (13) are presented in column 1a of Table 3. We refer to this as the base model. As discussed in Sections 4.7, our model of unbundling yields predictions about the effects of agency media billings, media prices, and their interaction on the share of agency revenue accounted for by unbundled services. Referring to the results for our base model (13) shown in column (1a) of Table 3, we find that the log of media billings (LMBL) is *negatively* related to unbundling share and the estimated coefficient is significant with $p < .001$. Thus, as predicted, the greater the volume of media placed by an agency, the less its reliance on income from unbundled services. Moreover, also as predicted by the model, the estimated interaction coefficient involving LMBL and MPI is negative and statistically significant ($p<.001$).

To facilitate interpretative comparisons of the relative magnitude of the effects of the regressors, we report standardized regression coefficients (Wooldridge 2000) for the base model (1a) in column (1b) of Table 3. The standardized regression coefficients (SRC) answer the question: "By how many standard deviations does the dependent variable unbundling share (SHUNB) change when the regressor increases by one standard deviation?" Aside from the census year dummy variables, we see from column (1b) of Table 3 that the scale and scope variables have the largest positive effects on SHUNB, the SRC's being .414 and .278 for LINC and SCPS, respectively. LMBL (log media billings) and the interaction of LMBL and MPI (media prices) have the largest negative effects, their SRC's being -.361 and -.186, respectively. None of the other explanatory variables in the base model (1a) has a SRC greater than 0.10 in absolute magnitude.

In columns (2)-(5) of Table 3, we report results for a set of alternative specifications formed by dropping regressors from the base model (1a) so as to assess the stability of the

estimates. LMBL and the interaction, MPI*LMBL, are collinear (r=.812); column (2) presents the estimates obtained when the interaction variable is eliminated from the base model (1a). Not unexpectedly, the principal effect of excluding the interaction term is that the coefficient on LMBL becomes increasingly negative, declining from -.058 in (1a) to -.079 in (2). As may be seen from columns (3)-(5) of Table 3, virtually identical results relating to the effects of LMBL and the MPI*LMBL interaction were obtained for several alternative specifications to (1a) wherein two or more agency variables were systematically excluded from the base estimating equation.

To capture the time trend in unbundling (Figure 2) as well as the direct effects on unbundling of changes in media prices and macroeconomic conditions occurring over time, we have included dummy variables for each census from 1987 through 2007 (D1987, ... , D2007), with 1982 serving as the base year and included in the intercept term. The estimated coefficients for these five dummy variables are positive and significantly different from zero ($p < .001$) for specifications (1a) through (5) in Table 3. These census year parameters increase from 1987 onward, drop off in 2002, and then rise again in 2007.[31]

Recall from the discussion in section 4.7 that since our media price variable (MPI) varies over time but is common across agencies, it was dropped from our specification of the base model (see (12) and (13)) which includes dummy variables for the census years. Thus, the expected positive effects of changes in media prices over time are absorbed in the census year dummy variables and MPI does not appear as a separate term in our model.[32]

6.1.2 Agency Scale and Scope Variables

[31] To assess the possible effects of changes in the question used to measure the scope variable (SCPS noted in section 5.2, we added interaction terms for the scope variable (SCPS) with each of the census year dummy variables to our base model (1a) and obtained the estimates shown in Columns (3) of Table A4 of . Estimates of interaction effects follow a pattern of diminishing influence over time: positive and statistically significant ($p< .001$) for 1987 and 1992 (with the 1992 estimate exceeding that for 1987), but negative and significant ($p <.001$) for 1997, and unreliable thereafter (positive with $p<.10$ in 2002 and then negative with $p<.05$ in 2007). Not surprisingly, inclusion of the interaction terms for SCPS and the year dummy variable (column 3 of Table A3) leads to estimates of the census year dummy variables in the augmented model that are smaller in magnitude than those obtained for the basic model (column (1a of Table 2) for three of the four years, the exception being 1997. Nonetheless, the pattern over time exhibited by the census year dummy variables is essentially similar for both specifications (column 1a in Table 3 and 3 in Table A5). While the estimated 1987 coefficient in (3) is negative but non-significant, those for 1992 through 2007 are significantly positive and of increasing magnitude. The estimated 2002 coefficient is also positive and significant but of lesser magnitude than the 1997 value; however, the magnitude of the 2007 coefficient estimate exceeds that for 2002.

[32] Models that included MPI, LMBL, and their interaction but excluded the census year dummy variables were also estimated and the results are presented in Table A5 of Appendix A. The estimated regression coefficients for MPI and LMBL were found to have the expected positive and negative (respectively) and were statistically significant ($p<.001$). The coefficient estimate for MPI*LMBL also had the predicted negative sign and was significant ($p=.015$).

The share of agency income from unbundled services increases with increases in agency size (LINC) and the breadth of its service offerings (SCPS)[33]. Across the basic and alternative specifications, the estimated coefficients for each of these regressors presented in columns (1a) through (5) of Table 3 are of almost identical (positive) magnitude and statistically significant ($p < .001$).

Two variables capture the effects of the number of establishments comprising an agency: the dummy variable SGUD contrasts single and multiunit agencies while LEST (logarithm of the number of establishments within an agency) measures the influence of size variations in multiunit agencies. For the base model shown in column (1a) of Table 3, the estimated coefficient for SGUD is negative, indicating single unit agencies tend to have lower unbundling shares than multiunit agencies; but the effect is imprecisely measured and not statistically significance ($p < .10$). [34]. On the other hand, unbundled share decreases as the log of the number of establishments (LEST) comprising an agency increases; and this effect is highly significant ($p < .001$). A possible interpretation of this latter result is that the more establishments operated by a multiunit agency, the more specialized are the establishments.

6.1.3 Holding Company Affiliation and Agency Age

As discussed in section 4.2.2, holding companies have established specialized units to capture pecuniary and non-pecuniary scale economies in media and other services. Hence, we expect holding company ownership to increase the unbundling share of their affiliated agency establishments. Although the estimated coefficient for HCD shown in Table 3 for the base model (1a) has the expected positive sign, it is not significant. Given the moderate collinearity between HCD and the scope measures, SGUD and LEST, we dropped the latter two variables from our base model (1a) and re-estimated this more restricted specification, shown in (3) of Table 3.[35] The sign of the estimated coefficient for HCD changes, becomes negative and significant ($p < .001$), implying that establishments affiliated with holding companies tend to have lower unbundling shares than do independent agencies. This result appears anomalous and we conjecture that it may indicate that our simple dichotomous measure of holding company affiliation, HCD, fails to capture the heterogeneity of holding companies with respect to the composition and specialization of their establishments.

