EFFECTS OF NATIONAL NEWSPAPER ADVERTISING EXPENDITURES ON

AGGREGATE CONSUMPTION

by

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(Under the Direction of Hugh J. Martin)

ABSTRACT

This study extends the academic community's understanding of the macroeconomic effects of advertising by examining the relationship between aggregate consumption and newspaper advertising expenditures. The study found three things: (1) aggregate consumption *Granger*-causes newspaper advertising expenditures; (2) changes to newspaper advertising expenditures and aggregate consumption are disproportionate; and (3) changes to newspaper advertising expenditures do not lag behind changes to aggregate consumption but rather occurs concurrently.

INDEX WORDS: Economics of Advertising, Macroeconomic Effects of Advertising, Advertising Expenditures, Aggregate Consumption

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DEDICATION

I would like to dedicate this work to my endearing wife who has been so supportive throughout this entire process.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

This study will address one of the less understood questions in the field of advertising—does advertising affect the general economy? Many studies (Marshall, 1920; Chamberlin, 1933; Robinson, 1936; Kaldor, 1950; Galbraith, 1958; Comanor & Wilson, 1967) about the economic consequences of advertising exist at the microeconomic level, including advertising's effects on industry profits and concentration, the impact of advertising on manufacturing and retail prices, and advertising's effects on the height of barriers to entry (Farris & Albion, 1980). However, the impact of advertising at the macroeconomic level has been less explored. In fact, to the best of the author's knowledge, there are no macroeconomic models that explain advertising's effects on the national economy.

Despite the lack of theoretical attention to the macroeconomic effects of advertising, empirical evidence does exist. Modern mass communication scholars found advertising has a positive correlation with gross domestic product (Picard, 2001; Chang & Chan-Olmstead, 2005). However, it is difficult to interpret the meaning of the positive correlation because numerous economists have engaged in a still unresolved debate about advertising's micro-level effects. For instance, economists argued that advertising creates monopoly powers for the advertiser (Marshall, 1919; Chamberlin, 1953; Robinson, 1936; Kaldor, 1950; Galbraith, 1958; Comanor & Wilson, 1967). Arguments that advertising does not increase economic or social welfare trace back to neoclassical economics (Ekelund & Saurman, 1988). But modern or *new neoclassical* economists argue for positive effects of advertising on the economy (Ekelund & Saurman, 1988). Despite more than 50 years of research, the debate is unresolved. This lack of understanding lends to the need for continued research.

      This thesis seeks to add to the sparse literature in one area of the debate by examining the macroeconomic effects of advertising on the national economy. At the national level, advertising arguably only has an effect on aggregate consumption (Ekelund & Gramm, 1969). Therefore, this study will utilize quarterly, aggregate consumption data. The thesis will examine the relationship between consumption and quarterly spending on advertising. Specifically, this thesis will revisit an earlier project by Ashley, Granger, and Schmalensee (1980) in which the authors tested whether national advertising expenditures *Granger*-cause national aggregate consumption. Since the (Ashley et al., 1980) study, only one additional research endeavor was found in the economics literature that concerned the aggregate consumption—national advertising question. However, the most recent study (Jung & Seldon, 1995) dedicated to this question utilized annual data which does not appropriately capture the dynamic effects of quarterly changes to advertising expenditures. Therefore, this thesis extends the research regarding aggregate consumption and national advertising by utilizing quarterly advertising data. The results of this thesis will help the academic community better understand the macroeconomic effects of advertising. The author hopes this study will prompt the academic community to develop a macroeconomic model explaining how advertising affects the national economy, but such an endeavor is beyond the scope of the current project.

CHAPTER 2

LITERATURE REVIEW

Development of Microeconomic Models of Advertising

One of the first economists to discuss advertising was the neoclassicist Alfred Marshall. Marshall refers briefly to advertising in several sections of his seminal work *Principle of Economics* (1920). He writes that a sufficiently large producer can take advantage of economies of scale by advertising to increase market share: "[the producer] can spend large sums on advertising by commercial traveler and in other ways; its agents give it trustworthy information on trade and personal matters in distant places…" (Marshall, 1920, p. 282). Marshall discusses how advertising can also increase the life of a business beyond the stage of natural decay within its lifecycle (1920, p. 286). Marshall also recognizes how advertising and marketing expenses are often necessary costs in the operation of business, especially businesses that do not operate in perfectly competitive markets (1920, p. 396). Marshall posits that advertising and marketing can help a producer cover some variable costs by selling surplus output in other markets (1920, pp. 457-458). Therefore, it seems at first that Marshall considered advertising a necessary part of the economic process. However, Marshall elucidates his view of the effectiveness of advertising in "Industry and Trade" (1927). Marshall claims wealthy producers have the ability to oust competition through advertising, which he calls "social waste" (p. 306-307). Another element of social waste is when advertising by wealthier producers throws into obscurity the advertisements from less wealthy producers (Marshall, 1919, p. 307). It seems that Marshall is willing to accept advertising as a necessary part of the economic process so long as the advertisements are not social waste. Marshall does not clearly define the limitations of advertising and what constitutes social waste, but he does concede that academics and advertising professionals have, "united in

applying modern methods of systematic and progressive analysis, observation, experiment, record, and provisional conclusion, in successive cycles to ascertaining the most effective forms of appeal" (1919, p. 307).

Neoclassical economists including Chamberlin (1933) and Robinson (1936) continued the investigation into microeconomic theory and advertising. Chamberlin established that firms do not operate in just two specific market structures (monopoly or perfect competition) as discussed by Marshall. Instead, Chamberlin states that some markets may operate as "monopolistic [competitions]," where producers manufacture products that are similar in nature but have differing elements so that there is "competition of more or less imperfect substitutes" (1933, p. 9). When a producer offers a product in a monopolistically competitive market, Chamberlin recognizes that advertising serves to alleviate, "imperfect knowledge on the part of buyers as to the means whereby wants may be most effectively satisfied, and… the possibility of altering wants by advertising or selling appeal" (1933, p. 72). However, Chamberlin ultimately defers his discussion of advertising in the market process because it is too problematic for the model he was trying to develop, and therefore he chose to assume both the buyer and seller have given wants and perfect information (1933, p. 73). A short passage in the appendix of *The Theory of Monopolistic Competition* refers back to his brief analysis of advertising as part of the marketing process:

> …the neglect by theoretical economics of a force of such overwhelming importance in the real world had long seemed to me an anomaly; and, as I remember it, the conviction that advertising was a *necessary* part of the hybrid theory I was trying to write… (Chamberlin, 1933, p. 305).

Unfortunately, Chamberlin admits that because of the deadline for his book he was not able to further explore advertising (1933, p. 306). Hence, it seems that Chamberlin left the academic

community with a sense that advertising was a "necessary" part of the market process for monopolistic competition, but he did not build advertising into his model.

Like Chamberlin, Robinson (1936) establishes that not all producers operate within either perfect competition or monopoly, but may instead fall somewhere in the middle, which she terms "imperfect competition"(p. 6). Robinson never defines the intermediate markets between monopoly and perfect competition. Instead, she focuses on the forces such as supply and demand that drive markets between monopoly and perfect competition, hence the term imperfect competition (1936, pp. 6-8). Robinson does not see the market operating according to perfect forces, such as the buyer purchasing a product according to the lowest price. She sees competition creating an imperfect market where buyers are attracted to products by quality, varying attributes, advertisements, and by price (1936, p. 90). The intensity of competition within markets forces producers to attract customers in any possible way so that consumers become loyal to the producer's product, and will not immediately drop it over a simple lower price (Robinson, 1936, p. 90). Robinson states that in the real world firms faced with intensive competition can utilize advertising to decrease demand elasticity (1936, p. 101). Thus, Robinson tries to the analyze how firms use advertising to attract new buyers and retain current buyers by making the individual buyer's demand curves less elastic.

Although advertising is discussed by Marshall (1920), Chamberlin (1933), and Robinson (1936), none seemed prepared to incorporate advertising into their formal models that explain how competitive markets operate. Advertising is discussed as a mere anecdote that explains real world phenomena in the operation of markets. The introduction of advertising complicates the models, making it difficult to explain static changes in the market (Chamberlin, 1933). All three neoclassic economists recognized the importance of advertising, but their stylized models

consisted of static changes in supply and demand, most of which were assumed to be cost-driven. The question of how advertising affects the market process remained unanswered. Contemporary economists responded by starting to analyze the economic aspects of advertising itself.

Nicholas Kaldor (1950) broke the functions of advertisements into informational and persuasional categories (p. 4). Kaldor discussed the peculiar nature of advertising, because its production is not a response to consumer demands or preferences, "as registered through the price-mechanism" (1950, p. 4). Advertisements are produced in response to extraneous considerations (1950, p. 4). As a consequence, Kaldor states:

> [this] does not necessarily mean that the expenditure, from a social point of view, is wasted (in the sense that it brings no utility—or a utility considerably less than the costs); it means however, that it needs to be justified by considerations other than profitability (1950, p. 5).

As with public goods, Kaldor states that advertising's value should be judged by the "social utility of the service which the expenditure provides" (1950, p. 5). Kaldor argues that advertising serves an important social function by providing information about the price and quality of products that consumers may not have otherwise known about (1950, p. 5). However, Kaldor would like to ensure that advertising is conducted in a satisfactory manner and does not constitute "an unnecessary waste of resources which might have been devoted to other uses" (1950, p. 5). Kaldor criticizes advertising as a "highly inadequate and defective information-service" because of the exorbitant costs associated with the practice (1950, p. 6). He comes to the conclusion that advertising should not be justified by its direct benefit, which is hard to measure, but by its indirect consequences such as "demonstrating… improvements in productive and distributive efficiency" (1950, p. 6). Therefore, Kaldor is concerned with advertising's indirect effects on the economy, not its direct effects.

In order to tell if advertising has indirect effects on the economy, Kaldor (1950) argues that advertising must be judged by the demand it creates for a particular product from a particular firm. Would demand for the product be different in the absence of the advertising? (p. 8). Kaldor concludes that advertising does increase the quantity demanded, otherwise businesses would not invest large sums in ads (1950, p. 12). He also argues, citing Marshall, that advertising could reduce competition to only a few firms that have the finances to advertise intensively (Kaldor, 1950, p. 13). This is the basis for the criticism that advertising creates monopoly power. The challenge to this criticism is that a certain degree of concentration allows for technical organization within an industry that requires large financial outlays (Kaldor, 1950, p. 15). Advertising, Kaldor argues, is why a large number of industries have become oligopolies (1950, p. 19).

In line with Kaldor's arguments about the effects of advertising, Comanor and Wilson (1967) conducted an empirical study of industries producing differentiable products. The authors found that companies with high average advertising outlays earned higher profits than their competitors (Comanor & Wilson, 1967, p. 437). They concluded that advertising by companies with the larger outlays led to increased profit concentration within the industry and created barriers to entry (Comanor & Wilson, 1967, p. 437).

Normative arguments about the effects of advertising were offered in addition to the positive economic arguments. Galbraith (1958) criticized advertising for creating desires in consumers that previously did not exist (p. 155). According to Galbraith, "[outlays] for the manufacturing of a product are not more important in the strategy of modern business enterprise than outlays for manufacturing of demand for the product" (1958, p. 156).

The works of Marshall (1919), Chamberlin (1933), and Robinson (1936), coupled with the analysis of Kaldor (1950) and the empirical findings by Comanor and Wilson (1967) fit into what Farris and Albion (1980) define as the *Advertising = Market Power* model (p. 18). According to the market power model, advertising affects consumer behavior by creating brand loyalties and reducing demand elasticities (Farris & Albion, 1980, pg. 18). In this model a firm can create market concentration by advertising and thereby increasing profits, creating higher barriers to entry that allow it to charge higher prices, which reduces innovation (Farris & Albion, 1980, pg. 18). In other words, advertising is used to create monopoly power for a firm within an industry.

Counter to the market power model is what Farris and Albion (1980) define as the *Advertising = Information* model (p. 19). According to the information model, advertising informs consumers about product attributes—it does not change the behavior of consumers (Farris & Albion, 1980, pg. 18). In the information model consumers become more price sensitive and make purchases based upon *value* judgments (Farris & Albion, 1980, pg. 18). The authors define value as the relationship between price and quality—value is the only thing that affects elasticity for a product (Farris & Albion, 1980, pg. 18). Counter to the market power model, the information model argues that advertising lowers barriers to entry because advertising helps entrants explain the attributes of new products to potential consumers (Farris & Albion, 1980, pg. 18). Potential consumers can then compare competitive offers, and the industry becomes more competitive (Farris & Albion, 1980, pg. 18). As consumers become better informed they can put pressure on firms to lower prices and improve quality, stimulating innovation (Farris & Albion, 1980, pg. 18). Thus, according to the information model, advertising reduces monopoly power, lowers prices, and compels firms to make innovations.

