

ALTERNATIVE USES OF MAGAZINE COVERS AS PROMPT AIDS

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Summary

A very widely used syndicated audience study of US agricultural publications, FARMS, has for a number of years used an issue-specific approach with magazine covers as prompt aids in mail questionnaires.

Cost pressures, related to the high costs of questionnaire production, resulted in a change to reliance on a reading frequency question, with frequency-based reading probabilities calibrated by a "latent structure" approach to the data to ensure maximum agreement with the previous issue-specific data. The agreement found was very close indeed.

The approach is being explored for use in other fields of trade, technical, and professional publications which are candidates for "database audience research" using mail questionnaires.

Background

Since 1983, in alternate years, Roper Starch has conducted a syndicated magazine audience research study for agricultural publications, known as FARMS -- an acronym for Farm Audience Readership Measurement Service. The subscribers are advertisers and agencies, especially in chemicals and equipment categories, and of course, the publications themselves - currently some one hundred in the US

The design of the study is complex, given the local (state) distribution of many of the publications, and the need to oversample larger sized farms across a number of categories, such as numbers of planted acres of different crops. Oversampling is, of course, corrected for by weighting.

Following earlier studies which sampled commercial lists of farmers, it was found that by far the most satisfactory procedure was to obtain subscriber lists from all significant publications and to reduce them, by a merge/purge operation, to a common list. Audience data for publications, coupled with demographic or "farmographic" characteristics, are then collected by mail questionnaires. The procedure identifies the "principal operators" of US farms (currently some one million with annual revenues of \$10,000 or more), the "co-operators" who may be involved with purchasing decisions but who are not the principal operators, and excludes those who are not farmers, or who farm on too small a scale (less than \$10,000 annual revenues) to be worth counting.

In this paper we describe the procedure used to estimate publication audiences in the first six FARMS studies, 1983-1993, and explain modifications subsequently made for FARMS 1996 and 1998, which is now effectively under contract to a body known as the ARC (Agricultural Research Committee), which has endorsed the new procedures.

The US agricultural publication field

The agricultural publication field in the US has a number of distinctive characteristics, including the following:

Publication frequencies are often irregular. Some are seasonal only; others, while year-round, publish with different frequencies at different times in the year. Of the approximately 100 measured publications, some one-half do not have a regular publication cycle (e.g., cannot be reasonably characterized as weeklies, biweeklies, monthlies, and so forth).

Some titles could be readily confused. Many have controlled circulations. While a few titles are quite unique (*Hoard's Dairyman* being an extreme example), the possibility of confusion between publications such as the following is rather self-evident:

US Rice
Rice Journal
Rice Farming

Beef
Beef Today

Cotton Grower
Cotton Farming

Given these considerations, an issue-specific measurement (e.g., farmers would be asked whether or not they read or looked into this specific issue of the publication), has been used since the inception of the service in 1983. Since in the "ag" field there is relatively little passalong readership, and virtually no public place reading, the usual arguments against issue-specific measurement in consumer magazine research - where these factors may have substantial effects, leading to issue reading relatively late in the lives of the issues concerned - do not apply.

Additionally, an issue-specific approach - whatever its disadvantages may be - is computationally very straightforward: all that is involved is a simple count of those recognizing the test issue.

Personal interviewing of farmers would be prohibitively expensive: therefore, a full "through-the-book" approach to issue-specific measurement was never a possibility. Instead, it was decided to use magazine covers as the prompt aid, each on a separate sheet, in a mail questionnaire. These questionnaires had to be very carefully collated, and rotated, to ensure that respondents received the correct package for their state and that order effects were minimized.

The original FARMS procedures

A copy of a sample questionnaire page, as used in FARMS 1983-1993, is appended to this paper. (The covers were originally reproduced in black-and-white, and subsequently in four-color.)

It will be seen that the line of questioning was as follows:

- 1a. A six-month screen question.
- 1b. How many issues out of the last four of this publication had been read or looked into by the respondent.
2. Whether the respondent had read or looked into "THIS SPECIFIC ISSUE" of the publication.
- 3-6. Qualitative questions.

This approach served the industry well for six successive studies. However, cost pressure within the industry made it necessary to re-think the approach. As a result, savings were achieved which made it possible to collect data from more respondents (14,375 projected for FARMS 1996) for less total cost.

First, a switch back from four-color reproductions to black-and-white was deemed appropriate, given resulting cost savings, and the fact that a switch to color previously had had little apparent influence on the data.

Second, and central to the topic of this paper, a review of the basic audience measurement procedure was obviously desirable. The earlier FARMS studies had involved measurement of publications in three "waves," with variations of course in the covers used. This almost tripled certain questionnaire production costs.

One option in terms of cost reduction was obviously to reduce the number of field waves (i.e. issues measured) from three to two, while retaining issue-specific measurement. However, this would seem to increase effects due to issue-to-issue variation in readership to an undesirable degree.

It occurred to us that a more radical change should be tested: namely to rely only on the frequency of reading question, and to have only one cover of each publication in the questionnaire for the field period concerned, November through February.