The effects of agency age are measured by two variables. The dummy variable BRDD distinguishes between agencies that began operations before (=1) versus after 1975 (=0). In the base model (1a), the estimates of the coefficient for BRDD is negative and statistically significant ($p < .001$), indicating that older agencies tend to have a lower the share of their

[33] The positive relationship between agency size and unbundling is consistent with Horsky's (2006) finding that the likelihood of an advertiser unbundling increases with the size of its advertising budget.

[34] SGUD and LEST are moderately inter-correlated (r=-.725). See Table A4, Appendix A. When LEST is dropped from model (1a), the estimate coefficient for SGUD was positive but not significant ($p <. 10$).

[35] As shown in Table A4, Appendix A, the simple correlations of HCD with SGUD and LEST are -.644 and .776, respectively.

incomes from unbundled services than younger ones. When measured by the log of agency age (LAGE, defined as the log of the difference between a given census year and 1975), the effects of increasing agency age are also found to be negative but only weakly significant ($p < .05$) in the base model (1a) and non-significant in two alternative specifications (columns 3 and 4 in Table 3). These estimates imply that, other things equal, older surviving advertising agencies are more likely to cling to bundling, whereas the younger and newer entrants are more likely to specialize and unbundle.

6.2 *Extension to Scope Model*

One possible specification issue is whether the SCPS variable, the number of distinct product groups (range 1-4) for which the establishment receives revenues, is jointly determined with the unbundling share, thereby potentially generating a simultaneous equations bias in the unbundling share equation. On *a priori* grounds, we believe that any such simultaneity is much more likely to be present at the level of a firm, but not at the establishment level. It is, of course, possible that as an establishment becomes unbundled, it becomes more specialized, reducing the scope of its product offerings. Unweighted means of the SCPS variable generally declined over time between the 1977 and 2007 Census, having sequential values of 3.19, 3.03, 3.01, 2.82, 2.74, and 2.95 and 2.94 over that period. These data suggest that at the establishment level, scope of services offered declined as the unbundling share increased, implying possible increased specialization. Hence the sensitivity of our principal findings in the unbundled share equation to such a specification issue is an empirical issue.

We have addressed this specification issue by deleting the SCPS variable from the unbundled share equation, and then estimating an additional equation with SCPS as the dependent variable having the same set of regressors as the unbundled share equation with SCPS deleted. This two equation system can be interpreted as a set of reduced form equations. We estimate the SCPS equation (where the dependent variable may take on the values of 1, 2, 3 or 4) using ordered probit estimation methods. We then assess the extent to which our principal findings in the preferred unbundled share equation model are sensitive to deletion of the SCPS variable. Results of our analysis are presented in Table 4.

INSERT TABLE 4 HERE

As is seen by comparing columns (1) and (2) of Table 4, other than the intercept term, parameter estimates for the unbundled share equation (column 1) are not only qualitatively unaffected by exclusion of the SCPS variable (column 2), they are also quantitatively very similar. This provides us with some assurance that our principal findings are robust to a possible simultaneous equation estimation bias involving SCPS.

Nonetheless, it is of interest to examine the parameter estimates in the ordered probit equation. Note that since our dependent variable can take on only four values, coefficient estimates indicate how changes in a regressor affect the probability of moving from 1 to 2

and from 3 to 4, but not from 2 to 3.[36] With this caveat in mind, we present in Column (3) of Table 4 parameter estimates from the ordered probit equation. As is seen there, probabilities of moving from 1 to 2 products, and from 3 to 4 products, increase with establishment size, and decrease with number of establishments in the unit, media billings, price and over time (i.e., the absolute magnitudes for the yearly dummy variables tend to increase from 1987 to 2007). It bears noting that the signs of these estimated coefficients in the SCPS equation (Column 3) parallel those in the unbundled share equation (Column 2), with the coefficient for HCD being negative and significant in the Scope model while negative but insignificant in the unbundling share regression.

7 Conclusions

This study has addressed a longstanding puzzle concerning the unbundling of services that has occurred over more than two decades in the advertising agency industry: How can the shift from the bundling to the unbundling of services be explained, and what accounts for the slow pace of change? The puzzle stems from the unexpectedly long, drawn out response to the 1956 consent decree that sought to dismantle the recognition system. Using the Evans and Salinger (2005, 2008) cost-based theory of bundling as a framework, we have developed a simple model of an advertising agency's decision to unbundle its services. Empirical support for the key predictions of the model was obtained from an econometric analysis of pooled longitudinal establishment data for the period 1982-2007. More specifically, our results show that advertising agency establishments are more likely to unbundle if they are large and diversified in their service offerings and are less likely to do so with increasing age. A strong trend toward unbundling over time is evident, a result that is partially explained by the substantial increases in media prices that occurred over the period studied.

The unbundling of advertising agency services investigated in this study evolved gradually over a long period of more than two decades and was accompanied by a continuing stream of criticism maintaining that unbundling led to a decoupling of creative and media services that sacrificed valuable synergies between the two functions (Drexler 2002). Interestingly, the advertising industry is presently in the early stages of a major transition from its longstanding reliance on mass media to an era where new communications technologies will play an increasingly important role. With the onslaught of numerous novel communications options, demand for closer integration of creative and media services has again heightened and led to calls for "re-bundling" (Reinhard 2001, Sawyer 2008). Holding companies have expanded their digital marketing capabilities via numerous acquisitions. Recently, they have begun to re-organize their media agencies with digital operations and other capabilities (branding and creative services) so as to position themselves as offering

[36] See Greene (2003, pp. 736-740) for further discussion.

broader "marketing solutions" beyond media planning and buying (McClellan 2008). The re-bundling may also in part reflect the lower observed prices for digital ads.

Technological changes bring not only new means of reaching consumers but also new tools for managing campaigns (Evans 2008). As these developments unfold and their effects on media, creative, and production costs come into sharper focus, an important task for future research will be to assess the viability of new bundling strategies.