Ekelund and Saurman (1988) classify proponents of the information model as *new neoclassical* economists (p. 37). One major criticism of the market power model is that buyers and sellers are assumed to have *perfect information* within the market (Ekelund & Saurman, 1988, p. 20). Ekelund and Saurman agree that such an assumption may be necessary for constructing Marshall's (1919) model, but the assumption is unrealistic (1988, p. 20). According to this traditional assumption consumers are *passive* beings whose quantity demands are increased by advertising (Ekelund & Saurman, 1988, p. 37). As passive beings, consumers are willing to pay higher prices for an advertised product just because they observed the advertisements (Ekelund & Saurman, 1988, p. 38). Ekelund and Saurman construct a new definition of the consumer: "[a] *rational* consumer is an individual making self-interested choices or who makes choices that are expected to improve, or avoid the deterioration of his or her own economic welfare" (1988, p. 38). The authors contend their definition is a better representation of the true consumer who doesn't respond zombie-like to an advertisement's appeal (Ekelund & Saurman, 1988, p. 38).

Another assumption, closely related to the passive consumer assumption, is that advertising decreases demand elasticity (Ekelund & Saurman, 1988, p. 39). New neoclassicals return to basic principles of economics and posit that consumer price sensitivity (demand elasticity) is influenced by the number of close substitutes available for a given product or service, not by advertising (Ekelund & Saurman, 1988, p. 39). Advertising plays the critical role of informing consumers about available substitutes for a product (Ekelund & Saurman, 1988, p. 40). The consumer is more price sensitive because he or she is more aware of potential substitutes (Ekelund & Saurman, 1988, p. 40). Since advertising makes consumers more price

sensitive, it plays an essential role facilitating competition between firms and within industries (Ekelund & Saurman, 1988, p. 40).

The notion that consumers develop brand loyalties through advertising dates to Robinson (1936). She asserted that a firm "can resort to advertising and other devices which attach customers more firmly to itself" (Robinson, 1936, p. 101). Robinson argued that advertisements create *inertia* in consumers (1936, p. 101). This inertia makes consumers less willing to respond to the advertisements of other firms, which creates higher barriers to entry into an industry (Robinson, 1936, p. 101). Thus, the incumbent firms in the industry gain monopoly power by advertising and creating consumer inertia. New neoclassical economists disagree with this argument (Schmalensee, 1982; Leffler, 1981; Kessides, 1986).

Schmalensee (1982) finds that a *pioneering brand*, particularly if it is an experience good, has a *first-mover* advantage (p. 360). He contends that if "the first brand within any product class performs satisfactorily, that brand becomes the standard against which subsequent entrants are rationally judged" (Schmalensee, 1982, p. 360). This first-mover advantage makes it increasing difficult for potential entrants to persuade consumers to invest in learning about the new entrant's product (Schmalensee, 1982, p. 360). He concludes the "product differentiation advantage of early entry…has nothing to do with advertising or consumer irrationality" (Schmalensee, 1982, p. 360). Schmalensee suggests that research should not look at advertising's effect, but should instead examine consumers' purchase behavior and use of information (1982, p. 360).

Leffler (1981) examines the effects of advertising within the prescription drug industry because it has high promotional expenditures (p. 46). This empirical study found advertising informs physicians about the existence and character of new products, and also produces "brand-

name recall" (Leffler, 1981, p. 46). He concludes that, "[pharmaceutical] advertising thus serves to speed the entry of superior new products while likely retarding the entry of later, low-priced close substitutes" (Leffler, 1981, p. 47-48).

Kessides (1986) tested whether advertising creates barriers to entry (p. 84). He found that the entrant's need to advertise to penetrate an industry results in sunk costs, which are a barrier to entry. However, he also found that entrants had a greater likelihood of success in markets where advertising plays an important role (p. 93).

Ekelund and Saurman (1988) point out that Kessides (1986) makes an important distinction in the term "entry barrier" (p. 42). They argue that Kessides' research illustrates that entry into an industry requires a certain amount of "advertising capital," which raises the expected or perceived costs of entry (Ekelund & Saurman, 1988, p. 42). Thus, advertising itself is not a barrier; the barrier is the perceived or expected costs of advertising required to enter the market (Ekelund & Saurman, 1988, p. 42). The authors define the necessary advertising capital as a "socially unavoidable cost of doing business" (Ekelund & Saurman, 1988, p. 42).

Another issue with entry barriers is an incumbent firm's ability to produce a large volume of advertising with relatively low average costs (economies of scale), while potential entrants face higher advertising costs per unit of sales (Ekelund & Saurman, 1988, p. 44). Stigler (1960) contends that if there is free entry into an industry a new firm's long run costs will equal those of the incumbent (p. 27). Like Kessides, Stigler's view is that certain capital outlays for new firms are a necessary part of entry into an industry. Although the entrant may suffer short-run losses, the losses cannot be construed as preventing entry over the long run (Stigler, 1960, p. 27). In other words, the advertising capital required for new entrants is a necessary part of the process, but advertising capital expenditures do not *bar* entry (Ekelund & Saurman, 1988, p. 45).

New neoclassical economists dismiss the neoclassical assumption that buyers and sellers have perfect knowledge and information. Instead, new neoclassicists assume that consumers are rational and behave in more realistic ways where knowledge and information are imperfect (Ekelund & Saurman, 1988, p. 48). For example, Stigler (1968) points out that price dispersion in a particular geographic area exists largely because of consumer ignorance (p. 172). This observation led Stigler to conclude that the acquisition of information and knowledge about price is costly; he defined this as *search costs* (1968, pp. 171-173). Stigler points out that advertising is an immensely powerful tool for providing information to potential buyers so that sellers can identify themselves (1968, p. 182).

The economic effects of advertising have been extensively studied and debated for longer than a half-century (Leffler, 1981, p. 45). However, this review of the literature shows there has been little attention to the macroeconomic effects of advertising. Perhaps that is because the debate over micro-economic models of advertising has not been satisfactorily resolved, as demonstrated by the debate between the neoclassicals and new neoclassicals. To gain a better understanding of advertising's macroeconomic effects it is important to first observe the empirical work conducted to date.

Empirical Evidence of Advertising Effects on the Economy at the Macro-level

Mass Communication Research. Examination of the relationship between Gross Domestic Product (GDP) and national advertising expenditures is a relatively recent research endeavor for mass communication scholars. Picard (2001) conducted a comparative analysis of recessions and national advertising expenditures in nine developed countries from 1989 to 1998. Picard used correlations to examine the relationship between recessions and advertising expenditures. He found that a 1 percent decline in GDP was accompanied by a 5 percent decline

in advertising expenditures; a 3 percent decline in GDP was accompanied by a 10 percent decline; and a 6 percent decline in GDP was accompanied by a 15 percent decline (Picard, 2001, p. 10). Picard conceded this did not reveal the cause of the correlations, but he contended that his research, "[showed] a relation in which a higher decline in advertising spending accompanies a decline in GDP" (Picard, 2001, p. 10).

Chang and Chan-Olmstead (2005) explored the relationship between GDP and advertising spending across 70 nations by conducting static and dynamic analyses. Chang and Chang-Olmstead also examined the effects on national advertising expenditures of changes in population, foreign domestic investment, economic freedom and press freedom. The study is an empirical examination of the principle of relative constancy, which proposes that mass media expenditures will grow or decline in proportion with the pace of the general economy (Chang & Chan-Olmstead, 2005, pp. 3-4). The researchers broke advertising expenditures into specific industry categories such as television, radio, newspaper, magazine, cinema, and outdoor. Chang and Chan-Olmstead (2005) found a significant relationship between GDP and all the measures of advertising expenditures using correlation analysis and simple regression analysis (2005, p. 354). The researchers established that GDP was the *only* significant independent variable determining advertising expenditures. Despite their findings, the researchers assert "the relationship is not proportionate and there is the potential that other variables also affect a country's advertising expenditures" (Chang & Chan-Olmstead, 2005, p. 355).

Both Picard (2001) and Chang & Chan-Olmstead's (2005) findings provide evidence that GDP and national advertising expenditures are highly correlated. These results seem straightforward, however, economists are skeptical about the relationship between national

advertising expenditures and GDP. In other words, economists question the existence of positive effects from advertising expenditures on the economy.

Economic Research. After World War II politicians and policy-makers started to recognize the growing financial outlays of the advertising industry. By 1964, total advertising volume in the US had reached $14 billion, or 2.2 percent of gross national product (Verdon, McConnell, & Roesler, 1968). Policy-makers were interested in both the growth of the industry and its relation to business cycles. Critics (Yang, 1964; Blank, 1962; Hansen, 1960; Verdon, McConnell & Roesler, 1968; Ekelund & Gramm, 1969; Borden, 1942) claimed that advertising outlays were procyclical with the growth or decline of the national economy, and suggested regulating advertising outlays as a means of economic stabilization. The idea was that if the economy appeared to be entering a recession, the government could stimulate the economy by offering advertisers an incentive to increase advertising outlays, and increased advertising would lead to an increase in personal consumption expenditures (Verdon, McConnell, & Roesler, 1968). This increase in personal consumption expenditures would stimulate the economy and perhaps stave off a recession. Conversely, if the economy appeared to be entering a phase of high inflation, the government would regulate the amount of advertising outlays to potentially decrease personal consumption (this is known as *countercyclical regulation*). A decrease in advertising would lead to a decrease in personal consumption expenditures, keeping prices in check and preventing the economy from entering an inflationary environment.

This interest in countercyclical regulation sparked the academic community to examine the relationship between advertising expenditures and GDP. In 1964 an economist who formerly worked with the Columbia Broadcasting Co. found advertising outlays were closely related to sales levels, with sales levels driving advertising outlays (Yang, 1964). Another study by Blank

(1962) found close conformity between general business cycles and national advertising expenditures. Blank (1962) concluded that that advertising expenditures lagged behind business cycles by about one quarter. Blank's (1962) analysis revealed that print media responded quickly to changes in business cycles while the broadcast media and outdoor advertising responded more slowly (p. 26). Blank's (1962) analysis was descriptive, but it seems to imply that business cycles drive advertising expenditures.

Verdon, McConnell, and Roesler (1968) found that advertising was procyclical with Gross National Product (GNP), however the authors acknowledged that their study was not "entirely conducive to sweeping generalization" (p. 17) . Ekelund and Gramm (1969) criticized Verdon et al.'s (1968) model for not relating advertising expenditures to aggregate consumption. Ekelund and Gramm (1969) argued that advertising can *only* affect business cycles through aggregate consumption. Berndt (1996) states that "the reason for excluding the investment and government spending GNP components," in Ekelund et al.'s study, "is that they are not likely to be greatly affected by advertising" (p. 393). Despite Ekelund et al.'s (1969) argument they were unable to find a significant relationship between consumption and advertising expenditures.

Taylor and Weiserbs (1972) also argued that advertising had a significant effect on consumption. However the authors could not prove that the relationship was uni-directional; instead the study found a simultaneous effect showing that consumption causes advertising and vice versa. Ashley et al. (1980) attempted to identify the direction of causality between consumption and advertising. Ashley et al. (1980) found that aggregate consumption influences aggregate advertising, not vice-versa, utilizing a statistical test known as Granger causality.

Since Ashley et al.'s (1980) findings only one study could be found in the economics literature concerning the aggregate consumption—national advertising question. Jung and

Seldon (1995) found that aggregate consumption affects national advertising, but they also found that national advertising affects aggregate consumption (p. 585).

However, Jung and Seldon (1995) used annual data, which fails to appropriately capture the dynamic effects of quarterly changes in aggregate consumption and national advertising. Therefore, the current study seeks to further understanding of the aggregate consumption— national advertising question by utilizing quarterly advertising data. The current study will also improve upon Ashley et al.'s (1980) findings by using data that is seasonally unadjusted. Ashley et al.'s (1980) data was adjusted seasonally, which the authors admitted may have biased their results (p. 1164). Ashley et al. (1980) also failed to correct for a unit root process within the data which could have led to spurious results—the current study corrects for the unit root process.

Advertising Issues in Marketing Research

Financial Implications of Advertising Expenditures? Before proceeding to the development of hypotheses it is important to explore how organizations treat advertising. How do organizations plan and manage budgets for advertising expenditures? Can micro-level advertising budget decisions influence the macroeconomic effects of advertising?

According to Aaker & Myers (1987) the theoretical underpinning of an advertising budgeting decision is based upon marginal analysis (p. 61). A firm will continue to spend money on advertising as long as the incremental expenditures do not exceed the marginal revenue generated by the advertising (Aaker & Myers 1987, pp. 61-62). A potential problem with marginal analysis is that it can assume that sales are a function of advertising expenditures with advertising as the only input and immediate sales as the output (Aaker & Myers 1987, p. 62). This assumption is false because other extraneous variables may influence an organization's sales, such as market conditions and the competitive environment (Aaker & Myers 1987, p. 62).

Given the problematic nature of the advertising-sales assumption, an organization can adopt an extended marginal analysis that more completely describes inputs and outputs (Aaker & Myers 1987, p. 63). For example, the inputs can include, "a complete description of the advertising program, the target audience, the creative approach, and the media used, plus any salient environmental conditions" (Aaker & Myers 1987, p. 63). Outputs might include determining what the audience has learned, the impact on its attitudes, and the direct or indirect impact on buying decisions (Aaker & Myers 1987, p. 63). This theoretical marginal analysis provides a basis for how an organization decides to allocate its advertising budget.

There are four basic advertising budget decision rules— (1) percentage of sales, (2) all that can be afforded, (3) competitive parity, and (4) object and task (Aaker & Myers 1987, pp. 64-66). The different rules are justified by arguing that each one approximates the optimal budget decisions that would be made if an extended marginal analysis could be performed (Aaker & Myers, 1987, p. 64).

