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8.6 An approach to a magazine audience prediction model

OBJECTIVE

Among the tools of market surveys, repetitive surveys rank among the most important, at least in terms of money spent.

In this category are consumer and retailer panels, periodical surveys, advertising media readership surveys — and also polls on the popularity ratings of politicians. One of the main concerns of these repetitive surveys should be the ability to predict future results according to changes in time.

Unfortunately, the results of consecutive surveys do not truly reflect the real changes because the random error in the difference between two consecutive results is often higher than the change itself.

In the particular case of CESP* media surveys in France, which are used for the planning of advertising campaigns, every new report replaces the previous one in the data bank of media planners, just as the new rate card of a medium replaces the previous one which is no longer applicable.

The purpose of this paper is to show why this procedure is fallacious and to propose a better method for utilising the CESP results, a method for smoothing and predicting the data.

SYSTEMATIC ANALYSIS OF THE RESULTS OF PRESS SURVEYS, 1975-1981.

Between 1975 and 1981 the questionnaire was unchanged. This analysis follows, for all the publications in the survey, the series of their readership variations.

An average of 73% of the variations each year are not statistically significant and 53% of observed variations were followed in the next year by an opposite variation, as shown in **Table 1**. So we can say that the results of the latest available CESP survey are not very reliable data for media planning needs. Indeed, how can we build a plan for the year (t + 1) using estimates of the audiences for the year (t), when we know that most of these estimates vary in an inconsistent way from one year to another?

SYSTEMATIC ANALYSIS OF OWNERSHIP OF DURABLE GOODS — A FORMULA FOR SMOOTHING THE DATA

The idea we have followed is to see if the annual CESP surveys, which do not succeed in measuring reliably the changes of audiences, have better luck with changes in more concrete phenomena, such as ownership of durable goods.

The same analysis method as we have used for press audiences gives the results shown in **Table 2**. This shows clearly that the CESP results are perfectly consistent in respect of 16 durable goods categories in which the ownership rates, during the period studied, grew by more than 1% per year on average. And for 25 products (or characteristics) in which the change has been less perceptible, the CESP results often stay very acceptably consistent.

If we call P (between 0 and 1) the ownership rate of a product, we find that the variable

$$Y = Log \frac{P}{1-P}$$

is almost a linear function of time, as **Figure 1** shows.

A systematic application enables us to conclude that a very good estimate of P for the year (t + 1) is obtained by smoothing Y on the four latest known values of P, ie. years (t − 3), (t − 2), (t − 1), and (t) (this work was done by Henri Bergonnier).

The application of this method to the results of the four latest CESP surveys allows us to:
(a) obtain for the year of the *latest* survey a smoothed ownership rate, not very different from the observed one but more reliable;
(b) determine for the year of the *next* survey a projected rate, which can be somewhat different from the latest observed one and which is the extrapolation of the trend of the past four years.

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* ('Centre d'Etudes des Supports de Publicité' or Centre for Advertising Media Research).

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In fact, for all the products in growth markets this projected rate is a good prediction, whereas the usual practice, that of regarding the observed given rate as valid for the year (t + 1) is obviously incorrect (see **Figure 2**).

APPLICATION OF THE FORMULA TO MAGAZINE AUDIENCES

Figure 3 shows for 9 publications: the observed percentage figures of penetration; the smoothed figures; the projected figures.

We can see that the series of smoothed figures show less irregular variations than the series of observed values. The value obtained for the year (t) can generally be considered as a better estimate of the reality than the observed penetration of the surveys of the same year.

However, the differences between the smoothed figures of two consecutive years cannot be considered as the measure of the change that occurred. Nor can the projected penetration be considered as a prediction: it shows only what extrapolation of the trend of the latest four years would result in for the year (t + 1).

MAIN CONCLUSIONS

The final step is to ask ourselves what is the use of these smoothed data.

First of all they are useful for checking the quality of the CESP samples

The remarkable consistency of the results concerning the ownership of some durable goods is noteworthy, and proves that the yearly CESP surveys are able to perceive changes in penetration of about 1%.