Interpreted through the lens of the model presented here, this complexity might increase the fixed costs of creating agency-client relationships as well as stimulate greater inter-media competition with the introduction of new communication technologies, thereby exerting downward pressure on media prices. For example, the latter phenomenon has become a major revenue issue for traditional media, as evidenced by the struggle of newspapers to survive the transition to digital delivery. More broadly, these developments are likely to affect advertising agency service offerings and their underlying governance structure. The dynamics of firm and industry structure promise to continue to be an interesting topic for future study.

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Figure 1

Media Price Index and GDP Implicit Price Deflator: 1977-2007

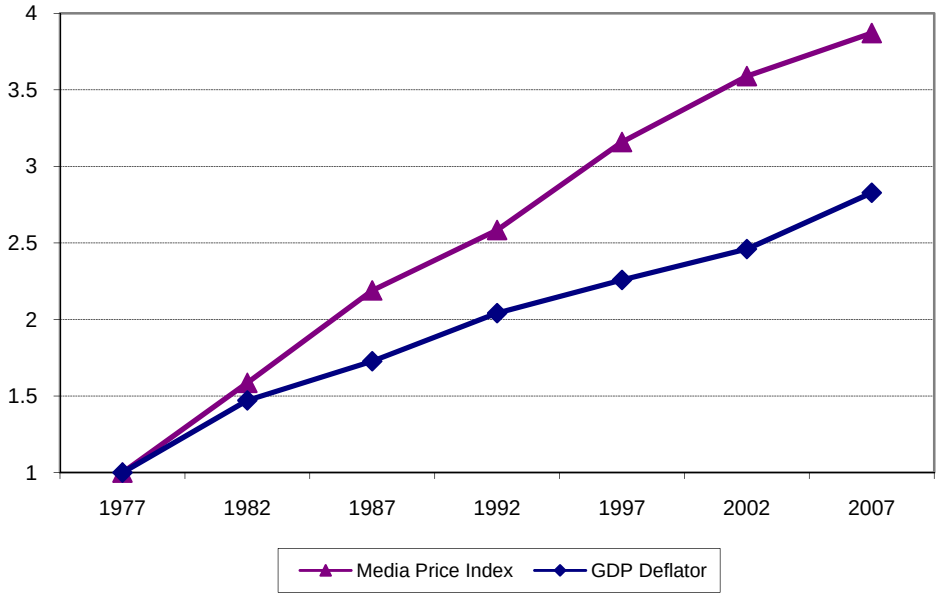

Figure 2

Unbundling Shares, 1977—2002

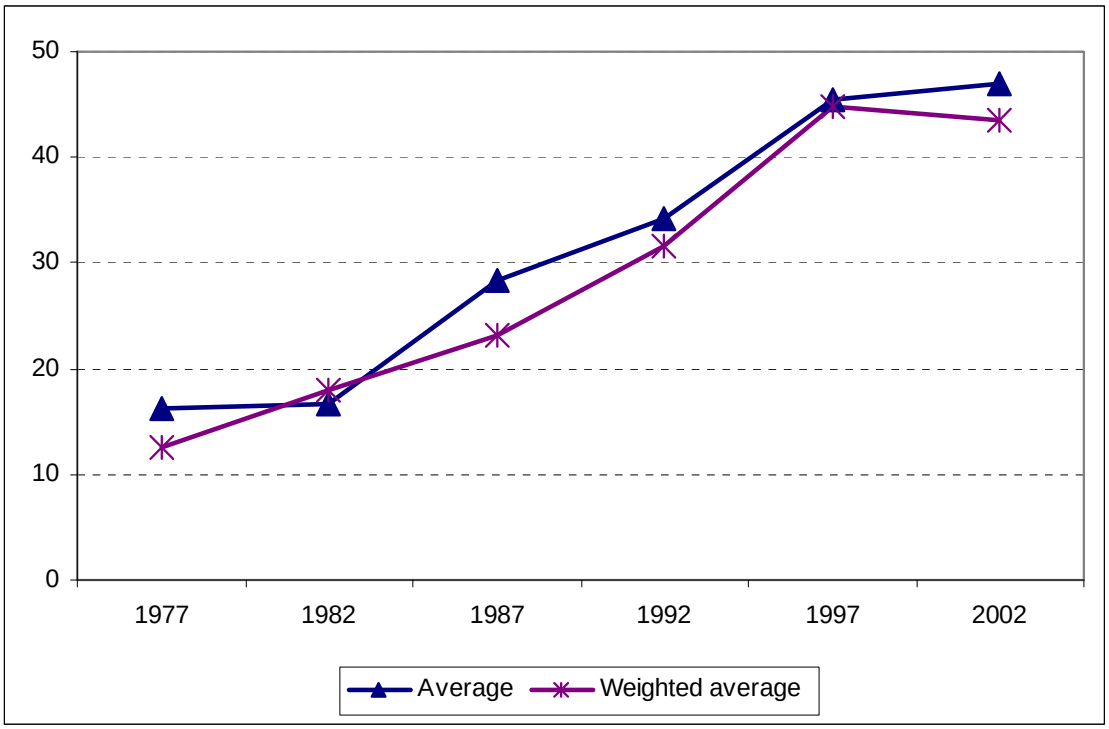

Table 1

PERCENT CHANGES IN AGENCY AND MEDIA COSTS OVER FIVE YEAR PERIODS: 1977-2007

Census Year	(1) Payroll Share of Agency Revenue	(2) Payroll/ Employee ($000)	(3) Media Unit Cost Index 1982-84=100	(4) GDP Implicit Price Deflator 2005=100
1977	-----	-----	-----	-----
1982	-3.65	44.45	58.62	46.78
1987	-4.01	34.23	38.04	16.88
1992	-2.55	21.34	18.03	18.17
1997	6.90	25.24	22.21	10.48
2002	1.56	24.75	13.65	8.94
2007	n.a.	n.a.	7.83	15.30

Sources:

(1) Annual payroll of all agency establishments operating a full year as a percent of revenues.