The percentage-of-sales rule was the most common in one study. A 1981 survey of 54 of the 100 leading consumer advertisers found that more than 70 percent reported using some version of the percentage-of-sales method (Patti & Blasko, 1981, p.25). This rule sets the advertising budget as a percentage of past sales or a percentage of the forecast for future sales (Aaker & Myers, 1987, p. 64). The all-that-can-be-afforded method allocates spending to advertising after budgeting for all other unavoidable expenditures (Aaker & Myers, 1987, p. 65). The competitive parity method sets advertising budgets according to comparable budgets established by competitors (Aaker & Myers, 1987, p. 66). The objective and task method allocates money for advertising according to specific marketing objectives; for example a firm

may seek to increase to 50 percent brand awareness in a certain population segment (Aaker & Myers, 1987, p. 66).

White and Miles (1996) argue that advertising expenditures should be treated as an investment with multi-period effects. This would make ad spending a capital budgeting decision instead of an expense, allowing ad expenditures to be rationalized as a component of a single year's working capital expenditure (p. 43). The authors state that, "the prevailing viewpoint among business decision makers is derived from the US tax code, which treats advertising expenditures as single period business expenses, with the cost of the current year's advertising campaign being deducted from the year's gross income" (White & Miles, 1996, pp. 43-44). They contend that advertising can have a significant intertemporal, or multi-period, effect upon sales (White & Miles 1996, p. 44). Therefore, the authors argue that advertising should be treated as an investment because it creates a "future income stream" (White & Miles 1996, p. 45). Thus, they argue that advertising budgets should be allocated utilizing a capital budgeting framework (White & Miles 1996, p. 45).

Low and Mohr (1999) conducted in-depth interviews with 21 managers from eight consumer product firms that each had more than $1 billion in sales per year and more than 5,000 employees (p. 68). The objective was to see how these organizations made budget allocations for advertising and promotion (Low & Mohr 1999, p. 68). The managers indicated that increasingly sophisticated data and computer systems are helping them improve the allocation of marketing budgets (Low & Mohr 1999, p. 71). Despite these improvements, the 21 managers interviewed still faced uncontrollable realities in budgeting, such as risk-averse corporate executives, a short-term focus on return-on-investment, and organizational inertia (Low & Mohr 1999, pp. 70-76).

Thus, there is a persistent disparity between academia and the corporate world in theories of advertising budgeting. Almost 30 years ago Dhalla (1978) argued that:

> although a strong case can be made on theoretical grounds [for treating advertising as an investment], the fact still remains that in many corporations the advertising budget is governed by immediate considerations, such as the impact on the current profit and loss statement. The media costs are treated for the most part as discretionary expenses—a spot where the ax may fall when the pressures mount for improving the cash flow (p.88).

If a majority of organizations allocate advertising budgets as a percentage-of-sales, this will influence how much is spent on advertising. If sales fail to reach forecast amounts, then money for advertising will not be reallocated into other budget areas. Decreases in sales probably results in simply cutting advertising expenditures. Conversely, if sales exceed the forecast amounts, then advertising spending increases. Therefore, intuitively it seems that advertising can contribute to the macro-economy if a majority of firms in the microeconomy are basing expenditures on a percentage-of-sales. This intuition of budgets based on percentage-of-sales seems to suggest that advertising has a positive relationship with overall spending in the economy, however there is no indication what the direction of the relationship is.

Advertising—Information or Persuasion? Arguably advertising's effect on consumers influences GDP if advertising entices consumers to spend money by buying the advertiser's product. However, if advertising only persuades consumers to change brands, then perhaps in the aggregate advertising does not have the positive effect on the economy proposed under the Market Power model discussed earlier. The advertising as persuasion model suggests consumers are constantly switching brands in response to advertisements, so there are no steady or consistent gains for the advertiser at the micro-level and therefore no effects on the overall economy.

Mitra (1995) conducted a longitudinal experiment to test if advertising affects individual consumer's consideration sets (pp. 81-82). A consideration set the subset of brands that the consumer considers in a purchase decision (Mitra 1995, p. 81). Mitra (1995) found there was less instability in the composition of consideration sets for subjects exposed to informational advertising than for subjects in a control group who were not exposed to advertisements (pp. 88-93).

In addition to Mitra's (1995) findings, Ackerberg (2003) examined consumer-level panel data tracking advertising exposure and grocery purchases over a 15-month period (pp. 1008-1009). In the market he found "a large, significant, and robust informative effect of advertising and an insignificant prestige [persuasional] effect" (Ackerberg 2003, p. 1037).

Ackerberg's (2003) and Mitra's (1995) findings are limited. However, Mitra's study does suggest that advertising would have a positive effect on the economy by stabilizing individual consideration sets. Admitting that there are inevitably instances where advertising has a purely persuasional effect on individual purchase decisions, which would destabilize the consideration set, the author assumes a large portion of advertising has a stabilizing effect on consideration sets and therefore has a positive effect on the aggregate economy. Of course, it is possible that even if advertising influences which products consumers buy, it might not influence their overall level of spending. If this is the case, advertising's macroeconomic effects might be limited. However, the current study assumes that advertising does affect the macroeconomy and therefore seeks to advance our knowledge of how national advertising affects aggregate consumption and, ceteris paribus, the economy as a whole. The question of how advertising affects the economy dates to the time of Chamberlin (1933), but an acceptable explanation still

does not exist. The results of this study may bring the academic community closer to developing

a macroeconomic model explaining the effects of advertising on the national economy.

CHAPTER 3

HYPOTHESIS AND METHODOLOGY

Hypotheses

Past research provides strong evidence that aggregate consumption (and ceteris paribus, GDP) and advertising expenditures are highly correlated. However, the correlation between the two variables does not necessarily mean that one causes the other. Ashley et al. (1980) found aggregate consumption *Granger*-causes national advertising expenditures; however, the results of this statistical test do not prove a causal relation between the two variables. Instead, the Granger causality test indicates that changes to aggregate consumption are good predictors of changes in advertising expenditures. Despite this limitation, Granger causality still serves as a powerful tool to suggest that a causal relationship exists between aggregate consumption and advertising expenditures. The evidence of a causal relationship will be strengthened if results of the current study are similar to the findings of Ashley et al. (1980) who used different data over a different time period.

Therefore, the current study reexamines the findings of Ashley et al. (1980) and Jung and Seldon (1995) to determine whether national advertising expenditures *Granger*-cause aggregate consumption. Through this analysis the current study seeks to test the following hypotheses:

H_1: Aggregate consumption *Granger*-causes national advertising expenditures.

Hypothesis H_1 assumes that if a majority of organizations allocate advertising budgets using the percentage-of-sales method (Patti & Blasko, 1981), then it follows intuitively that sales will decrease with decreases in the business cycle (and conversely will increase with increases in the business cycle), and therefore advertising expenditures will decrease or increase with the business cycle. It can be argued that advertising has intertemporal effects on consumer spending

(White & Miles, 1996) that may offset changes in the business cycle, however it seems intuitive that these effects would only delay the changes in advertising expenditures that follow changes in the business cycle. Delayed effects might explain Blank's (1962) findings that changes in advertising expenditures lag behind changes to the business cycle by approximately one fiscal quarter.

H₂: Changes in aggregate consumption are not proportional to changes in advertising expenditures.

Hypothesis H₂ follows from the findings of Picard (2001) and Chang and Chan-Olmstead (2005); both across nation studies found that changes in the business cycle are not proportionate to changes in advertising expenditures.

H₃: Advertising expenditures lag behind aggregate consumption.

Hypothesis H₃ follows from the argument that intertemporal effects will cause changes in advertising expenditures to lag behind changes to business cycles. H₃ will test the argument that even if advertising has intertemporal effects on spending, such effects only delay turns in advertising expenditures under the percentage-of-sales method of advertising budgeting.

Methodology

This study conducted a statistical test to determine if aggregate consumption *Granger*-causes national advertising expenditures in a uni-directional and statistically significant manner. Berndt (1996) defines Granger causality as follows:

> Granger causality testing involves using *F*-tests to determine whether lagged information on a variable, say *X*, has any statistically significant role in explaining Y_t in the presence of lagged *Y*. If, in the presence of lagged *Y's*, lagged *X's* make no statistically significant contribution to explaining Y_t, then it is said that "*X* does not *Granger*-cause *Y* (p. 381).

The null hypothesis of the test is that *X* does not *Granger*-cause *Y*, or conversely that *Y* does not

Granger-cause *X*.

The concept that a variable *X* causes *Y* is a deep philosophical question that transcends

the discussion in this study. However, Berndt (1996) argues that despite the lack of a universally

accepted definition of causality, the Granger causality test is useful for dealing with causality

issues in data analysis (p. 381). He contends that best interpretation of Granger causality is "as

assessing whether a variable's lags either do or do not make a significant incremental

contribution to the movement of a dependent variable" (Berndt, 1996, p. 381). Like Berndt,

Sørenson (2005) posits that that Granger causality is not causality in a deep sense of the word (p.

2). Sørenson (2005) states:

> It [is] just talk about linear prediction… In economics you may often have that all
> variables in the economy react to some unmodeled factor (the Gulf war) and if the
> response of *X* and *Y* is staggered in time you will see Granger causality even
> though the real causality is different. There is nothing we can do about that
> (unless you can experiment with the economy) - Granger causality measures
> whether one thing happens before another thing and helps predict it - and nothing
> else. Of course we all secretly hope that it partly catches some "real" causality in
> the process (pp. 2-3).

Therefore, the interpretation for the Granger causality test is that one variable predicts the other.

In conducting the Granger causality test several different lag lengths are chosen for both

variables to see if the Granger causality is persistent over a reasonably long time. For example,

if the Granger causality is only statistically significant for one prior lag then it is difficult to say

that the independent variable is a good predictor of the dependent variable. However, if Granger

causality is persistent over several lags then it is reasonable to say that the independent variable

is *Granger*-caused by the dependent variable.

To define Granger causality more formally, let Γ_t represent a set of information up to and

including period *t* on $A_{1\text{-}t}$ and $C_{1\text{-}t}$, $t = 0, 1, …, T$. Where A_t represents national advertising

expenditures and C_t represents aggregate consumption. The regression equation takes the following form

$$A_t = \alpha + \sum_{i=1}^{I} \beta_i A_{t-i} + \sum_{j=1}^{J} \gamma C_{t-j} + \varepsilon_t$$

where ε_t is a "white noise" error term with a mean of zero and variance σ^2, and I and J are chosen by the researcher "to be sufficiently large to permit a variety of autocorrelation patterns" (Berndt, 1996, p. 381). The test can also be conducted in the reverse direction with aggregate consumption as the dependent variable and national advertising expenditures as the independent variable. The regression equation is run with and without C_{t-j} variables included, and then a *F*-test is performed to test the null hypothesis that $\gamma_j = 0$, $j = 1, \ldots, J$ (Berndt, 1996, p. 381). If the calculated F-statistic is greater than the associated critical value, then it is said that aggregate consumption (C_{t-j}) *Granger*-causes national advertising expenditures (Berndt, 1996, p. 381).

Data

Time series data is a sequence of random variables indexed by time; the sequence is referred to as a stochastic (or random) process (Wooldridge, 2006, p. 343). The stochastic process follows the linear model:

$$y_t = \beta_0 + \beta_1 x_{t1} + \ldots + \beta_k x_{tk} + u_t,$$

where $\{u_t: t = 1, 2, \ldots, n\}$ is a sequence of errors or disturbances and n is the number of observations (time periods) (Wooldridge, 2006, pp. 347-348). An important concept in time series analysis is the notion of weak dependence. Wooldridge (2006) defines weak dependence as:

> [a process that] puts restrictions on how strongly related the random variable x_t and x_{t+h} can be as the time distance between them, *h*, gets large… a stationary time series process is said to be weakly dependent if x_t and x_{t+h} are 'almost independent' as *h* increases without bound (p. 382).

Weak dependence with time series data allows the researcher to appeal to the Law of Large Numbers and the Central Limit Theorem so that generalizations can be made about the researcher's regression model (Wooldridge, 2006, p. 382). Time series processes that do not satisfy weak dependence are called highly persistent or strongly dependent (Wooldridge, 2006, p. 392). A particularly egregious form of a highly persistent series is a unit root process. Woodridge (2006) defines the unit root process as, "a highly persistent time series process where the current value equals last period's value, plus a weakly dependent disturbance" (p. 871). In other words, past values within a time series affect today's values. For example, GDP data contains a unit root process when business cycles in the past affect today's cycles. One tests for a unit root process by utilizing an augmented Dickey-Fuller test which includes the lagged changes of a variable as regressor (Wooldridge, 2006, p. 859).

Fortunately correcting for a unit root process is quite simple— the researcher takes the first difference of the values to use in the analysis. Woodridge (2006) defines the first difference as, "a transformation on a time series constructed by taking the difference of adjacent time periods, where the earlier time period is subtracted from the later time period" (p. 863).

