Constructing Nutrition Information Trend Indicators from the Media and Scientific Journals for Demand Analysis

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Introduction

U.S. Consumers have become increasingly concerned with health problems. Nutrition is one of the factors which directly affects health, thus credible nutritional information has become more valuable to individuals. Understanding the impact of nutritional information on consumers' food choices will contribute to the development and implementation of effective communication strategies related to diet and health. This will not only help policy makers design regulatory and legal polices that promote health, but will also help the food industry to develop products that better match consumers' interests.

The purpose of this study is to present the number of articles or transcripts in the media, which will be used to produce information trend indicators, and to suggest the distributed time lags among the information sources. Since consumers' knowledge is not observable, one of the ways to measure the impact of information on food demand is to develop some indicators of consumers' exposure to the information.

In this study, the articles or transcripts in the media and scientific journals about omega-3 fatty acids are investigated. Omega-3 fatty acids have received growing attention due to their several health benefits such that they help to reduce the risk of cardiovascular disease. The use of omega-3 heart claims on food labeling was approved by the FDA in 2004.

Objectives

Two issues are examined in this study.

(1) The number of articles by information sources

The number of articles or transcripts regarding omega-3 fatty acids presented in the media and journals is counted.

(2) Distributed time lags

The time lags between publication in scientific journals and their dissemination by the general media are investigated.

Methods

(1) **The number of articles by information sources**

For the period from 1998 to 2008, monthly number of articles or transcripts were counted from four information sources. The articles and transcripts were picked up by keyword searches using power search mode in LexisNexis® academic[1].

Information sources: [2]
(a) Newspapers and newswires
(b) TV and radio
(c) Magazines
(d) Scientific journals

Keywords used:
" (omega 3 or DHA or fish oil or flaxseed oil or flax seed oil or linseed oil) and health!"

(2) Distributed time lags

After obtaining the numbers for each information source, regression analysis was conducted to ascertain the significance of lagged scientific articles' number on the number of articles in the media. Assuming that the articles in scientific journals trigger the increase in their media coverage, three regressions were conducted.

(d) → (a), (d) → (b), (d) → (c)

The infinite geometric distributed lag model was used. The assumption is that (i) nutrition information accumulates, and that (ii) the lag weights are positive and decline geometrically, that is,

$\beta_i = \beta\phi^i, \quad |\phi|<1$

where β: scaling factor, ϕ: parameter which controls the rate at which the weights decline.

The dependent variable y_t is the number of articles in the media ((a)-(c) above) and x_t is the number of articles in scientific journals.

$y_t = \alpha + \beta(x_t + \phi x_{t-1} + \phi^2 x_{t-2} + \phi^3 x_{t-3} \ldots) + e_t$

where α: intercept parameter, e_t: random error.

The Koyck form of geometric lag becomes:

$y_t = \alpha(1-\phi) + \phi y_{t-1} + \beta x_t + (e_t - e_{t-1})$

Since y_{t-1} and $(e_t - e_{t-1})$ are correlated, instrumental variables estimator (IV) was used. IV estimation was carried out using two-stage least squares.

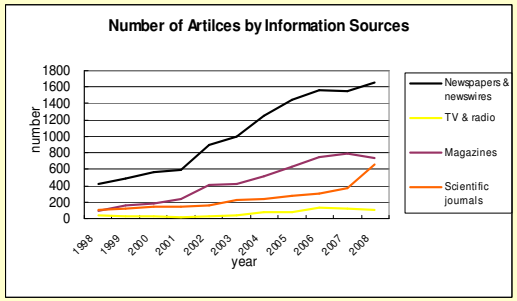
$y_t = \alpha(1-\phi) + \phi \hat{y}_{t-1} + \beta x_t + (e_t - e_{t-1})$,

where $\hat{y}_{t-1} = a_0 + a_1 x_{t-1}$

Results

(1) The number of articles by information sources

To simplify, this graph presents the annual number (the original data are on monthly basis).



(2) Distributed time lags

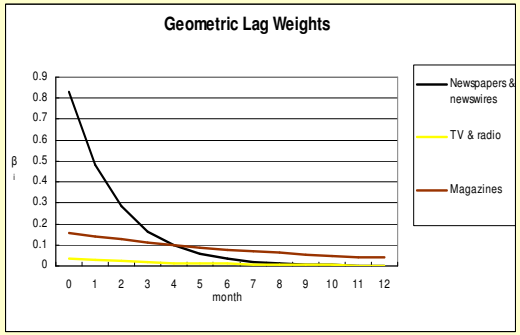
The estimation results are shown in Table 1.

Table 1. Estimation results

	β	ϕ	R^2
Newspapers & newswires	0.83*** (0.19)	0.58*** (0.16)	0.71
TV & radio	0.04 (0.05)	0.79** (0.31)	0.10
Magazines	0.16 (0.14)	0.89*** (0.19)	0.56

**: significant at 5% level
***: significant at 1% level

Based on the estimation results, the graph below illustrates distributed lag weights β_i ($\beta_i = \beta\phi^i$) for 12 months.



Conclusion

The number of the articles or transcripts has been increasing during the period. The pattern of increase varies by information sources.

Newspapers and newswires (NW) has higher declining rate in lag weights than other media. After the publication in scientific journals, NW follows it for about six months while other media follows for longer period. This is intuitive because NW is mainly meant to convey "news"- new information, on the other hand, other media often conveys rather summarized information through featured articles for instance.

Future Directions

1. The indicator will be constructed based on computer-coded content analysis, not only the number of the articles. The software called InfoTrend®[3] will generate scores which shows the intensity of the messages according to the list of words and/or phrases and a set of computer rules.
2. There are several methods for incorporating these information indicators into demand equations to estimate consumers' food demand, e.g. (a). enter all of the indicators separately, (b). combine them into one indicator by assigning weights among information sources.
3. Include Internet information that is now excluded. It is currently difficult to systematically obtain information trend data from online sources such as websites and blogs targeted to health-conscious consumers.

Footnotes

[1] LexisNexis® Academic is an online information source for researching news, business, and legal topics.

[2] These were obtained using the following method.
(1) Select "U.S. newspapers and newswires"
(2) Select "Transcript" and add the keyword "and geographic (United States) and not publication (global broadcast database)"
(3) Select "Magazine stories, combined" and add the keyword "and geographic (United States)"
(4) Select "Medline" (MEDLINE® is the U.S. National Library of Medicine's bibliographic database/article index. Only the abstracts were searched.)

[3] InfoTrend® was developed by Professor David Fan, Dept. of Genetics and Cell Biology, University of Minnesota.