(2) Total first quarter payroll for all agency establishments divided by total employee for week of March 12. (1) and (2) were computed from data published in reports issued by the Economic Census, *Sources of Receipts or Revenues, Census of Service Industries,* (1977-92) and 1997 Economic Census, *Establishment and Firm Size, Professional, Scientific and Technical Services*; and *Product Lines: 2002, 2002Economic Census, Professional, Scientific, and Technical Services.*

(3) Composite Media Unit Cost Index for national and local advertising budgets prepared by MagaGlobal (2008).

(4) GDP Implicit Price Deflator, reported in *Economic Report of the President 2010,*Table B-3.

Table 2

VARIABLE DEFINITIONS AND POOLED SAMPLE SUMMARY STATISTICS

Variable Name	Mean	Standard Deviation	Description
SHUNB	.323	.330	Unbundled (non-commission compensation) share of total agency establishment operating income
LINC	6.106	1.620	Log of agency establishment operating income (current $ thousands)
SCPS	2.899	1.045	Number of major services offered by the establishment (range: 1-4), consisting of a total count from (i) media buying, (ii) purchases of advertising materials and services, (iii) creative services, and (iv) other services, including public relations and marketing research.
LEST	.385	1.000	Log of the number of advertising establishments in the firm
HCD	.104	.305	Holding company ownership; dummy variable: 1=holding company ownership, 0=otherwise.
LAGE	1.938	.819	Log of establishment age: census year – age of birth, where 1975 is the earliest year of birth (censored distribution).
BRDD	.273	.446	Dummy variable denoting establishment birth date: 1=born before 1975; 0=otherwise
SGUD	.783	.412	Single-unit agency; dummy variable: 1=single-unit; 0=multi-unit
LMBL	6.790	2.092	Log of establishment gross media billings (current $ thousands)
MPI	.957	.220	Media unit price index (Universal McCann) for national and local budgets
LMBL*MPI	6.587	2.879	Interaction term: LMBL x MPI

Table 3

POOLED UNBUNDLING SHARE REGRESSIONS:

1982, 1987, 1992, 1997, 2002, & 2007 CROSS SECTIONS

(n=15,583)

Estimated Coefficient / (Robust Std, Error)

Model	**(1a)**	**(1b*)**	**(2)**	**(3)**	**(4)**	**(5)**
Regressors						
Intercept	.062[d] (.018)	.184	-.008. (.014)	-.081[d] (.016)	-.071[d] (.015)	-.078[d] (.015)
LINC	.084[d] (.003)	.414	084[d] (.003)	.083[d] (.003).	.082[d] (.003)	.081[d] (.003)
SCPS	.091[d] (.002)	.278	.091[d] (.002)	.092[d] (.002)	.094[d] (.002)	.093[d] (.002)
LEST	-.029[d] (.004)	-.088	-.031[d] (.004)	-----	-----	-----
SGUD	-.014[a] (.008)	-.017	-.016[b] (.008)	-----	-----	-----
LAGE	-.008[b] (.003)	-.025	-.008[b] (.003)	-.006[a] (.003)	-.005 (.003)	-----
BRDD	- .030[d] (.007)	-.039	-.029[d] (.007)	-.026[d] (.007)	-.023[d] (.007)	-----
HCD	.015 (.011)	.014	.018 (.011)	-.046[d] (.008	-----	-----
D1987	.110[d] (.009)	.142	.078[d] (.005)	.114[d] (.009)	.114[d] (.009)	.116[d] (.009)
D1992	.186[d] (.013)	.258	.134[d] (.005)	.192[d] (.013)	.190[d] (.013)	.192[d] (.013)
D1997	.425[d] (.023)	.410	.337[d] (.009)	.431[d] (.023)	.426[d] (.023)	.429[d] (.023)
D2002	.386[d] (.028)	.309	.276[d] (.010)	.397[d] (.028)	.394[d] (.028)	.396[d] (.028)
D2007	.499[d] (.031)	.378	.371[d] (.010)	.513[d] (.031)	.509[d] (.031)	.511[d] (.031)
LMBL	-058[d] (.005)	-.361	-.079[d] (002).	-.057[d] (.005)	-.060[d] (.005)	-.060[d] (.005)
MPI*LMBL	-.020[d] (.005)	-.186	-----	-.023[d] (.005)	-.021[d] (.005)	-.021[d] (.005)
SEE R^2 (adj.)	.268 .365		.268 .365	.269 .363	.269 .361	.269 .361

[a] p.< .10, [b] p <. .05, [c] p< .01, [d] p < .001 *Standardized regression coefficients for model 1a.

Table 4
POOLED UNBUNDLING SHARE AND SCOPE MODELS: 1982, 1987, 1992, 1997, 2002, & 2007 CROSS SECTIONS (n = 15,583)

Estimated Coefficient / (Robust Std, Error)

Variable	(1) Unbundling Share (Regression)	(2) Unbundling Share (Regression)	(3) Scope (Ordered Probit)
Intercept	-.062[d] (.018)	.168[d] (.017)	
LINC	.084[d] (.003)	.113[d] (.003)	.351[d] (.010)
SCPS	.091[d] (.002)	-----	-----
LEST	-.029[d] (.004)	-.038[d] (.005)	-.106[d] (.017)
SGUD	-.014[a] (.008)	-.020[b] (.008)	-.086[c] (.033)
LAGE	-.008[b] (.003)	-.010[c] (.004)	-.023[a] (.013)
BRDD	-.030[d] (.007)	-.024[d] (.008)	.068[b] (.031)
HCD	.015 (.011)	-.010 (.012)	-.303[d] (.049)
D1987	.110[d] (.009)	.102[d] (.009)	-.076[a] (.040)
D1992	.186[d] (.013)	.158[d] (.014)	-.299[d] (.054)
D1997	.425[d] (.023)	.406[d] (.024)	-.166[b] (.085)
D2002	.386[d] (.028)	.360[d] (.029)	-.295[c] (.105)
D2007	.499[d] (.031)	.470[d] (.032)	-.344[c] (.120)
LMBL	-.058[d] (.005)	-.073[d] (.006)	-.161[d] (.021)
MPI*LMBL	-.020[d] (.005)	-.023[d] (.005)	-.044[b] (.018)
SEE	.268	.282	NA
R^2 (adj.)	.365	.297	NA
Wald Chi Sq. (df=13)	NA	NA	1,666.14 p<.001
Pseudo R^2	NA	NA	.047