Another important issue in time series analysis is the intervals within the data; i.e., annual, quarterly, monthly or weekly. The general rule of thumb is that shorter intervals better ensure that one's model is properly capturing dynamics within the data that might be aggregated with longer intervals. Clarke (1976) conducted an econometric measurement of the duration of advertising's effect on sales utilizing both his own analysis and a meta-analysis of the existing literature (pp. 351-353). He found that interval bias was prevalent among studies using annual data (Clarke, 1976, p.353). However, in eight studies utilizing quarterly data only one had

interval bias (Clarke, 1976, p. 353). Therefore, it seems safe to assume that the quarterly data is a better choice than annual data.

     Newspaper Advertising Expenditures. The current study used national newspaper advertising expenditures for four reasons. One, newspaper advertising is the only national data that the researcher could access that estimates quarterly advertising expenditures and this data is seasonally unadjusted. Two, separate annual data shows newspaper advertising expenditures are highly correlated with national advertising expenditures. A Pearson product-moment correlation between newspaper expenditures and national expenditures was conducted utilizing Coen's (2006) national advertising expenditure forecasts from the years 1940-1996, yielding 76 observations. The correlation yielded a result ($r = .98$) showing that newspaper and national advertising expenditures were very highly correlated using a standard proposed by Ott and Longnecker (2001, pp. 590-5916). Three, newspaper expenditures have been shown to be sensitive to national business cycles (Blank 1962, p. 26). Four, newspaper advertising expenditures as a percentage of total national advertising expenditures remained fairly stable throughout the observation years 1940-1996.

Table 1.1. Annual Newspaper Advertising Expenditures as a Percentage of National Advertising Expenditures

Year	Total Newspaper	Total Advertising	News Percentage of Total	Percentage Change in Annual News
1940	8,341.01	21,594.51	0.39	0
1941	8,111.48	21,624.22	0.38	-0.03
1942	7,081.30	19,191.47	0.37	-0.13
1943	7,564.16	20,950.78	0.36	0.07
1944	7,283.19	22,194.82	0.33	-0.04
1945	7,364.96	22,760.06	0.32	0.01
1946	8,289.08	23,970.14	0.35	0.13
1947	9,497.68	27,505.17	0.35	0.15
1948	10,658.44	29,745.91	0.36	0.12
1949	11,678.07	31,838.18	0.37	0.10
1950	12,550.78	34,560.12	0.36	0.07
1951	12,770.91	36,423.47	0.35	0.02
1952	13,682.05	39,646.84	0.35	0.07
1953	14,429.82	42,434.21	0.34	0.05
1954	14,565.48	44,211.78	0.33	0.01
1955	16,446.63	48,906.94	0.34	0.13
1956	16,647.73	51,188.02	0.33	0.01
1957	16,268.28	51,250.06	0.32	-0.02
1958	15,483.62	50,263.26	0.31	-0.05
1959	16,989.50	54,302.79	0.31	0.10
1960	17,491.92	56,833.30	0.31	0.03
1961	16,921.20	55,730.46	0.30	-0.03
1962	16,961.80	57,620.99	0.29	0.00
1963	17,338.65	60,088.99	0.29	0.02
1964	18,613.90	63,928.80	0.29	0.07
1965	19,637.94	67,663.50	0.29	0.06
1966	20,987.92	71,742.88	0.29	0.07
1967	20,546.51	70,594.64	0.29	-0.02
1968	20,998.56	72,603.95	0.29	0.02
1969	21,848.35	74,255.34	0.29	0.04
1970	20,713.20	70,992.81	0.29	-0.05

	News Ad Percentage
Mean	0.28
Standard Deviation	0.05

All figures are listed in $ Millions

Table 1.2. Annual Newspaper Advertising Expenditures as a Percentage of National Advertising Expenditures

Year	Total Newspaper	Total Advertising	News Percentage of Total	Percentage Change in Annual News
1971	21,327.29	71,586.66	0.30	0.03
1972	22,995.59	76,928.18	0.30	0.08
1973	23,485.28	78,420.29	0.30	0.02
1974	22,585.76	76,668.30	0.29	-0.04
1975	21,664.43	73,407.53	0.30	-0.04
1976	23,924.18	82,831.70	0.29	0.10
1977	25,143.83	87,562.56	0.29	0.05
1978	26,690.27	94,685.55	0.28	0.06
1979	27,976.11	98,440.05	0.28	0.05
1980	27,364.88	99,089.93	0.28	-0.02
1981	27,952.92	102,252.74	0.27	0.02
1982	28,203.00	106,267.33	0.27	0.01
1983	31,560.71	116,539.39	0.27	0.12
1984	34,762.95	130,069.17	0.27	0.10
1985	36,099.48	136,108.08	0.27	0.04
1986	37,870.60	143,638.89	0.26	0.05
1987	40,178.13	150,633.85	0.27	0.06
1988	41,208.09	156,856.79	0.26	0.03
1989	41,196.91	158,803.09	0.26	0.00
1990	39,553.26	158,784.03	0.25	-0.04
1991	36,005.30	151,047.28	0.24	-0.09
1992	35,574.41	153,526.54	0.23	-0.01
1993	36,231.47	157,868.54	0.23	0.02
1994	38,061.26	168,038.55	0.23	0.05
1995	39,425.72	176,876.73	0.22	0.04
1996	40,914.56	186,694.94	0.22	0.04
1997	43,672.38	196,540.38	0.22	0.07
1998	45,910.34	208,959.83	0.22	0.05
1999	47,596.76	219,917.64	0.22	0.04
2000	49,050.00	247,472.00	0.20	0.03
2001	43,216.93	225,861.80	0.19	-0.12
2002	42,259.08	227,342.53	0.19	-0.02
2003	42,142.11	230,691.95	0.18	0.00
2004	42,597.48	241,038.48	0.18	0.01
2005	41,984.50	240,433.19	0.17	-0.01
2006	42,541.06	251,593.98	0.17	0.01

		News Ad Percentage		
Mean		0.28		
Standard Deviation		0.05		
All figures are listed in $ Millions				

As can be gleaned from Tables 1.1 and 1.2, during the period of 76 years only 20 observations yielded annual changes in newspaper ad expenditures in excess of 0.05% despite the gradual reduction in the percentage of national expenditures accounted for by newspaper advertising. Therefore, the separate quarterly data should serve as a good proxy for national advertising expenditures to in tests to determine whether there is a relationship between national advertising expenditures and aggregate consumption.

The quarterly figures for national newspaper advertising expenditures are available from the Newspaper Association of America (2007). The advertising expenditures are unadjusted seasonally and cover the period 1971-2005, yielding 140 observations.

All newspaper advertising expenditures were deflated with the Bureau of Economic Analysis's (BEA) Gross Domestic Product seasonally unadjusted price indexes using the base year 2000 ("Bureau of Economic Analysis," 2007).[2]

Aggregate Consumption. The quarterly data on aggregate consumption, seasonally unadjusted, was obtained from the BEA ("Bureau of Economic Analysis," 2007).

All aggregate consumption figures were deflated using the BEA's personal consumption expenditure price indexes using the base year 2000 ("Bureau of Economic Analysis," 2007).[2]

CHAPTER 4

RESULTS

Tables 2.1-2.4 show the descriptive statistics for national newspaper advertising

expenditures, aggregate consumption, and their percentage changes per quarter respectively.

Observation of the newspaper advertising expenditures and aggregate consumption data,

adjusted for inflation, does not yield anything provocative. There is clearly a seasonal trend with

first quarter newspaper advertising expenditures always decreasing from the previous quarter.

This observation is not surprising considering that the fourth quarter includes the Christmas

holiday which garners a lot of ad spending for the newspaper; ad spending in the first quarter

should decrease after the holiday season. Aggregate consumption showed steady growth with

similar seasonal trends toward a slow down in consumption in the first quarter of each year. It is

interesting to note that there seems to be healthy growth in newspaper advertising expenditures

throughout the 1970's and 1980's. Expenditures grew by approximately 72% (percentage

change from Q1, 1971 to Q4, 1979) in the 1970's and approximately 81% (percentage change

from Q1, 1980 to Q4, 1989). However, growth in advertising expenditures starts to slow in the

1990's and 2000's. Growth was approximately 50% (percentage change from Q1, 1990 to Q4,

1999) in the 1990's and approximately 11% (percentage change from Q1, 2000 and Q4, 2005) in

the first half of the 2000's. This shows a clear trend toward slower growth in newspaper

advertising expenditures over the past two decades.

The changes in newspaper advertising expenditures were compared to changes in

business cycles defined by the National Bureau of Economic Research (NBER, n.d.) NBER

(n.d.) does not define a recession as a slow down in the economy for two consecutive quarters.

Instead, it defines a recession as "a significant decline in economic activity spread across the

Table 2.1. Descriptive Statistics of Percentage Changes in Newspaper Ad Expenditures and Aggregate Consumption

qtr	Year	National News Ad Expend	% Change from Previous Period	Aggregate Consumption	% Change from Previous Period
I	1971	4.59	.	594.91	.
II	1971	5.42	0.18	633.01	0.06
III	1971	5.23	-0.04	635.12	0.00
IV	1971	6.06	0.16	681.35	0.07
I	1972	4.95	-0.18	628.41	-0.08
II	1972	5.81	0.17	669.39	0.07
III	1972	5.65	-0.03	676.40	0.01
IV	1972	6.57	0.16	725.86	0.07
I	1973	5.14	-0.22	675.33	-0.07
II	1973	6.09	0.18	708.84	0.05
III	1973	5.83	-0.04	705.08	-0.01
IV	1973	6.40	0.10	742.55	0.05
I	1974	5.07	-0.21	666.62	-0.10
II	1974	5.87	0.16	707.48	0.06
III	1974	5.51	-0.06	706.94	0.00
IV	1974	6.09	0.10	728.72	0.03
I	1975	4.73	-0.22	671.18	-0.08
II	1975	5.46	0.15	715.05	0.07
III	1975	5.21	-0.05	723.37	0.01
IV	1975	6.22	0.19	765.02	0.06
I	1976	5.10	-0.18	715.32	-0.06
II	1976	6.01	0.18	754.15	0.05
III	1976	5.87	-0.02	756.96	0.00
IV	1976	6.91	0.18	807.43	0.07
I	1977	5.28	-0.24	748.00	-0.07
II	1977	6.29	0.19	782.71	0.05
III	1977	6.19	-0.02	789.72	0.01
IV	1977	7.34	0.19	841.70	0.07
I	1978	5.67	-0.23	777.29	-0.08
II	1978	6.83	0.20	821.27	0.06
III	1978	6.49	-0.05	826.63	0.01
IV	1978	7.64	0.18	875.02	0.06
I	1979	5.98	-0.22	813.53	-0.07
II	1979	6.98	0.17	837.04	0.03
III	1979	7.06	0.01	839.45	0.00
IV	1979	7.89	0.12	890.50	0.06

	Ad Expend	Change in Ad Expend	Agg Con	Change in Agg Con
Mean	5.98	0.03	739.93.94	0.01
SD	0.80	0.16	183.38	0.06

All figure listed in $ Billions.

Table 2.2. Descriptive Statistics of Percentage Changes in Newspaper Ad Expenditures and Aggregate Consumption

qtr	Year	National News Ad Expend	% Change from Previous Period	Aggregate Consumption	% Change from Previous Period
I	1980	6.21	-0.21	824.15	-0.07
II	1980	6.75	0.09	826.52	0.00
III	1980	6.66	-0.01	833.59	0.01
IV	1980	7.69	0.15	887.41	0.06
I	1981	6.31	-0.18	820.43	-0.08
II	1981	7.29	0.16	850.26	0.04
III	1981	6.78	-0.07	853.02	0.00
IV	1981	7.54	0.11	896.54	0.05
I	1982	6.44	-0.15	829.72	-0.07
II	1982	7.26	0.13	856.06	0.03
III	1982	6.62	-0.09	860.12	0.00
IV	1982	7.86	0.19	922.72	0.07
I	1983	6.96	-0.12	858.40	-0.07
II	1983	7.94	0.14	906.50	0.06
III	1983	7.61	-0.04	916.98	0.01
IV	1983	9.03	0.19	984.79	0.07
I	1984	7.80	-0.14	921.25	-0.06
II	1984	8.99	0.15	959.61	0.04
III	1984	8.45	-0.06	957.33	0.00
IV	1984	9.50	0.12	1,024.03	0.07
I	1985	8.34	-0.12	960.25	-0.06
II	1985	9.13	0.09	1,006.54	0.05
III	1985	8.71	-0.05	1,018.11	0.01
IV	1985	9.91	0.14	1,077.99	0.06
I	1986	8.47	-0.15	1,002.22	-0.07
II	1986	9.70	0.15	1,046.04	0.04
III	1986	9.19	-0.05	1,060.35	0.01
IV	1986	10.49	0.14	1,119.32	0.06
I	1987	9.11	-0.13	1,028.66	-0.08
II	1987	10.39	0.14	1,087.61	0.06
III	1987	9.85	-0.05	1,095.84	0.01
IV	1987	10.81	0.10	1,156.01	0.05
I	1988	9.48	-0.12	1,081.15	-0.06
II	1988	10.60	0.12	1,124.94	0.04
III	1988	10.01	-0.06	1,133.36	0.01
IV	1988	11.10	0.11	1,205.53	0.06
I	1989	9.43	-0.15	1,112.80	-0.08
II	1989	10.56	0.12	1,157.46	0.04
III	1989	9.92	-0.06	1,169.02	0.01
IV	1989	11.27	0.14	1,234.11	0.06

	Ad Expend	Change in Ad Expend	Agg Con	Change in Agg Con
Mean	8.65	0.02	991.67	0.01
SD	1.48	0.13	121.97	0.05

All figure listed in $ Billions.