However, the lesser regularity of the results concerning the place of living (farm, house, flat) seems to show that the samples need to be improved on these criteria.

They enable us to arrive at a better evaluation of the errors which affect the results for audiences

To the random error, which is easily calculable, we must add errors of observations. These can be deliberate or not. The deliberate lie may be an explanation of the answer to the questions about the age of equipment as well as about reading habits. But conversely, a genuine mistake is less probable when we ask:

"Is there a washing machine in your home — yes or no?"

than when we ask:

"Other than today, when is the last time you have personally read or flipped through a copy of *Marie France*, even if it is an old issue, whether at home or elsewhere?
Was it - less than 8 days ago
        - 8 to 15 days ago
        - 15 to 30 days
        - 1 to 3 months
        - 3 to 6 months
        - more than 6 months?"

Consequently the error which affects the measures of audiences is certainly much greater than the one which affects the other results, so that some variations of audiences seem to be significant when they are not.

They may enable space buyers to use sounder data for media planning needs

Furthermore, knowledge of the series of projected data, compared with that of smoothed data, makes it possible to appreciate the regularity of the change in readership for each publication and to see whether the projected audience for the year (t + 1) may be considered or not as a likely prediction.

They may allow media to reduce the risk of being unfairly penalized or favoured by incorrect results

The use of smoothed data is a way to eliminate a great deal of incorrect variations, and the consequences for media on advertising revenues .

Another advantage for publications is to show what is the general trend of the past years, and if necessary to undertake actions to affect this trend. Comparison between observed data and the initially projected data will measure the effect of these actions.

Finally, they may be useful for the development of audience forecasting

What delays this development is the fact that, if we want to test its quality, we must be able to compare a prediction for the year (t + 1) with an estimate, as accurate as possible, of the reality for the same year, which is only possible in the year (t + 3), with data preceding and following the year (t + 1). Now, in respect of 1982, we can only estimate accurately the reality for the years 1979 and 1980, which is not yet enough to test the quality of a forecasting model.

That is why our present contribution has been entitled 'an approach to a magazine audience prediction model'.

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TABLE 1
CESP: publication audiences

	1975	1976	1977	1978	1979	1980	1981	Average % total variations
Number of publications studied	86	86	91	97	100	103	108	
Number of variations observed		81	83	88	92	96	101	
Significant variations		19	41	19	12	25	32	27%
Variations followed by an opposite variation		50	47	46	50	40		53%

Source: CESP

TABLE 2
CESP: ownership of durables

	1976	1977	1978	1979	1980	1981	Average % of total variations
Products in growth markets	13	15	16	16	16	16	
Significant variations	7	14	15	10	13	16	82%
Cancelled variations	0	0	0	1	1	-	2%
Other products	18	19	25	26	25	25	
Significant variations	9	10	8	7	5	4	31%
Cancelled variations	8	9	5	10	10	-	37%