[a] p.< .10, [b] p <. .05, [c] p< .01, [d] p < .001

APPENDIX A

Table A1

SOURCES OF AGENCY INCOME: 1977-2002[1]

	1977	1982	1987	1992	1997	2002
Share of Total Agency Income (%)						
Media Commissions	58.55	59.42	61.30	54.17	45.95	n.a.
Markups on Purchased Advertising Materials & Services	11.77	16.19	15.82	15.81	12.98	n.a.
Fees for Services	24.11	20.62	19.82	24.56	26.52	n.a.
Public Relations Services	2.69	1.52	1.48	1.44	1.99	n.a.
All Other Services	2.88	2.25	1.58	4.02	12.56	n.a.
Total	100.00	100.00	100.00	100.00	100.00	n.a.
Tot. Agency Income (Current $ Millions)	3,168.560	5,919.826	10,213.00	13,607.846	16,871.520	21,103.772
Share of Total Agency Billings (%)						
Media	84.78	83.95	84.48	80.38	79.29	72.58
Adv. Materials & Services	15.22	16.05	15.52	19.62	20.71	27.42
Total	100.00	100.00	100.00	100.00	100.00	100.00
Total Agency Billings (Current $ Millions)	15,453.080	30,115.432	52,328.000	69,586.730	89,061.326	85,282.793
Commissions & Markups						
Media Commissions as a % of Media Billings	14.13	13.92	14.16	13.18	10.98	n.a.
Markups on Purchases of Adv. Materials & Services as a % of Billings for Same	15.84	19.83	19.90	18.39	11.88	n.a.
No. of Agencies (Establish-ments with Payroll)	8,089	9,668	12,335	13,879	13,390	12,489

[1] 1977-92: SIC 7311; 1997-2002: NAICS 54181.

Sources: Compiled from data reported in *Sources of Receipts or Revenues, Census of Service Industries,* (1977-92) and 1997 Economic Census, *Establishment and Firm Size, Professional, Scientific and Technical Services*; and *Product Lines: 2002, 2002Economic Census, Professional, Scientific, and Technical Services.*

Table A2

COST INDICES FOR ADVERTISING AGENCY SERVICES AND MEDIA

Census Year	(1) Agency Payroll As a % of Rev.	(2) 1st Qtr. Payroll/ Employee ($000)	(3) Media Unit Cost Index 1982-84=100	(4) GDP Implicit Price Deflator 2005=100
1977	46.6	4.3241	58.0	37.751
1982	44.9	6.2462	92.0	55.412
1987	43.1	8.3843	127.0	64.764
1992	42.0	10.1734	149.9	76.533
1997	44.9	12.7416	183.2	84.555
2002	45.6	15.8954	208.2	92.118
2007	n.a.	n.a.	224.5	106.214

Sources: (1) Annual payroll of all agency establishments operating a full year as a percent of revenues.

(2) Total first quarter payroll for all agency establishments divide by total employee for week of March 12.
(1) and (2) were computed from data published in reports issued by the Economic Census,1977-2002 and listed in Table A1 for SIC 7311 (1977-92) and NAICS 54181 (1997-2002).

(3) Composite Media Unit Cost Index for national and local advertising budgets prepared by MagaGlobal (2008).

(4) GDP Implicit Price Deflator, reported in *Economic Report of thePresident 2010,*Table B-3.

Table A3

WEIGHTED MEAN SHARE OF AGENCY INCOME

BY SOURCES OF INCOME: 1977-2007

Weighted Mean Share of Agency Income/ (Standard Deviation)

Census Year[a]	No. of Agency Establishments	Commissions on Media Purchases Billed to Clients	Markups on Costs of Materials & Services Used on Client Accounts	Fee Income. for Services Not covered by (1) or (2)	Income from all other Unbundled Services)
		(1)	(2)	(3)	(4)
1977	2439	0.6971 (0.2319)	0.1770 (0.1647)	0.0937 (0.1441)	0.0322 (0.0986)
1982	2385	0.6690 (0.2172)	0.1521 (0.1634)	0.1445 (0.1335)	0.0344 (0.0776)
1987	3941	0.6209 (0.3159)	0.1486 (0.1999)	0.2018 (0.2451)	0.0287 (0.0753)
1992	5064	0.5267 (0.3306)	0.1566 (0.2046)	0.2565 (0.2886)	0.0602 (0.1574)
1997	1876	0.4321 (0.3567)	0.1210 (0.1999)	0.3251 (0.3250)	0.1218 (0.2203)
2002	1232	0.2992 (0.3237)	0.2504 (0.3173)	0.3128 (0.3698)	0.1576 (0.2364)

[a] 1977-1992, SIC 7311; 1997-2007, NAICS 54181.

Table A4

CORRELATION MATRIX

(n = 15,583)

	SHUNB	LINC	SCPS	LEST	SGUD	LAGE	BRDD	HCD	LMBL	LMBL* MPI
SHUNB	----									
LINC	.186	----								
SCPS	.347	.127	----							
LEST	-.107	.323	-.129	----						
SGUD	.062	.331	.075	-.725	----					
LAGE	.153	.130	-.046	-.023	.082	----				
BRDD	-.119	.068	.073	.003	-.025	-.725	----			
HCD	-.098	.307	-.112	.776	-.644	-.033	.044	----		
LMBL	-.123	.767	-.059	.388	-.384	.033	.121	.351	----	
LMBL* MPI	.118	.742	-.076	.327	-.311	.258	-.087	253	.812	----

Table A5
POOLED UNBUNDLING SHARE REGRESSIONS: 1982, 1987, 1992, 1997, 2002, & 2007 CROSS SECTIONS
(n=15,583)

Estimated Coefficient / (Robust Std, Error)