Table 2.3. Descriptive Statistics of Percentage Changes in Newspaper Ad Expenditures and
Aggregate Consumption

qtr	Year	National News Ad Expend	% Change from Previous Period	Aggregate Consumption	% Change from Previous Period
I	1990	9.06	-0.20	1,143.67	-0.07
II	1990	10.21	0.13	1,188.91	0.04
III	1990	9.66	-0.05	1,193.45	0.00
IV	1990	10.61	0.10	1,242.35	0.04
I	1991	8.03	-0.24	1,141.57	-0.08
II	1991	9.11	0.13	1,189.09	0.04
III	1991	8.73	-0.04	1,196.99	0.01
IV	1991	10.04	0.15	1,249.64	0.04
I	1992	7.75	-0.23	1,175.90	-0.06
II	1992	8.98	0.16	1,220.92	0.04
III	1992	8.62	-0.04	1,233.12	0.01
IV	1992	10.09	0.17	1,303.73	0.06
I	1993	7.94	-0.21	1,208.62	-0.07
II	1993	8.98	0.13	1,264.51	0.05
III	1993	8.73	-0.03	1,277.35	0.01
IV	1993	10.39	0.19	1,348.21	0.06
I	1994	8.24	-0.21	1,260.56	-0.07
II	1994	9.33	0.13	1,310.51	0.04
III	1994	9.24	-0.01	1,321.75	0.01
IV	1994	10.95	0.19	1,396.45	0.06
I	1995	8.65	-0.21	1,290.63	-0.08
II	1995	9.64	0.11	1,351.03	0.05
III	1995	9.38	-0.03	1,360.77	0.01
IV	1995	11.50	0.23	1,429.95	0.05
I	1996	8.90	-0.23	1,342.42	-0.06
II	1996	9.90	0.11	1,396.86	0.04
III	1996	9.93	0.00	1,403.89	0.01
IV	1996	11.82	0.19	1,475.11	0.05
I	1997	9.48	-0.20	1,391.21	-0.06
II	1997	10.60	0.12	1,439.75	0.03
III	1997	10.63	0.00	1,463.17	0.02
IV	1997	12.59	0.18	1,537.01	0.05
I	1998	10.11	-0.20	1,447.13	-0.06
II	1998	11.24	0.11	1,523.11	0.05
III	1998	11.11	-0.01	1,537.13	0.01
IV	1998	13.07	0.18	1,617.74	0.05
I	1999	10.52	-0.19	1,527.20	-0.06
II	1999	11.61	0.10	1,601.33	0.05
III	1999	11.55	-0.01	1,614.74	0.01
IV	1999	13.60	0.18	1,693.86	0.05

	Ad Expend	Change in Ad Expend	Agg Con	Change in Agg Con
Mean	10.01	0.02	1,357.78	0.01
SD	1.39	0.15	145.91	0.05

All figure listed in $ Billions.

Table 2.4. Descriptive Statistics of Percentage Changes in Newspaper Ad Expenditures and Aggregate Consumption

qtr	Year	National News Ad Expend	% Change from Previous Period	Aggregate Consumption	% Change from Previous Period
I	2000	10.89	-0.20	1,620.81	-0.04
II	2000	12.14	0.11	1,675.94	0.03
III	2000	11.78	-0.03	1,682.18	0.00
IV	2000	13.84	0.17	1,759.51	0.05
I	2001	10.18	-0.26	1,665.09	-0.05
II	2001	10.84	0.06	1,718.62	0.03
III	2001	10.31	-0.05	1,717.75	0.00
IV	2001	11.90	0.15	1,808.23	0.05
I	2002	9.38	-0.21	1,713.79	-0.05
II	2002	10.47	0.12	1,766.21	0.03
III	2002	10.25	-0.02	1,775.02	0.00
IV	2002	12.21	0.19	1,843.23	0.04
I	2003	9.34	-0.23	1,750.06	-0.05
II	2003	10.43	0.12	1,814.42	0.04
III	2003	10.18	-0.02	1,829.27	0.01
IV	2003	12.26	0.20	1,900.75	0.04
I	2004	9.45	-0.23	1,829.91	-0.04
II	2004	10.54	0.12	1,883.59	0.03
III	2004	10.27	-0.03	1,892.18	0.00
IV	2004	12.39	0.21	1,970.02	0.04
I	2005	9.39	-0.24	1,882.99	-0.04
II	2005	10.45	0.11	1,948.98	0.04
III	2005	10.12	-0.03	1,968.55	0.01
IV	2005	12.06	0.19	2,038.57	0.04

	Ad Expend	Change in Ad Expend	Agg Con	Change in Agg Con
Mean	10.88	0.01	1,810.65	0.01
SD	1.17	0.16	109.63	0.04

All figure listed in $ Billions.

economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales" (NBER, n.d.). According to NBER (n.d.) there have been five periods of sustained decline in the economy in the past four decades—(1) Q4, 1973 to Q1, 1975, (2) Q1, 1980 to Q3, 1980, (3) Q2, 1981 to Q4, 1982, (4) Q3, 1990 to Q1, 1991, and (5) Q1, 2001 to Q4, 2001. Ironically, aside from the normal seasonal trends, newspaper ad expenditures do not seem to be affected by these downward cycles.

Natural logs of each of variable were taken in this study. Many modern econometricians use the loglinear model because it allows analysts to model second-order effects (Greene, 2003, p. 12). Second-order effects were not modeled in the current study, however natural logs were still taken to honor the convention.

A better way to see the data is through linear graphs of each variable plotted against time. Figure 1 and Figure 2 show the log of Aggregate Consumption and the log of Newspaper Advertising Expenditures, respectively, plotted against time. Both line graphs show a strong linear trend indicating that both are likely to follow a unit root process.
Wooldridge (2006) argues that using time series with strong persistence, such as those containing a unit root process, can produce misleading results if there are violations of the assumptions of Classic Linear Model (p. 397). Therefore, an augmented Dickey-Fuller test was conducted to test whether both variables contain a unit root process. A quarterly trend term was included in the test to account for the linear trending process of both series. A lag length of 12 was chosen for each test to ensure that the dynamics of the series was completely modeled. In other words, this test analyzes the change in the past 12 lags as regressors. Then, the cumulative changes of the lags are tested against the change in the current value of the variable to see if the series is highly persistent (Wooldridge, 2006, p. 242). According to Wooldridge (2006), if an augmented
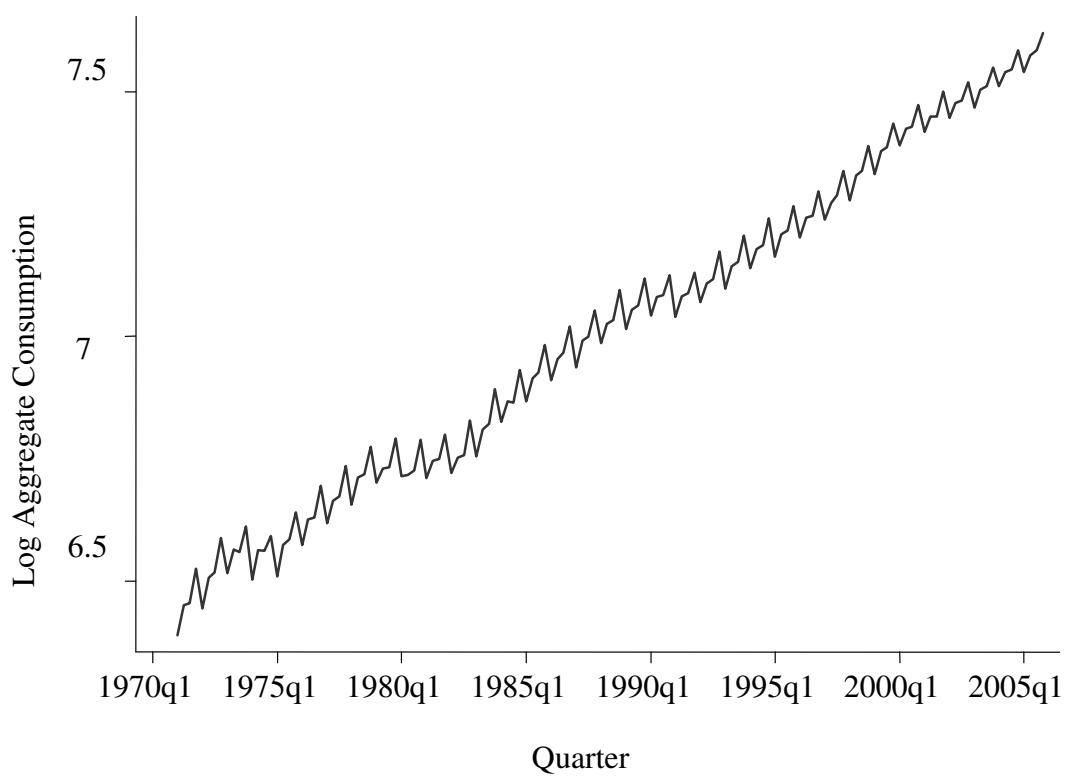
Figure 1. Log of Aggregate Consumption Plotted Against Time
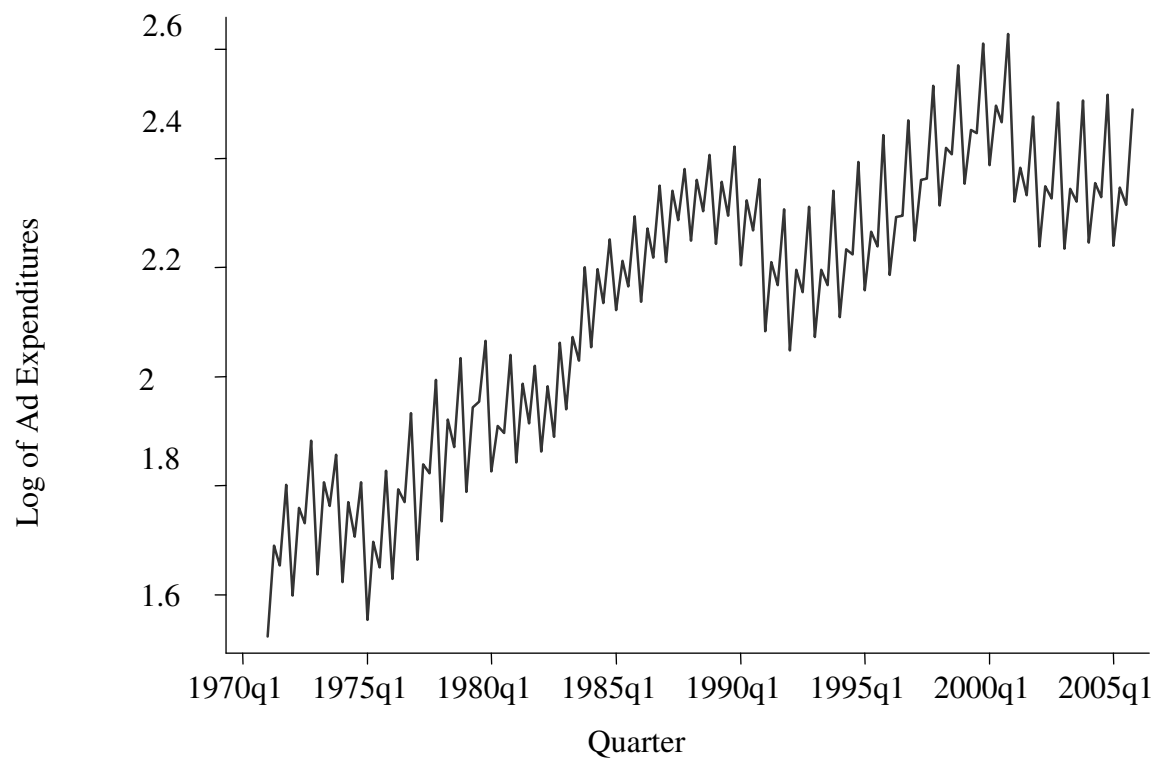
Figure 2. Log of Newspaper Advertising Expenditures Plotted Against Time

Dickey-Fuller test includes too few lags, the size of the test statistic will be incorrect (p. 642).

Conversely, the more lags that are included the more observations that are lost (Wooldridge

2006, p. 642). Despite the relatively large lag length chosen for the test, there were still 127

observations left to be tested. Such a large number of observations should be sufficient to

capture the full dynamics of the series. The results of the augmented Dickey-Fuller test are listed

in Tables 3 and 4.