Source: CESP

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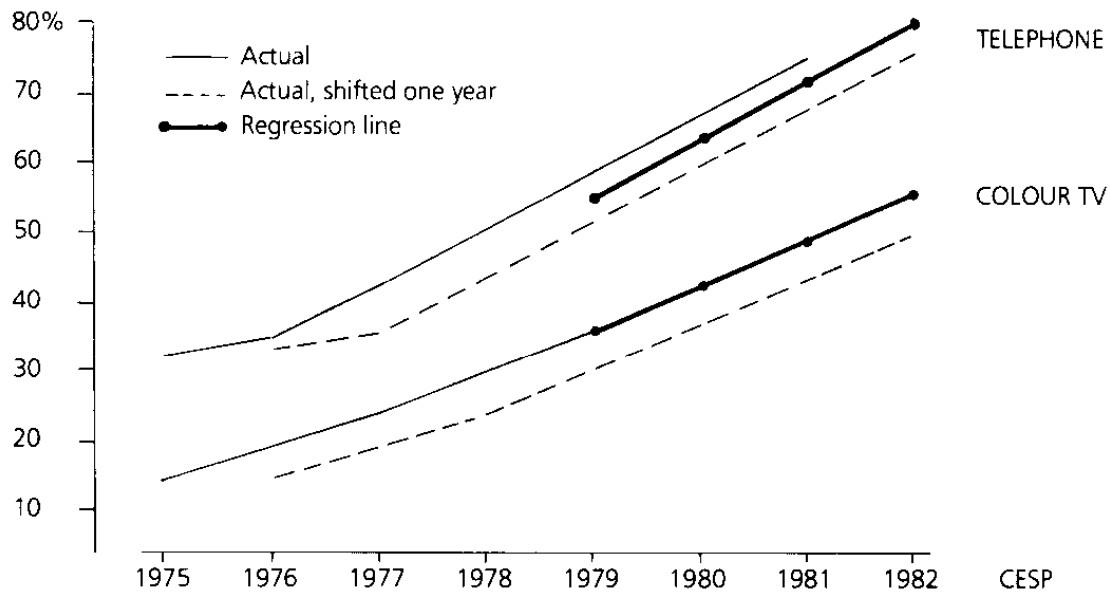
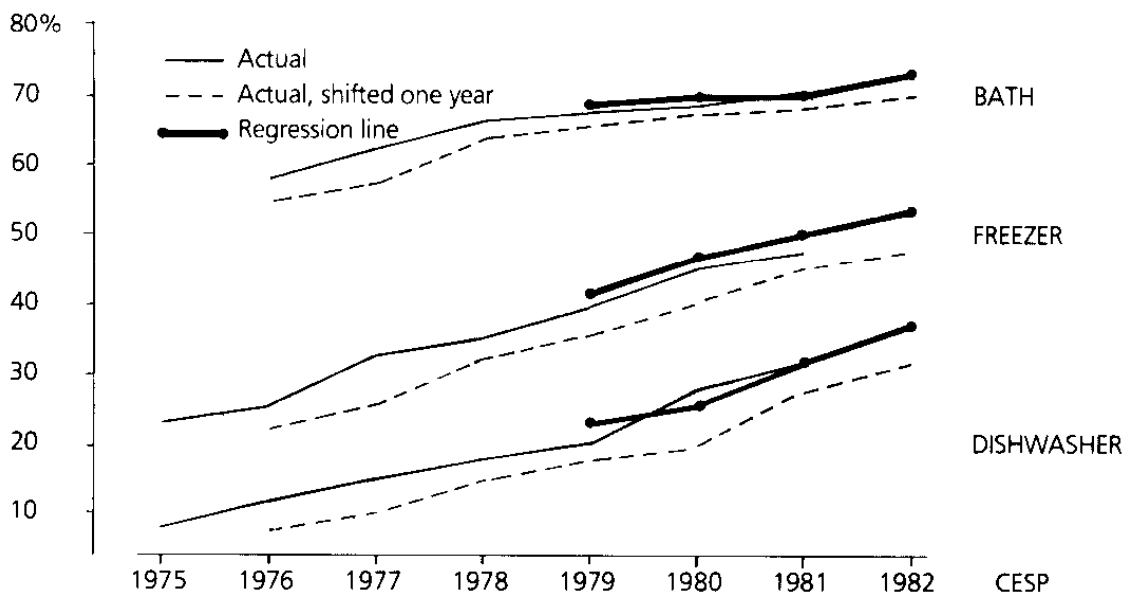**FIGURE 1**