Model	(1)	(2)	(3)	(4)	(5)
Regressors					
Intercept	-.124[d] (.013)	.035[c] (.013)	-.026 (.017)	-.027[a] (.014)	-.035[c] (.013)
LINC	.009[d] (.002)	.087[d] (.003)	.085[d] (.003)	.084[d] (.003)	.083[d] (.003)
SCPS	.093[d] (.002)	.077[d] (.002)	.075[d] (.002)	.075[d] (.002)	.074[d] (.002)
LEST	-.043[d] (.004)	-.033[d] (.004)	-.031[d] (.004)	-----	-----
SGUD	.010 (.009)	-.018[b] (.008)	-.015[a] (.008)	-----	-----
LAGE	-.014[d] (.004)	-.008[b] (.003)	-.009[b] (.003)	-.005 (.003)	-----
BRDD	-.055[d] (.008)	-.029[d] (.007)	-.030[d] (.007)	-.023[d] (.007)	-----
HCD	.027[b] (.012)	.022[b] (.011)	.019[a] (.011)	-----	-----
D1987	-.031[c] (..011)	-.042[d] (.012)	-.012 (.013)	-.018 (.013)	-.015 (.013)
D1992	.089[d] (.014)	.045[d] (.014)	.101[d] (018)	.096[d] (.018)	.098[d] (.018)
D1997	.382[d] (.027)	.462[d] (.027)	.564[d] (.033)	.549[d] (.033)	.553[d] (.033)
D2002	.249[d] (.041)	.211[d] (.037)	.343[d] (.046)	.336[d] (.046)	.339[d] (.046)
D2007	.491[d] (.044)	.440[d] (.040)	.596[d] (.049)	.601[d] (.049)	.604[d] (.049)
SCPS*D1987	.046[d] (.004)	.039[d] (.004)	.042[d] (.004)	.045[d] (.004)	.045[d] (.004)
SCPS*D1992	.034[d] (.005)	.030[d] (.004)	.033[d] (.004)	.035[d] (.004)	.035[d] (.004)
SCPS*D1997	-.023[c] (.008)	-.047[d] (.008)	-.046[d] (.008)	-.041[d] (.008)	-.041[d] (.008)
SCPS*D2002	.034[c] (.013)	.021[a] (.011)	.020[a] (.011)	.026[b] (.011)	.026[b] (.011)
SCPS*D2007	- .013 (.014)	-.025[b] (.012)	-.026[b] (.012)	-.024[b] (.012)	-.024[b] (.012)
LMBL	------	-.081[d] (.002)	-.056[d] (.005)	-.057[d] (.005)	-.057[d] (.005)
MPI*LMBL	------	-----	-.024[d] (.005)	-.025[d] (.005)	-.025[d] (.005)
SEE R^2 (adj.)	.284 .284	.267 .373.	.266 .373	.267 .370	.267 .370

[a] p.< .10, [b] p <. .05, [c] p< .01, [d] p < .001 *Standardized regression coefficients for model 4a.

Table A6
POOLED UNBUNDLING SHARE REGRESSIONS:
1982, 1987, 1992, 1997, 2002, & 2007
(n = 15,583)

Estimated Regression Coefficient / (Robust Std, Error)

Model

Variable	1	2	3	4
Intercept	-.002 (.015)	-.500[d] (.014)	-.310[d] (.015)	-.391[d] (.036)
LINC	.115[d] (.003)	.008[d] (.012)	.079[d] (.003)	.079[d] (.003)
SCPS	.080[d] (.003)	.114[d] (.002)	.093[d] (.002)	.092[d] (.002)
LEST	-.017[d] (.004)	-.041[d] (.004)	-.027[d] (.004)	-.026[d] (.004)
SGUD	-.030[d] (.009)	.010 (.009)	-.017[b] (.008)	-.016[a] (.008)
LAGE	.018[d] (.003)	-.014[d] (.004)	-.011[d] (.003)	-.011[d] (.003)
BRDD	-.055[d] (.008)	-.055[d] (.008)	-.033[d] (.007)	-.003 (.006)
HCD	-.047[d] (.012)	.023[b] (.012)	.013 (.011)	.011 (.011)
LMBL	-.083[d] (.002)	-----	-.073[d] (.002)	-.061[d] (.005)
MPI	-----	.504[d] (.010)	.445[d] (.010)	.525[d] (.035)
MPI*LMBL	-----	------	-----	-.011[b] (.005)
SEE R^2 (adj.)	.286 .278	.285 .281	.271 .354	.270 .355

[a] p.< .10, [b] p <. .05, [c] p< .01, [d] p < .001

Appendix B:
CES Production Function and Bundling and Unbundling Decisions

1 CES Production Function for Advertising Campaign

The CES production is usually specified as:

$$Y = Q_c\left(\alpha W^{\rho} + (1-\alpha)V^{\rho}\right)^{\frac{1}{\rho}}, \tag{1}$$

where $\rho \leq 1$ and $0 \leq \alpha \leq 1$.

In the case of an advertising campaign, W presents the media units (space and time) used for producing a campaign for an account and V is creative inputs for the campaign.

A few general points about this production function.

First, the marginal product of W and V are given by

$$\begin{aligned} MP_W &= Q_c(\alpha W^{\rho} + (1-\alpha)V^{\rho})^{\frac{1-\rho}{\rho}}\alpha W^{\rho-1} \\ MP_V &= Q_c(\alpha W^{\rho} + (1-\alpha)V^{\rho})^{\frac{1-\rho}{\rho}}(1-\alpha)V^{\rho-1}. \end{aligned} \tag{2}$$

Second using (2), it is clear that the elasticity of substitution, σ, is constant.

$$\sigma = -\frac{d\ln(V/W)}{d\ln(MP_V/MP_W)} = -\frac{d\ln(V/W)}{(\rho-1)d\ln(V/W)} = \frac{1}{1-\rho} \tag{3}$$

Third, the function is CRS regardless of the parameters.

Fourth, it is easy to show that for $\rho = 0$, the function transforms to Cobb-Douglas $Q_c W^{\alpha} V^{1-\alpha}$; and for $\rho = 1$ and as $\rho \to -\infty$, the function transforms to linear production (perfect substitutes) and approaches in limit to Leontief (perfect complements), respectively. Thus as is clear from (3), movements in ρ from $-\infty$ to 1 provide the full spectrum of the elasticity of substitutions from perfect complements to perfect substitutes, where $\rho < 0$ correspond to the cases that the inputs are limited substitutes, $\rho = 0$ provides unit elasticity of substitution, and $\rho > 0$ are the cases that the inputs are highly substitutable.