Table 3. Augmented Dickey-Fuller Test for Unit Root in Aggregate Consumption
Number of obs =   127   Lag Order = 12

| | Test Statistic | ----------Interpolated Dickey-Fuller---------- | | |
		1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-2.934	-4.031	-3.446	-3.146

MacKinnon approximate p-value for Z(t) = 0.1515

Table 4. Augmented Dickey-Fuller Test for Unit Root in News Advertising Expenditures
Number of obs =   127   Lag Order = 12

| | Test Statistic | ----------Interpolated Dickey-Fuller---------- | | |
		1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-1.424	-4.031	-3.446	-3.146

MacKinnon approximate p-value for Z(t) = 0.8537

The null hypothesis for the augmented Dickey-Fuller test is that the variable contains a unit root,

and the alternative is that the variable was generated by a stationary process.[3] The tests for both

series failed to reject the null at significance level of $\alpha=.10$ (aggregate consumption, p = 0.15 and

newspaper advertising expenditures, p = 0.85). Therefore, it is concluded that both series follow

a unit root process.

According to Wooldridge (2006), a series containing a unit root can be corrected by

taking the first difference of the process, which makes the data points within the series weakly

dependent as well as correcting for the linear trend (p. 397). Therefore, the first difference was

taken for each time series to correct for the unit root process as well as the linear time trend. The results for the augmented Dickey-Fuller test with the first difference of each series are listed in Tables 5 and 6.

Table 5. Augmented Dickey-Fuller Test for Unit Root in the First Difference of Aggregate
Consumption   Number of obs   =   127   Lag Order = 12

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	
	----------Interpolated Dickey-Fuller----------				
$Z(t)$	-3.501	-4.031	-3.447	-3.147	MacKinnon

approximate p-value for $Z(t)$ = 0.0393

Table 6. Augmented Dickey-Fuller Test for Unit Root in the First Difference of News
Advertising Expenditures   Number of obs   =   127   Lag Order = 12

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
	----------Interpolated Dickey-Fuller----------			
$Z(t)$	-3.280	-4.031	-3.447	-3.147

MacKinnon approximate p-value for $Z(t)$ = 0.0696

Both tables show that taking the first difference allows the null to be rejected. Hence, the unit root process within each series is corrected and inferences based upon the Classic Linear Model should no longer be problematic.

Before the Granger causality test is conducted it is important to view the first difference of aggregate consumption plotted against time, and then overlay the first difference of newspaper advertising expenditures on the same graph. There is a lot of variation in the quarterly data over the entire 140 observations, so the graphs were broken into roughly 35 observations each to better capture the changes in aggregate consumption and newspaper advertising expenditures. The results for the graphs are listed below:
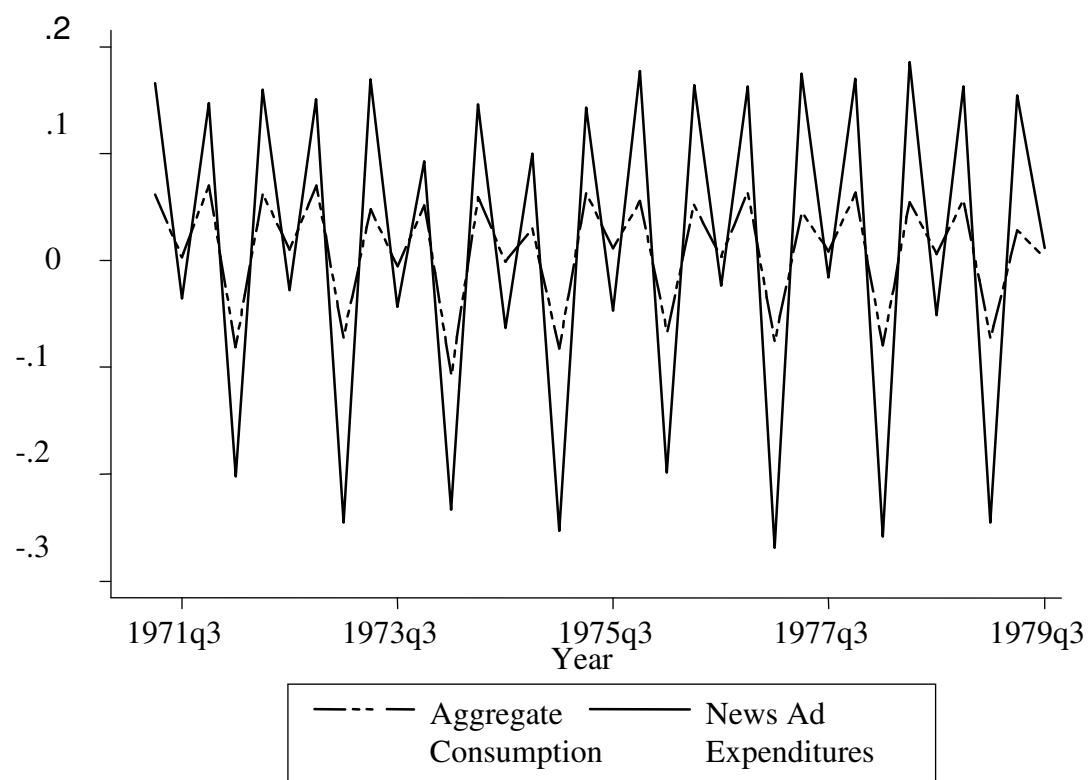
Figure 3.1. Overlaid Graph of the Difference of the Log of Aggregate Consumption and the Difference of the Log of News Ad Expenditures Plotted Against Time; Observations 1 - 35
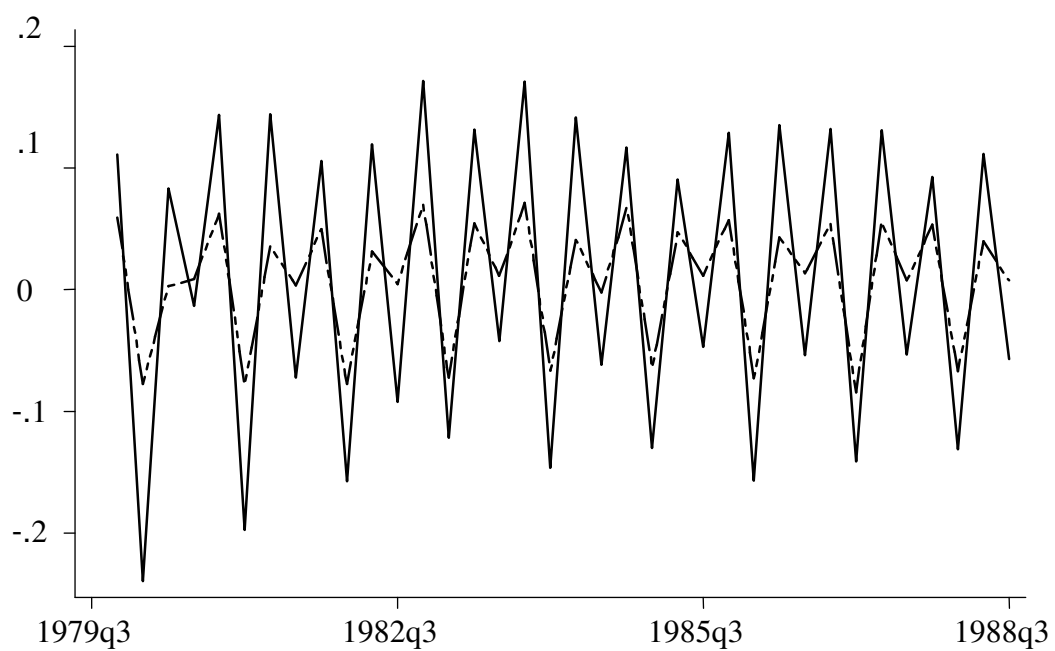
Figure 3.2. Overlaid Graph of the Difference of the Log of Aggregate Consumption and the Difference of the Log of News Ad Expenditures Plotted Against Time; Observations 36 - 71
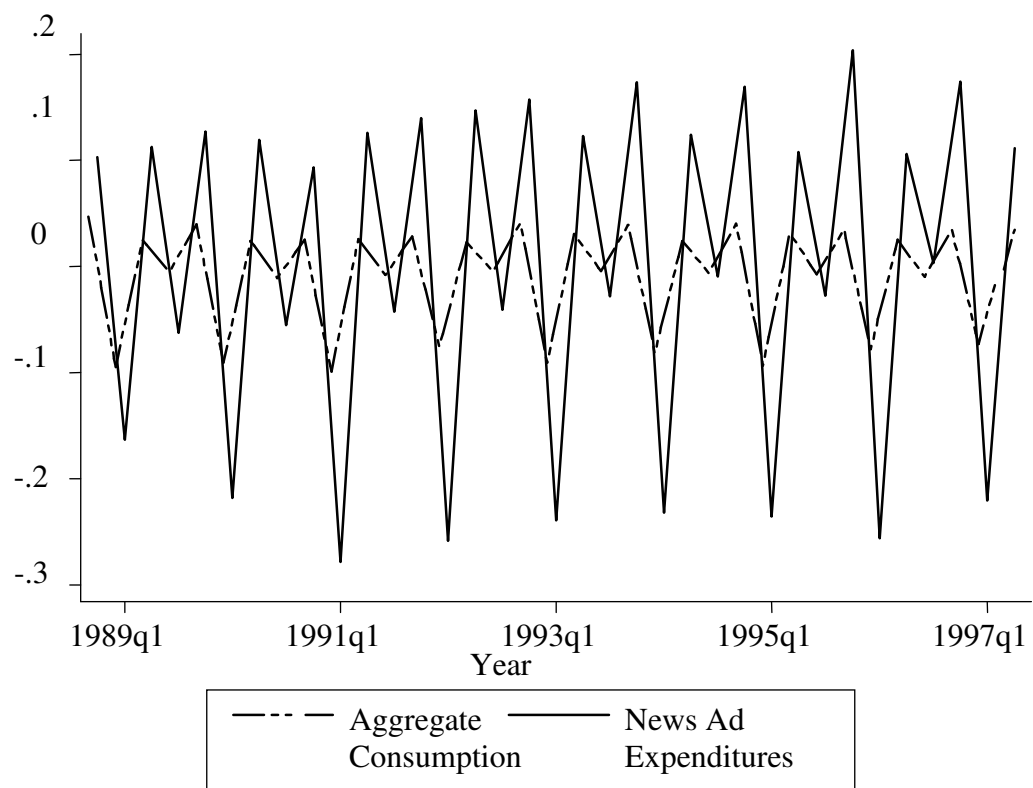
Figure 3.3. Overlaid Graph of the Difference of the Log of Aggregate Consumption and the Difference of the Log of News Ad Expenditures Plotted Against Time; Observations 72 - 107
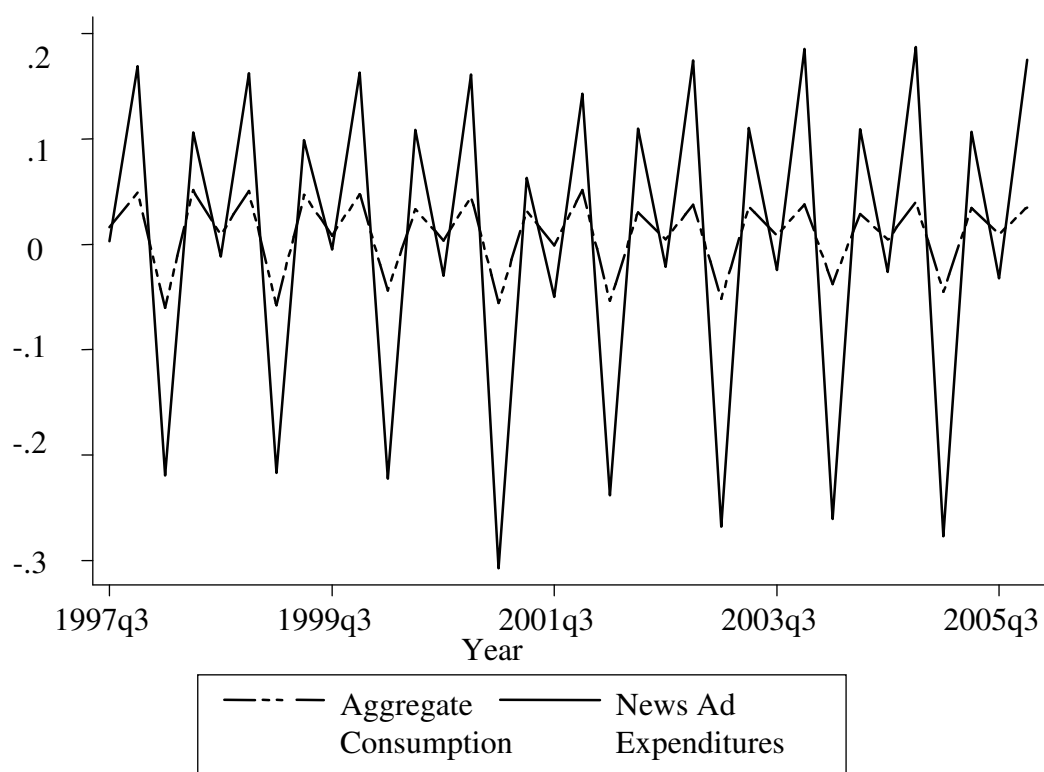
Figure 3.4. Overlaid Graph of the Difference of the Log of Aggregate Consumption and the Difference of the Log of News Ad Expenditures Plotted Against Time; Observations 108 - 140

The dynamics of aggregate consumption and newspaper advertising expenditures become pretty clear given the graphs. Quarterly changes in newspaper advertising expenditures are almost identical to quarterly changes in aggregate consumption, but the variation in newspaper advertising expenditures is much larger than the variation in aggregate consumption.