We rejected the recency approach (e.g., having read or looked into the publication in the most recent issue-interval) as a possibility, given the extreme irregularity of publication frequencies noted earlier.

Testing a frequency approach

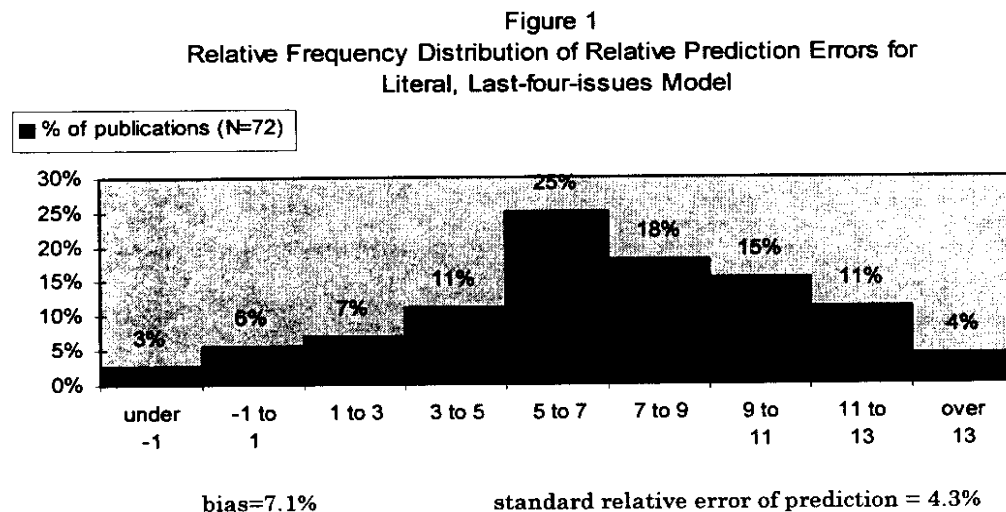
The alternative, reliance on the frequency question, could clearly be tested by taking FARMS data from the previous studies, and determining with what level of accuracy the issue-specific measurement (Q.2 above) could be predicted by the reading frequency question (Q.1b above).

Analysis of previous FARMS data indicated that the frequency question on its own would be entirely satisfactory, if the data are handled appropriately. Two approaches to development of audience estimates from frequency data were considered. In both cases, the frequency-based estimates were compared with the average issue audience estimates derived from the issue-specific data.

The strategy was to develop a frequency-based estimator with minimum total prediction error, where total prediction error was decomposed, as usual, into prediction bias and prediction error variance components. Both the bias and error components were measured in terms of the deviation of frequency-based estimates of publication audiences relative to their issue-specific based estimates.

The first approach considered was to take the frequency question quite literally as a direct measure of reading probability over a four-issue interval, with the four-issue reading probability ranging from 0 for the 0 out of 4 group, to 1.0 for the 4 out of 4 group, with .25, .50 and .75 as the probabilities associated with the intermediate 1, 2 and 3 out of 4 response categories. Developing audience estimates in this manner from FARMS '93 data for 72 publications measured that year yielded a substantial overestimate of total audience across all publications, using the issue-specific estimate as a "yardstick of truth." Total audience as estimated by "literal, four-issue" model was seven percent higher than the issue-specific estimate; and, in fact, the frequency based estimates were higher than the issue-specific estimates for 70 of the 72 publications examined, sometimes by as much as 20%.

Figure 1 below provides a frequency distribution and summary statistics of the relative errors for the 72 publications studied under the "literal" model.