2 Cost Minimization Condition

The cost of production of an advertising campaign for an account is given by:

$$C = (1 - d_M + \delta)P_m W + P_c Q_c V, \tag{4}$$

where $\delta P_m W$ is the overhead cost of media buying activities for the account, $(1 - d_M)P_m$ is the discounted price of the media space, and $P_c Q_c$ is the quality adjusted price of creative inputs. We assume that there are pecuniary scale economies in the media buying activities, and capture those by assuming the media price discount, d_M, is an increasing function of the total media buying activities of an agency, M.[1]

To minimize the cost of production the following condition must be satisfied

$$\frac{MP_W}{MP_V} = \frac{(1 - d_M + \delta)P_m}{P_c Q_c}, \tag{5}$$

which means

$$\frac{\alpha}{1-\alpha}\left(\frac{W}{V}\right)^{\rho-1} = \frac{(1 - d_M + \delta)P_m}{P_c Q_c}, \tag{6}$$

or

$$\left(\frac{V}{W}\right)^{1-\rho} = \frac{1-\alpha}{\alpha}\frac{(1 - d_M + \delta)P_m}{P_c Q_c}. \tag{7}$$

3 Input Demands and Unit Cost Function

Rearranging the production function gives us

$$Y = Q_c W\left[\alpha + (1-\alpha)\left(\frac{V}{W}\right)^{\rho}\right]^{\frac{1}{\rho}}, \tag{8}$$

and using (7) to substitute for $\frac{V}{W}$ provides us with

$$Y_0 = Q_c W\left[\alpha + (1-\alpha)\left(\frac{1-\alpha}{\alpha}\frac{(1 - d_M + \delta)P_m}{P_c Q_c}\right)^{\frac{\rho}{1-\rho}}\right]^{\frac{1}{\rho}}. \tag{9}$$

Now, we can derive the demand for W to produce Y_0

$$W = \frac{Y_0}{Q_c}\left[\alpha + (1-\alpha)\left(\frac{1-\alpha}{\alpha}\frac{(1 - d_M + \delta)P_m}{P_c Q_c}\right)^{\frac{\rho}{1-\rho}}\right]^{-\frac{1}{\rho}}, \tag{10}$$

[1] That is, $\frac{\partial d_M}{\partial M} > 0$, where M is defined as $M = \sum W$ over all the agency's accounts.

or

$$W = \frac{Y_0}{Q_c}\alpha^{\frac{1}{1-\rho}}((1-d_M+\delta)P_m)^{-\frac{1}{1-\rho}}\left[\alpha^{\frac{1}{1-\rho}}((1-d_M+\delta)P_m)^{-\frac{\rho}{1-\rho}} + (1-\alpha)^{\frac{1}{1-\rho}}(P_cQ_c)^{-\frac{\rho}{1-\rho}}\right]^{-\frac{1}{\rho}}. \tag{11}$$

Using the same process, the demand for V is given by

$$V = \frac{Y_0}{Q_c}\left[\alpha\left(\frac{\alpha}{1-\alpha}\frac{P_cQ_c}{(1-d_M+\delta)P_m}\right)^{\frac{\rho}{1-\rho}} + (1-\alpha)\right]^{-\frac{1}{\rho}}, \tag{12}$$

or

$$V = \frac{Y_0}{Q_c}(1-\alpha)^{\frac{1}{1-\rho}}(P_cQ_c)^{-\frac{1}{1-\rho}}\left[\alpha^{\frac{1}{1-\rho}}((1-d_M+\delta)P_m)^{-\frac{\rho}{1-\rho}} + (1-\alpha)^{\frac{1}{1-\rho}}(P_cQ_c)^{-\frac{\rho}{1-\rho}}\right]^{-\frac{1}{\rho}}. \tag{13}$$

Using (11) and (13), the cost function is

$$C = \frac{Y_0}{Q_c}\left[\alpha^{\frac{1}{1-\rho}}((1-d_M+\delta)P_m)^{-\frac{\rho}{1-\rho}} + (1-\alpha)^{\frac{1}{1-\rho}}(P_cQ_c)^{-\frac{\rho}{1-\rho}}\right]^{-\frac{1-\rho}{\rho}}, \tag{14}$$

which is CES in prices.

Note that the cost function in limit reduces to a linear cost function when $\rho \to -\infty$.

4 Bundling vs. Unbundling

In the case of bundling, the advertiser incurs the "fixed informational costs"[2] to have working relationship with a single agency. The agency uses the CES production technology and, given the perfect contestability assumption, charges the advertiser the production cost in (4). That is, the agency passes the discounts to the advertiser, so that its profit is zero. Thus, the cost to the advertiser is

$$T_B = T_r + C = T_r + (1 - d_M + \delta)P_mW - P_cQ_cV, \tag{15}$$

where T_r is the fixed informational costs and W and V are given in (11) and (13). The media commission, $r(1-d_M)P_mW$, covers both the media and creative services costs, $\delta P_mW + P_cQ_cV$. Thus, the commission rate is

$$r = \frac{\delta}{1-d_M} + \frac{P_cQ_c}{(1-d_M)P_m}\frac{V}{W}, \tag{16}$$

and using (7)

$$r = \frac{\delta}{1-d_M} + \frac{P_cQ_c}{(1-d_M)P_m}\left(\frac{1-\alpha}{\alpha}\frac{(1-d_M+\delta)P_m}{P_cQ_c}\right)^{\frac{1}{1-\rho}}. \tag{17}$$

[2]These includes costs of searching for an agency, learning about it, and initiating and maintaining the relationship with it.

In the case of unbundling, the advertiser incurs larger informational costs of connecting to two agencies. We denote the unbundled terms with a prime (′); and for simplicity, we assume each contact costs T_r. The advertiser or one of the agencies on behalf of the advertiser uses the CES technology to produce the campaign at the cost C' resembling (4), but for a different discount rate and overhead costs. Thus, the cost to the advertiser is

$$T_U = 2T_r + C' = 2T_r + (1 - d_{M'} + \delta')P_m W' + P_c Q_c V', \tag{18}$$

where W' and V' are given in (11) and (13) by replacing δ with δ' and d_M with $d_{M'}$. The media commission, $r(1 - d_{M'})P_m W'$, covers only media services costs, $\delta P_m W'$, in this case. Thus, the commission rate is

$$r' = \frac{\delta'}{1 - d_{M'}}. \tag{19}$$

In general, we expect that the media commission rate for a specialized media service agency would be smaller than that of a full service agency with similar media buying sizes and overhead costs. This is because the latter needs also to cover the cost of the creative services using the media commission. This relationship is consistent with evidences in the industry.