Values of $\dfrac{p}{1-p}$
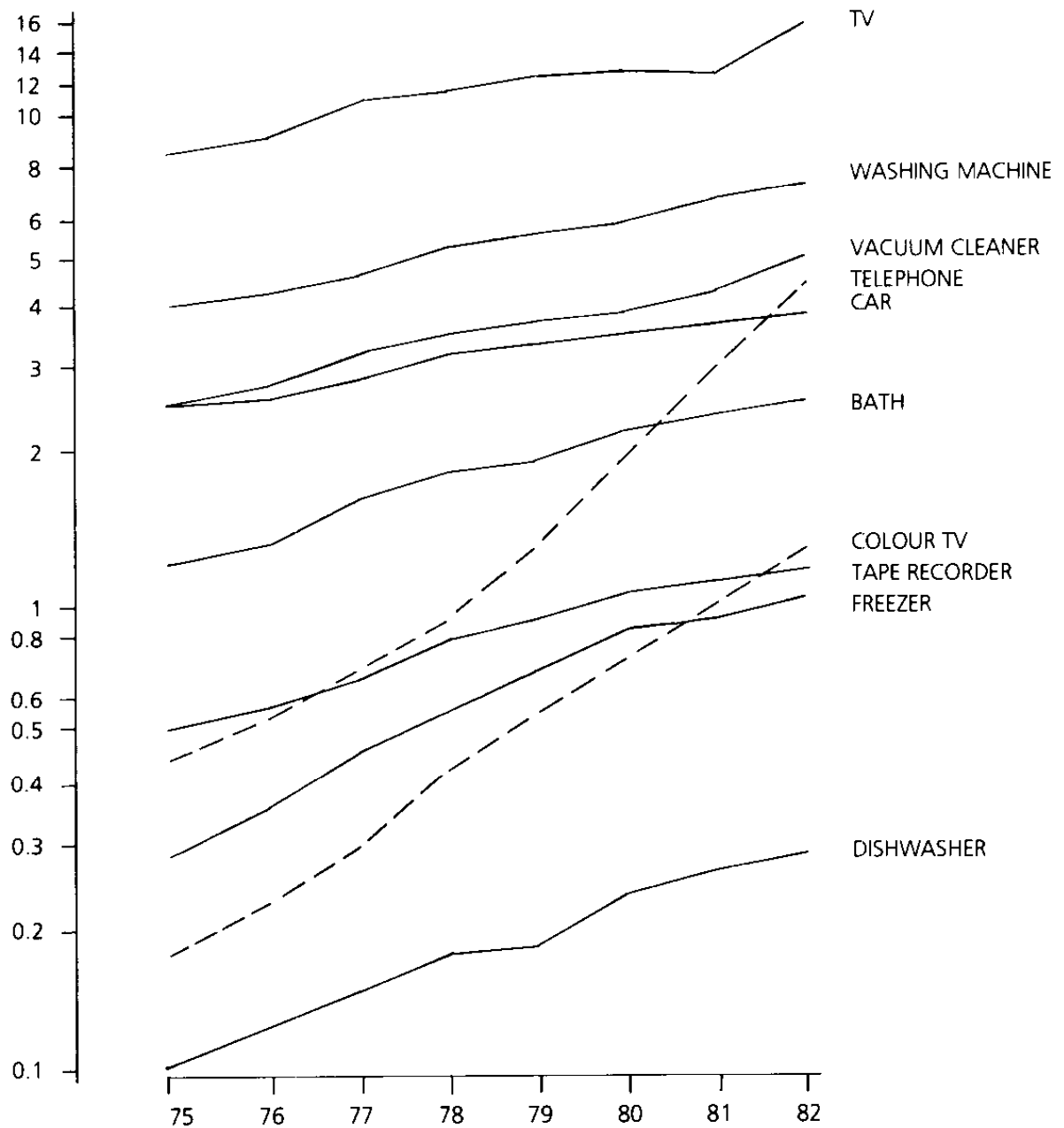
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FIGURE 2 (i)
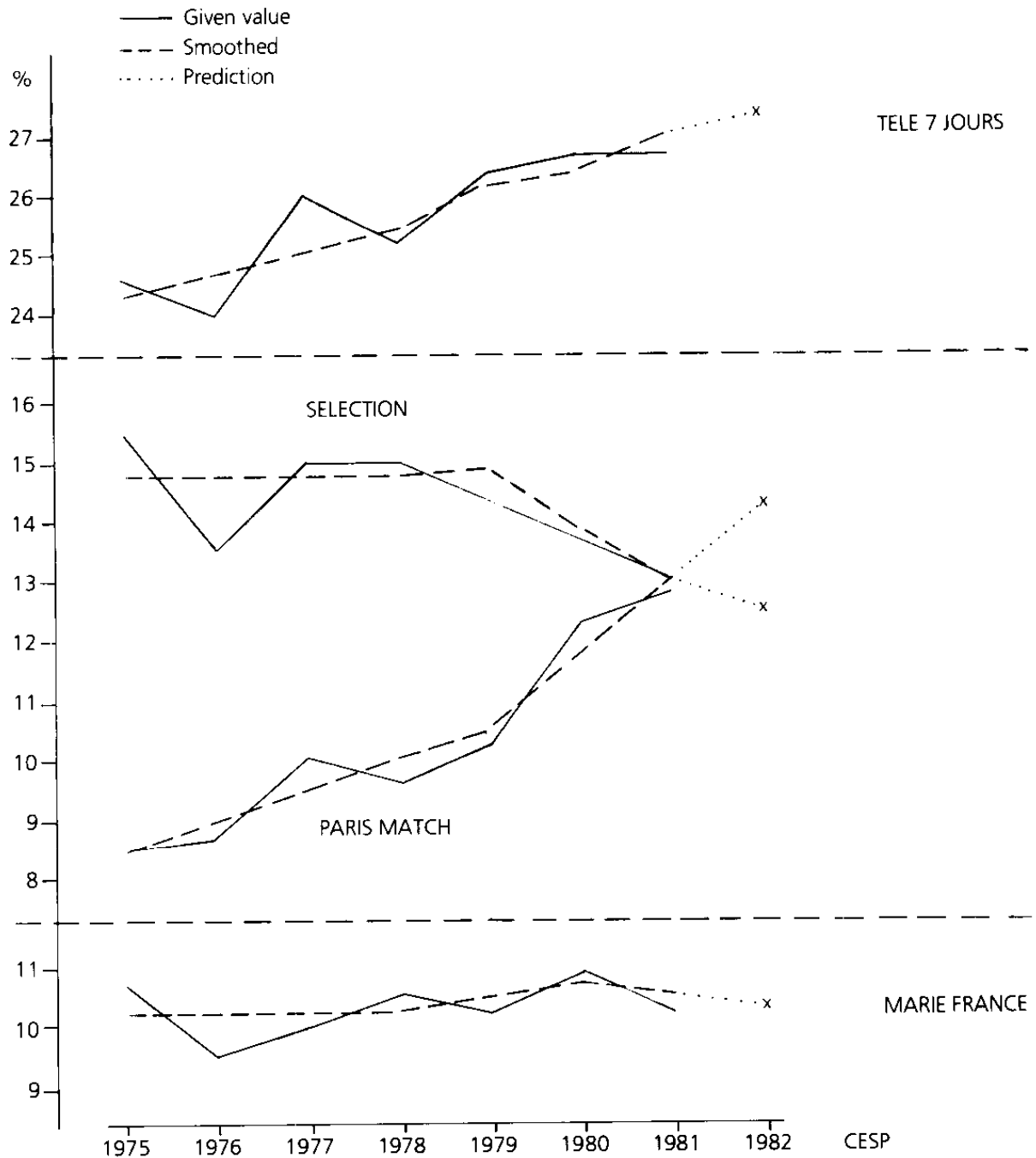**Growth of ownership rates**

FIGURE 2 (ii)
Growth of ownership rates

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FIGURE 3 (i)
Smoothing and prediction of audiences


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———— Given value
– – – Smoothed
· · · · · Prediction
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TELE 7 JOURS

SELECTION

PARIS MATCH

MARIE FRANCE

1975   1976   1977   1978   1979   1980   1981   1982   CESP

FIGURE 3 (ii)
Smoothing and predictions of audiences