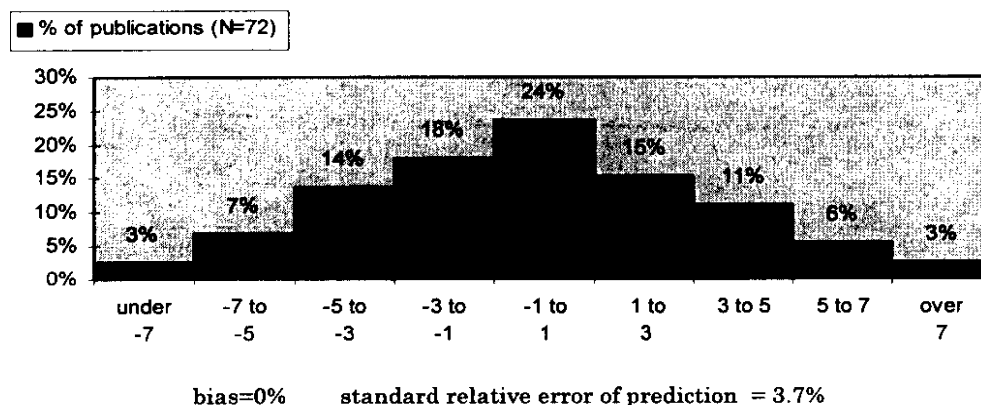


Our second approach to a frequency-based audience estimate involved rejection of the "literal" interpretation of the frequency data discussed above, and use of a latent structure style of conceptualization of the measurement problem, (see reference 1) wherein we looked at answers to the frequency question as observed indicators of latent (true) reading probabilities of an average issue of a publication over a much longer period of time, say at least as long as the screen interval (six months in FARMS) or perhaps even as long as the inter-study interval (two-years). There are several advantages to the latent structure approach. First, we can now bring in the screen question as an additional data element to be used in developing the reading probability for the 0 out of 4 group. If a 0 out of 4 respondent has failed the screen, he will still have a reading probability of 0, but if he passes the screen he will have a small positive reading probability somewhere between the 0 for the screen-outs and the value chosen for the 1 out of 4 group. Similar sorts of adjustments can be made to the reading probabilities of the 1, 2, 3 and 4 out of 4 groups of respondents. For example, in the long-interval, latent structure model, it is quite reasonable to assume that not 100 percent, but somewhat fewer, of those claiming to have read 4 out the last 4 issues will actually have read an "average" issue over the course of the longer interval.

Using a model that allowed for a slight collapsing of the reading probabilities from both the 0 out of 4 and 4 out of 4 tails toward the 2 out of 4 center, we were able to "scale" the reading probabilities in such a way that the frequency-based estimate of total audience was unbiased in the sense described above, a substantial improvement over the 7.1 % bias in the literal model, while the standard relative error of prediction, 3.7%, was slightly lower than for the literal model's 4.3%.

Figure 2 below provides a frequency distribution and summary statistics of the relative prediction errors across the 72 publications analyzed for the latent structure model.

Figure 2
Relative Frequency Distribution of Relative Prediction Errors for
Latent Structure Model



Further analyses of these prediction errors revealed no evident bias by publication type or frequency.

We conclude therefore that frequency-based estimates are an acceptable alternative to issue-specific measurement when appropriate scaling of reading probabilities is applied.

Conclusion

The agreement between estimates based on the frequency of reading question and the previous issue-specific data was deemed to be highly satisfactory, and was endorsed by an almost unanimous vote of the Agricultural Research Committee.

This new approach is being considered for other categories of trade, technical and professional publications, which are often largely controlled - circulation; often characterized by irregular publication frequencies; often subject to potential confusion between titles; and amenable to a mail survey approach constituting "database audience research".

References

1. Lazarsfeld, Paul F. and Harry, Niel W. **Latent Structure Analysis**, esp Chapters 6 and 7, "Latent Structure Models with Continuous Latent Space: I and II",

Appendix

HOGS TODAY

6-5

7-5

PLEASE INDICATE YOUR ANSWER BY PLACING
A CHECK IN THE APPROPRIATE BOX ☐

- 1a Have you read or looked into **ANY ISSUE** of Hogs Today (either the issue shown on this page or **ANY OTHER ISSUE**), at home or anywhere else, in the last six months? (8)

Yes ☐ 1 (GO TO QUESTION 1b) No ☐ 2 (GO TO QUESTION 6)

- 1b Please indicate below how many of the last four issues of this publication you, yourself, have read or looked into:

None ☐ 0 One ☐ 1 Two ☐ 2 Three ☐ 3 Four ☐ 4 (9)

- 2 Pictured to the right is the cover of a recent issue of this publication. Have you read or looked into **THIS SPECIFIC ISSUE**? (PLEASE STUDY THE COVER CAREFULLY BEFORE ANSWERING)

Yes ☐ 1 (GO TO QUESTION 3a) No ☐ 2 (GO TO QUESTION 6) (10)

- 3a On how many different days would you say you have read or looked into the issue pictured to the right? (11/12)

Days _____ Hours _____ Minutes _____ (13/16)

- 4 Which, if any, of the actions listed below did you take after reading the issue pictured to the right? (17)

Cut out an advertisement ☐ 1 Visited a dealer for more information on an advertised product ☐ 4
Discussed an advertised product or service with someone else ☐ 2 None of these ☐ 5
Sent for more information about a product or service advertised ☐ 3

Please answer the questions below **NOT** just about the issue pictured here, but about this publication in general:

- 5a About how thoroughly do you usually read it? (PLEASE CHECK ONE BOX)

Usually read ☐ 1
All or nearly all ☐ 1
More than half ☐ 2
About half ☐ 3
Less than half ☐ 4
Little or none ☐ 5

5b Please rate how important this publication is to you in operating this farm or ranch. (PLEASE CIRCLE ONE NUMBER BELOW)

Very Important Average Not at all Important
10 9 8 7 6 5 4 3 2 1 0


- 6 Do you receive this publication regularly in the mail?

Yes ☐ 1 No ☐ 2 (20)

PLEASE GO TO NEXT PAGE

Hogs Today

A Farm Journal Publication OCTOBER 1992



Attorney helps farmers cope with environmental law

If Clinton wins

Breeder benefits from housing bears not sows

Checkoff plans for when promotion money is tight

Hundreds of new pork products to please consumers

Cost of production is down to the penny

COVER STORY