We expect that for a given advertising campaign $C' < C$, as a specialized media buying agency handles larger media buying activities and could benefit from larger pecuniary scale economies in the form of larger media discounts and non-pecuniary scale economies in the form of smaller overhead cost. In general, the interplay between the lower variable cost of an account under the unbundling scenario and lower informational costs under the bundling scenario determines the best choice of advertisers.

Bundling is the preferred choice of an advertiser for the advertiser's account if

$$T_B < T_U. \tag{20}$$

That is

$$C - C' \leq T_r, \tag{21}$$

or

$$(1 - d_M + \delta)P_m W + P_c Q_c V - (1 - d_{M'} + \delta')P_m W' - P_c Q_c V' \leq T_r, \tag{22}$$

or

$$P_m \left[(1 - d_M + \delta)W - (1 - d_{M'} + \delta')W'\right] + P_c Q_c (V - V') \leq T_r. \tag{23}$$

Given (7), we also know that the following relationship exits between the cost minimizing combinations (W, V) and (W', V'):

$$\left(\frac{V/W}{V'/W'}\right)^{1-\rho} = \frac{1 - d_M + \delta}{1 - d_{M'} + \delta'}. \tag{24}$$

5 Comparative Statics Analysis

We use (21) to conduct our comparative statics analysis of the advertisers' choice and the unbundling practices of full service agencies–with media buying M–when the price of media space, P_m, changes (i.e., we determine the sign of the coefficient of the interactive term). To do so, we take the partial derivative of LHS of (21) with respect to these two variables.

First, to simplify the notations and discussions, we introduce D and D' corresponding to C and C' as follows:

$$D = \alpha^{\frac{1}{1-\rho}}((1-d_M+\delta)P_m)^{-\frac{\rho}{1-\rho}} + (1-\alpha)^{\frac{1}{1-\rho}}(P_cQ_c)^{-\frac{\rho}{1-\rho}} \quad (25)$$

$$D' = \alpha^{\frac{1}{1-\nu}}((1-d_{M'}+\delta')P_m)^{-\frac{\rho}{1-\nu}} + (1-\alpha)^{\frac{1}{1-\nu}}(P_cQ_c)^{-\frac{\rho}{1-\nu}}, \quad (26)$$

where clearly $C = \frac{Y_0}{Q_c}D^{-\frac{1-\rho}{\rho}}$ and $C' = \frac{Y_0}{Q_c}D'^{-\frac{1-\rho}{\rho}}$.

Second, we take the derivative with respect to the media price P_m. That yields

$$\frac{\partial(C-C')}{\partial P_m} - \frac{Y_0}{Q_c}\alpha^{\frac{1}{1-\rho}}P_m^{-\frac{1}{1-\rho}}\left[(1-d_M+\delta)^{\frac{-\rho}{1-\rho}}D^{-\frac{1}{\rho}} - (1-d_{M'}+\delta')^{\frac{-\rho}{1-\rho}}D'^{-\frac{1}{\rho}}\right]. \quad (27)$$

The sign of the derivative is positive because $1-d_{M'}+\delta' < 1-d_M+\delta$ and also consequently $D' < D$. This means an increase in the media price increases the LHS, and thus increases the likelihood of the unbundling practices.

Now, we take the second partial derivative with respect to M. The result is:

$$\frac{\partial^2(C-C')}{\partial P_m \partial M} = \frac{Y_0}{Q_c}\alpha^{\frac{1}{1-\rho}}P_m^{\frac{-1}{1-\rho}}\left(\frac{1}{1-\rho}\right)(1-d_M+\delta)^{\frac{-1}{1-\rho}}D^{-\frac{1+\rho}{\rho}}\left[\rho D - \alpha^{\frac{1}{1-\rho}}(1-d_M+\delta)^{\frac{-\rho}{1-\rho}}P_m^{\frac{-\rho}{1-\rho}}\right]\frac{\partial d_M}{\partial M}. \quad (28)$$

We already know that $\frac{\partial d_M}{\partial M} > 0$. Thus, the sign of the second derivative depends on the sign of the term inside the square brackets in (28) as all other multiplicative terms are positive. That means, the sign of interaction between P_m and M depends on

$$\rho D - \alpha^{\frac{1}{1-\rho}}(1-d_M+\delta)^{\frac{-\rho}{1-\rho}}P_m^{\frac{-\rho}{1-\rho}} \gtrless 0. \quad (29)$$

It is clear that if the two inputs are limited substitutes, i.e. when $\rho < 0$ (implying $0 < \sigma < 1$), then (29) is negative and thus $\frac{\partial^2(C-C')}{\partial P_m \partial M} < 0$. Even with $\rho = 0$ (Cobb-Douglas), the sign of (29) is clearly negative.

Thus, $\rho \leq 0$ is sufficient to observe negative effect form the interactive term. That is, for any elasticity of substitution that is less than or equal to 1 (when the inputs show limited substitutability), the effect of the interaction of M and P_m on unbundling decision is expected to be negative.

Even for $\rho > 0$ (recall by definition $\rho < 1$), where the inputs are relatively substitutable, one can show that under the following condition the sign of (29) and thus the sign of the interactive term is negative.

$$\frac{P_c Q_c}{(1 - d_M + \delta)P_m} < \left(\frac{1-\rho}{\rho}\right)^{\frac{1-\rho}{1}} \left(\frac{\alpha}{1-\alpha}\right)^{\frac{1}{\rho}} \tag{30}$$

This condition requires that ρ not to be very close to 1.[3] Thus, even in the case where the inputs are substitutes (but not perfect substitutes), the interactive term effect on the unbundling decision could be negative if the media price is high enough compare to the creative prices.

To show how restrictive this condition is, we provide a simple example. For $\rho = 0.5$, which represent elasticity of substitution of 2 (inputs are substitutes), the condition simplifies to

$$\frac{P_c Q_c}{(1 - d_M + \delta)P_m} < \left(\frac{\alpha}{1-\alpha}\right)^2. \tag{31}$$

This condition can be easily met by mild requirements on relative prices (for example, the media unit price must be high enough compared to the creative service price).