Changes in newspaper advertising expenditures appear to follow changes in aggregate consumption, but it is difficult to determine by observation how long the lag may be. This pattern appears to be consistent with Blank's (1962) findings. To elucidate this point Figure 3.5 was constructed containing observations 70 – 80 (chosen as a convenience sample), to provide a close up of the two overlaid series.
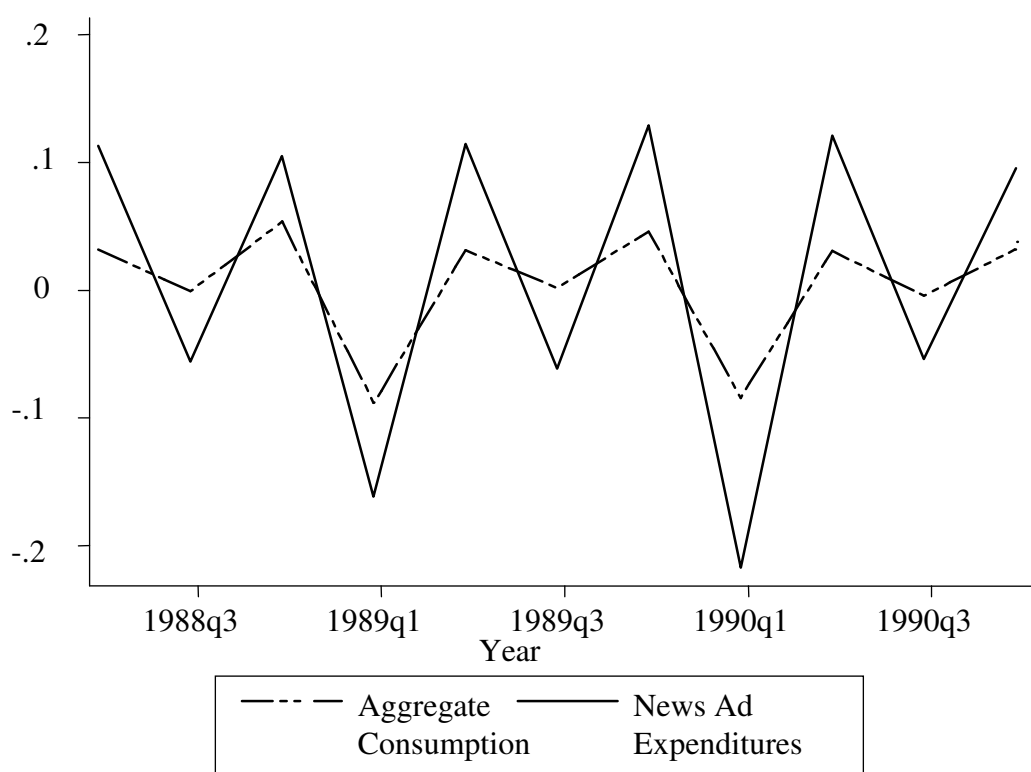

Figure 3.5. Overlaid Graph of the Difference of the Log of Aggregate Consumption and the Difference of the Log of News Ad Expenditures Plotted Against Time; Observations 70-80

The graphs appear to show that aggregate consumption is driving newspaper advertising expenditures. It seems then that the graphs indicated support for the first hypothesis that aggregate consumption *Granger*-causes national advertising expenditures. However, this is just conjecture. The Granger causality test must be conducted to determine if aggregate consumption is the driving force.

Results for the test of Granger causality are in Table 7. The first hypothesis predicted that aggregate consumption *Granger*-caused national newspaper advertising expenditures.

Table 7. Granger Causality Testing Results

		Number of Lags	F-Statistic	p-Value
H_0:	Ad Exp does	9	1.27	0.26
	not cause	10	1.21	0.29
	Agg Con	11	1.28	0.25
		12	1.24	0.27
		13	1.19	0.30
		14	1.14	0.34
		15	0.89	0.58
H_0:	Agg Con does	9	1.57	0.13
	not cause	10	1.82	0.06*
	Ad Exp	11	1.71	0.08*
		12	1.85	0.05**
		13	1.90	0.04**
		14	1.81	0.05**
		15	1.73	0.06*

* $p < .10$, ** $p < .05$

The results from the Table 7 show that indeed aggregate consumption *Granger*-causes national newspaper advertising expenditures, and not vice versa. Therefore, H_1 is accepted—this finding is also consistent in with the overlaid graphs.

The second hypothesis predicted that changes in aggregate consumption are not proportional to changes in advertising expenditures. Tables 8.1 and 8.2 display the quarterly percentage changes in national advertising expenditures and aggregate consumption.

Table 8.1 Proportionality of Change Between National Ad Expenditures and Aggregate Consumption

Qtr	Year	Real Nat. Ad Expnd (Billions)	% Change of Ad Exp	Real Agg Con (Billions)	% Change Agg Con	Proportion of Change (ΔAd Exp/ΔAgg Con)
I	1971	4.59	.	594.91	.	.
II	1971	5.42	0.18	633.01	0.06	2.82
III	1971	5.23	-0.04	635.12	0.00	-10.61
IV	1971	6.06	0.16	681.35	0.07	2.16
I	1972	4.95	-0.18	628.41	-0.08	2.35
II	1972	5.81	0.17	669.39	0.07	2.67
III	1972	5.65	-0.03	676.40	0.01	-2.70
IV	1972	6.57	0.16	725.86	0.07	2.22
I	1973	5.14	-0.22	675.33	-0.07	3.12
II	1973	6.09	0.18	708.84	0.05	3.71
III	1973	5.83	-0.04	705.08	-0.01	7.96
IV	1973	6.40	0.10	742.55	0.05	1.83
I	1974	5.07	-0.21	666.62	-0.10	2.03
II	1974	5.87	0.16	707.48	0.06	2.60
III	1974	5.51	-0.06	706.94	0.00	79.46
IV	1974	6.09	0.10	728.72	0.03	3.40
I	1975	4.73	-0.22	671.18	-0.08	2.83
II	1975	5.46	0.15	715.05	0.07	2.36
III	1975	5.21	-0.05	723.37	0.01	-3.89
IV	1975	6.22	0.19	765.02	0.06	3.35
I	1976	5.10	-0.18	715.32	-0.06	2.76
IV	1980	7.69	0.15	887.41	0.06	0.42
I	1981	6.31	-0.18	820.43	-0.08	2.37
II	1981	7.29	0.16	850.26	0.04	4.28
III	1981	6.78	-0.07	853.02	0.00	-21.82
IV	1981	7.54	0.11	896.54	0.05	2.20
I	1982	6.44	-0.15	829.72	-0.07	1.96
II	1982	7.26	0.13	856.06	0.03	4.03
III	1982	6.62	-0.09	860.12	0.00	-18.67
IV	1982	7.86	0.19	922.72	0.07	2.58
I	1983	6.96	-0.12	858.40	-0.07	1.66
II	1983	7.94	0.14	906.50	0.06	2.52
III	1983	7.61	-0.04	916.98	0.01	-3.56
IV	1983	9.03	0.19	984.79	0.07	2.52
I	1984	7.80	-0.14	921.25	-0.06	2.11
II	1984	8.99	0.15	959.61	0.04	3.65
III	1984	8.45	-0.06	957.33	0.00	24.88
IV	1984	9.50	0.12	1024.03	0.07	1.78

		% Change in Ad Exp=	% Change in Agg Con	Proportion of Change		
Mean		0.02	0.01	3.91		
Standard Deviation		0.15	0.05	15.17		

All Figures Listed in $ Billions

Table 8.2 Proportionality of Change Between National Ad Expenditures and Aggregate Consumption

Qtr	Year	Real Nat. Ad Expnd (Billion)	% Change of Ad Exp	Real Agg Con (Billions)	% Change Agg Con	Proportion of Change (ΔAd Exp/ΔAgg Con)
IV	1990	10.61	.	1242.35	.	.
I	1991	8.03	-0.24	1141.57	-0.08	2.99
II	1991	9.11	0.13	1189.09	0.04	3.23
III	1991	8.73	-0.04	1196.99	0.01	-6.31
IV	1991	10.04	0.15	1249.64	0.04	3.41
I	1992	7.75	-0.23	1175.90	-0.06	3.87
II	1992	8.98	0.16	1220.92	0.04	4.17
III	1992	8.62	-0.04	1233.12	0.01	-4.04
IV	1992	10.09	0.17	1303.73	0.06	2.98
I	1993	7.94	-0.21	1208.62	-0.07	2.93
II	1993	8.98	0.13	1264.51	0.05	2.84
III	1993	8.73	-0.03	1277.35	0.01	-2.79
IV	1993	10.39	0.19	1348.21	0.06	3.44
I	1994	8.24	-0.21	1260.56	-0.07	3.18
II	1994	9.33	0.13	1310.51	0.04	3.32
III	1994	9.24	-0.01	1321.75	0.01	-1.05
IV	1994	10.95	0.19	1396.45	0.06	3.28
I	1995	8.65	-0.21	1290.63	-0.08	2.77
II	1995	9.64	0.11	1351.03	0.05	2.44
III	1995	9.38	-0.03	1360.77	0.01	-3.76
IV	1995	11.50	0.23	1429.95	0.05	4.45
IV	2000	13.84	-0.20	1759.51	-0.04	0.22
I	2001	10.18	-0.26	1665.09	-0.05	4.92
II	2001	10.84	0.06	1718.62	0.03	2.01
III	2001	10.31	-0.05	1717.75	0.00	96.03
IV	2001	11.90	0.15	1808.23	0.05	2.92
I	2002	9.38	-0.21	1713.79	-0.05	4.06
II	2002	10.47	0.12	1766.21	0.03	3.82
III	2002	10.25	-0.02	1775.02	0.00	-4.29
IV	2002	12.21	0.19	1843.23	0.04	4.99
I	2003	9.34	-0.23	1750.06	-0.05	4.65
II	2003	10.43	0.12	1814.42	0.04	3.15
III	2003	10.18	-0.02	1829.27	0.01	-2.85
IV	2003	12.26	0.20	1900.75	0.04	5.22
I	2004	9.45	-0.23	1829.91	-0.04	6.15
II	2004	10.54	0.12	1883.59	0.03	3.94
III	2004	10.27	-0.03	1892.18	0.00	-5.63
IV	2004	12.39	0.21	1970.02	0.04	5.01

		% Change in Ad Exp=	% Change in Agg Con	Proportion of Change		
Mean		0.02	0.01	3.91		
Standard Deviation		0.15	0.05	15.17		

All figures listed in $ Billions

The furthest column to the right labeled "Proportion of Change" is the quotient of the quarterly percentage change in advertising expenditures and the quarterly percentage change in aggregate consumption. The table clearly shows that no stable proportional changes occurred during the 140 observation period, nor are there any trends in the proportionality. Therefore, H_2 is supported; a change in one of the variables is not accompanied by a proportional change in the other variable.

The third hypothesis predicts that advertising expenditures lag behind aggregate consumption. This hypothesis can be tested by observing the overlaid graphs in Figures 3.1-3.5. One may argue that Tables 2.1 and 2.2, which list quarterly statistics for these variables and their respective changes, could be used to test H_3. However, both national advertising expenditures and aggregate consumption contain a linear trend and strong persistence (unit root process) as established by the Augmented Dickey-Fuller tests (Tables 3-4). Therefore, the first differences were taken for both variables to eliminate the strong persistence. As demonstrated in Tables 5 and 6, the persistence was removed from both variables once the first differences were taken.

The overlaid graphs with first differences seem to clearly show that changes in advertising consumption lag behind changes in aggregate consumption. However, to clarify the relationship Tables 9.1 through 9.4 were constructed to demonstrate the first differences of the series in $ billion increments.

Comparing these tables to the periods of contraction in the economy listed by NBER (n.d.)— (1) Q4, 1973 to Q1, 1975, (2) Q1, 1980 to Q3, 1980, (3) Q2, 1981 to Q4, 1982, (4) Q3, 1990 to Q1, 1991, and (5) Q1, 2001 to Q4, 2001—we see markedly different results from the descriptive statistics within Tables 2.1-2.4. For example, in the first contraction outlined by the NBER the newspaper industry experienced approximately a $76 billion (Q1, 1974) and $58

Table 9.1. The First Differences in Aggregate Consumption and Advertising Expenditures

qtr	Year	Difference in Agg Con	Difference in Ad Exp
I	1971	.	.
II	1971	0.83	38.10
III	1971	-0.19	2.11
IV	1971	0.83	46.23
I	1972	-1.11	-52.94
II	1972	0.86	40.98
III	1972	-0.16	7.01
IV	1972	0.92	49.46
I	1973	-1.43	-50.53
II	1973	0.95	33.51
III	1973	-0.26	-3.76
IV	1973	0.57	37.47
I	1974	-1.33	-75.93
II	1974	0.80	40.86
III	1974	-0.36	-0.54
IV	1974	0.58	21.78
I	1975	-1.36	-57.54
II	1975	0.73	43.87
III	1975	-0.25	8.32
IV	1975	1.01	41.65
I	1976	-1.12	-49.70
II	1976	0.91	38.83
III	1976	-0.14	2.81
IV	1976	1.04	50.47
I	1977	-1.63	-59.43
II	1977	1.01	34.71
III	1977	-0.10	7.01
IV	1977	1.15	51.98
I	1978	-1.67	-64.41
II	1978	1.16	43.98
III	1978	-0.34	5.36
IV	1978	1.15	48.39
I	1979	-1.66	-61.49
II	1979	1.00	23.51
III	1979	0.08	2.41
IV	1979	0.83	51.05

		Agg Con	Ad Expend
Mean		0.09	8.45
Standard Deviation		0.97	41.14

All figures based upon $ Billions

Table 9.2. The First Differences in Aggregate Consumption and Advertising Expenditures

qtr	Year	Difference in Agg Con	Difference in Ad Exp
I	1980	-1.68	-66.35
II	1980	0.54	2.37
III	1980	-0.09	7.07
IV	1980	1.03	53.82
I	1981	-1.38	-66.98
II	1981	0.98	29.83
III	1981	-0.51	2.76
IV	1981	0.76	43.52
I	1982	-1.10	-66.82
II	1982	0.82	26.34
III	1982	-0.64	4.06
IV	1982	1.24	62.60
I	1983	-0.90	-64.32
II	1983	0.98	48.10
III	1983	-0.33	10.48
IV	1983	1.42	67.81
I	1984	-1.23	-63.54
II	1984	1.19	38.36
III	1984	-0.54	-2.28
IV	1984	1.05	66.70
I	1985	-1.16	-63.78
II	1985	0.79	46.29
III	1985	-0.42	11.57
IV	1985	1.20	59.88
I	1986	-1.44	-75.77
II	1986	1.23	43.82
III	1986	-0.51	14.31
IV	1986	1.30	58.97
I	1987	-1.38	-90.66
II	1987	1.28	58.95
III	1987	-0.54	8.23
IV	1987	0.96	60.17
I	1988	-1.33	-74.86
II	1988	1.12	43.79
III	1988	-0.59	8.42
IV	1988	1.09	72.17
I	1989	-1.67	-92.73
II	1989	1.13	44.66
III	1989	-0.64	11.56
IV	1989	1.35	65.09

	Agg Con	Ad Expend
Mean	0.08	8.59
Standard Deviation	1.07	52.21

All figures based upon $ Billions

Table 9.3. The First Differences in Aggregate Consumption and Advertising Expenditures

qtr	Year	Difference in Agg Con	Difference in Ad Exp
I	1990	-2.21	-90.44
II	1990	1.15	45.24
III	1990	-0.55	4.54
IV	1990	0.95	48.90
I	1991	-2.58	-100.78
II	1991	1.08	47.52
III	1991	-0.38	7.90
IV	1991	1.31	52.65
I	1992	-2.29	-73.74
II	1992	1.23	45.02
III	1992	-0.36	12.20
IV	1992	1.47	70.61
I	1993	-2.15	-95.11
II	1993	1.04	55.89
III	1993	-0.25	12.84
IV	1993	1.66	70.86
I	1994	-2.15	-87.65
II	1994	1.09	49.95
III	1994	-0.09	11.24
IV	1994	1.71	74.70
I	1995	-2.30	-105.82
II	1995	0.99	60.40
III	1995	-0.26	9.74
IV	1995	2.12	69.18
I	1996	-2.60	-87.53
II	1996	1.00	54.44
III	1996	0.03	7.03
IV	1996	1.89	71.22
I	1997	-2.34	-83.90
II	1997	1.12	48.54
III	1997	0.03	23.42
IV	1997	1.96	73.84
I	1998	-2.48	-89.88
II	1998	1.13	75.98
III	1998	-0.13	14.02
IV	1998	1.96	80.61
I	1999	-2.55	-90.54
II	1999	1.09	74.13
III	1999	-0.06	13.41
IV	1999	2.05	79.12

	Agg Con	Ad Expend
Mean	0.06	11.49
Standard Deviation	1.59	64.05

All figures based upon $ Billions

Table 9.4. The First Differences in Aggregate Consumption and Advertising Expenditures

qtr	Year	Difference in Agg Con	Difference in Ad Exp
I	2000	-2.71	-73.05
II	2000	1.25	55.13
III	2000	-0.36	6.24
IV	2000	2.06	77.33
I	2001	-3.66	-94.42
II	2001	0.66	53.53
III	2001	-0.53	-0.87
IV	2001	1.59	90.48
I	2002	-2.52	-94.44
II	2002	1.09	52.42
III	2002	-0.22	8.81
IV	2002	1.96	68.21
I	2003	-2.87	-93.17
II	2003	1.09	64.36
III	2003	-0.25	14.85
IV	2003	2.08	71.48
I	2004	-2.81	-70.84
II	2004	1.09	53.68
III	2004	-0.27	8.59
IV	2004	2.12	77.84
I	2005	-3.00	-87.03
II	2005	1.06	65.99
III	2005	-0.33	19.57
IV	2005	1.94	70.02
		Agg Con	Ad Expend
Mean		-0.06	14.36
Standard Deviation		1.90	64.34

All figures based upon $ Billions

billion (Q1, 1975) slowdown in advertising expenditures. Newspaper advertising expenditures also experienced large slowdowns (each in excess of \$66 billion) during the third contraction listed by the NBER. One of the largest slowdowns in newspaper ad expenditures correspond with the fourth contraction period in Q1, 1991 with a downturn in advertising expenditures in excess of \$100 billion.

Beyond the descriptive statistics within Tables 9.1-9.4 there is one very important observation. Newspaper advertising expenditures do not lag behind aggregate consumption as predicted by H_3. Instead the contractions occurred almost without fail within the same quarter. However, most downturns within newspaper ad expenditures followed the seasonal trend observed earlier, with contractions in the first quarter of each year when newspaper advertising slows in the winter months after a busy holiday shopping season. In fact, during the observation period only three downturns in ad spending did not occur in Q1—(1) Q3, 1974, (2) Q3, 1984, (3) Q3, 2001. None of those observations lagged behind a contraction in aggregate consumption, instead each occurred in the same quarter that aggregate consumption contracted. Therefore, H_3 is rejected.

CHAPTER 5

CONCLUSION

The first hypothesis predicted that aggregate consumption *Granger-* causes national newspaper

advertising expenditures. National newspaper advertising expenditures represent a sizeable

percentage of total advertising spending. The Granger causality test supported the hypothesis

between ten and fifteen lag lengths. These results are consistent with the findings of Ashley et

al. (1980) that aggregate consumption *Granger*-causes advertising expenditures but not the other

way around. However, these results are not consistent with Jung and Seldon (1995) who found

bi-directional Granger causality between aggregate consumption and newspaper advertising

expenditures. The disagreement with Jung and Seldon (1995) perhaps stems from their use of

annual advertising data. Clarke (1970) found a strong tendency toward bias in annual data

intervals. The results of the current study's Granger causality also seem consistent with a large

majority of organizations allocating money to their advertising budget by utilizing the

percentage-of-sales method (Patti & Blasko, 1981, p.25). The results are also consistent with the

findings of White and Miles (1996) that a majority of organizations follow the US tax code,

which treats advertising expenditures as single period business expenses, with the cost of the

current year's advertising campaign being deducted from the year's gross income (pp. 43-44). If

this is the case, it would seem intuitive that aggregate consumption is driving advertising

spending as organization's budgets react to changes in sales levels. If sales levels are affected by

business cycles then it would make sense that advertising spending would follow those cycles

when a percentage-of-sales budget method is used. In other words, it seems that aggregate

consumption is driving sales, and sales are driving advertising budgets. Therefore, changes in

aggregate consumption lead to changes in advertising expenditures.

The second hypothesis predicted changes in aggregate consumption would not be proportionate to changes in newspaper advertising expenditures. This hypothesis followed from the findings of Picard (2001) and Chang and Chan-Olmstead (2005), who each identified that disproportionate changes in cross nation studies. In conjunction, this study revealed that the changes were very disproportionate from 1971-2005 using 140 observations. Such findings cast a slight shadow on the belief that there is a causal connection between aggregate consumption and newspaper ad expenditures. A strong causal connection could be expected to produce a more stable, proportionate, change throughout the series. This disproportionality leads to the belief that there may be other intervening variables affecting changes to aggregate consumption and newspaper ad expenditures. Newspaper advertising is highly dependent on local market conditions because significant proportions of advertising revenue come from the sale of classified and local display advertising. There could also be environmental factors, such as the decay of advertising growth within the newspaper industry over the past couple of decades.

The third hypothesis predicted that newspaper advertising expenditures would lag behind business cycles. This prediction was based on the belief that aggregate consumption will drive ad spending if a large majority of organizations use the percentage-of-sales budget allocation method. Blank (1962) had found that expenditures lagged behind business cycles by about one quarter.

Figures 3.1 through 3.5 seemed to show that ad spending lagged aggregate consumption. However, the analysis within Tables 9.1 through 9.4 revealed that changes in business cycles and changes in advertising spending almost always occurred concurrently. There is a possibility that ad spending is lagging behind aggregate consumption, but that the data intervals need to be shorter to observe the lags. For example, perhaps monthly observations would indicate a lag.

However, if a majority of businesses use the percentage-of-sales method and sales respond to changes in business cycles, one month is probably not sufficient time for the advertising budget to feel any effects from a turn in a business cycle. Thus, the rejection of the third hypothesis casts a larger shadow on a causal relation between aggregate consumption and national advertising expenditures.

Despite strong evidence in the Granger causality test that aggregate consumption predicts newspaper ad spending, the combination of the last two hypothesises raise significant doubt that a true causal relationship exists. Perhaps the best interpretation of the relationship is to use Sørenson's (2005) definition, that Granger causality simply means aggregate consumption is a good linear predictor for newspaper advertising expenditures. These findings support the need for the academic community to continue building models to explain how advertising affects the economy. There is a particular need for a macro-economic model of the economics of advertising. There is a strong possibility that several intervening variables affect the relationship, such as environmental factors, and controlling for these variables could better the capture dynamics between ad spending and aggregate consumption. For example, a vector autoregression model controlling for the observed seasonal trends and various other environmental factors may reveal more about the relationship than was observed here. Such a model was unfortunately beyond the scope of this study.

Several limitations were encountered in this study. First, the quarterly data were limited to newspaper advertising expenditures. Second, this data was supplied by the Newspaper Association of America and comes from a private research firm which does not disclose its methods. Therefore, the expenditure estimates could contain potential flaws. Third, the interpretation of the Granger causality test was limited to linear prediction and does not denote a

deeper philosophical meaning of causality. Fourth, it should be duly noted that a significant percentage of newspaper advertising expenditures are composed of retail sales, and a significant portion of the retail advertising sales is local in orientation. Finally, it is generally accepted that the principle of relative constancy, referred to in Chang and Chan-Olmstead (2005), has been dismissed; it was mentioned in this study to explain the motivation for Chang and Chan-Olmstead's (2005) research.

Further research should investigate a fully-specified macroeconomic model of the dynamics between aggregate consumption and newspaper advertising expenditures. However, there needs first to be more understanding of the macroeconomic effects of advertising to develop a fully-specified model. As discovered in the literature review, there is an ample discussion of the microeconomic effects with little to no discussion of macroeconomic effects.

Organizations can benefit from the findings of this study since aggregate consumption serves as a good predictor for advertising expenditures. Perhaps current aggregate consumption data can be used in budget forecasts. In other words, aggregate consumption figures can be used in an organization's marginal analysis to predict when incremental revenues may change and improve forecasting of advertising expenditures.

According Coen (2005), total national advertising revenues have remained stable at more than 2 percent of total GDP since 1990 (p. 6). Thus, it is hard to believe that advertising has no effect in the economy. Such observations raise substantial heuristic questions about the nature of the relationship between GDP and advertising. This study has brought the academic community even closer to elucidating this very complicated relationship.

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FOOTNOTES

1.   Schmalensee (1982) defines an experience good as existing when "the only way a consumer can resolve uncertainty about quality is purchase a brand and try it. One trial is both necessary and sufficient to determine whether or not any single brand works" (p. 350).

2.   It is arguable whether the consumer price index (CPI) price deflator supplied by the Bureau of Labor Statistics or the personal consumption expenditure (PCE) price deflator supplied by the Bureau of Economics Analysis represents a better deflator for empirical analysis. The indices are chosen based upon which offers the best measure of inflation. Ultimately the PCE index was chosen based upon a presentation by Wynne (2000) in which he stated that, "the PCE is probably the most accurate of the government's inflation measures… [and it] is the preferred inflation measure of [former] Chairman Greenspan" (p. 3). The two measures differ because the CPI only represents prices paid by urban consumers, and the PCE represents prices paid by all consumers, urban and rural (Wynne, 2000, p. 5). Wynne (2000) argues that the main difference, however, is that the PCE deflator accounts for shifting spending patterns whereas the CPI deflator relies on spending patterns from several years ago (p. 5). He argues that goods which actually become cheaper over time will tend to be underrepresented in the aggregate CPI numbers, causing inflation to be overstated (Wynne, 2000, p. 5). Therefore, this researcher decided to utilize the PCE deflator to offer a truer estimation of inflation in the United States.

3.   Wooldridge (2006) defines a stationary process as, "a time series process where the marginal and all joint distributions are invariant across time" (p. 870).