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Advertising effectiveness in the South African motor industry

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ADVERTISING EFFECTIVENESS IN THE SOUTH AFRICAN MOTOR INDUSTRY

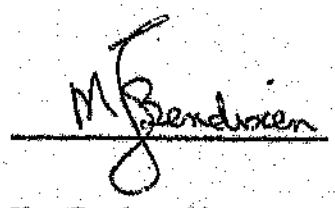
Michael Thomas Bendixen

A thesis submitted to the Faculty of Business Administration, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Doctor of Philosophy.

April 1991.

DECLARATION

I declare that this thesis is my own, unaided work. It is being submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.



M. T. Bendixen.

April 1991

ABSTRACT

This research was aimed at examining, in detail, advertising effectiveness in the South African Motor Industry over the period 1977 to 1985.

In examining previously used methodologies, significant theoretical deficiencies were found in both the econometric and time series approaches. The literature is sparse on the integration of the two approaches and an integrated model form was developed as the measuring instrument for this research.

As a consequence of the integrated model form, three distinct theoretical advertising effects were identified: viz:

- brand loyalty;
- current effects (simple and compound);
- carryover effects.

The inherent nature of these effects was related to the degree of involvement and the affective or cognitive aspects of the purchase decision. Consequently, the positioning of products on the FCB grid was used to hypothesise the type of advertising effect that could be expected. In addition, the Schultz and Wittink framework was used to hypothesise market advertising effects.

Application of the integrated model to a sample of motor industry data clearly indicated that advertising effects in the motor industry were characterised by:

- dominantly "current" effect forms;
- the presence of competitive effects;
- dominantly primary sales effects.

Further analysis of the data indicated that a strong negative exponential relationship existed between the extent to which a medium was used and the advertising effectiveness of that medium. This is indirectly supported by other research findings and by the law of diminishing returns and led to the following propositions:

(a) The creative devices and content of an advertisement determine whether or not that advertisement will be effective but not the magnitude of the effect.

(b) The magnitude of the effect of an advertisement is dictated by the extent to which the medium in which it is placed is used. The greater the extent of usage of the medium, the less the effectiveness of that medium.

Feedback, i.e. sales influencing advertising expenditure, was commonly found in the development of the models.

DEDICATION

This thesis is dedicated to Christine, Karen, Melanie and Peter for their tolerance and patience over the period of its completion and to Malcolm Button for his constant encouragement.

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CHAPTER 1

THE NATURE AND BOUNDS OF THE PROBLEM

1.1 THE RESEARCH PROBLEM

The purpose of this research was to measure advertising effectiveness for new passenger vehicles in the South Africa. In order for this problem to be solved, it was conveniently broken down into three separate sub-problems. The first sub-problem was that of developing a framework for the categorisation of advertising effects. The second sub-problem was that of developing a framework for the prediction of the type of advertising effect based on the characteristics of the product or service involved. The last sub-problem was that of developing a methodology for the measurement of advertising effect and advertising effectiveness.

The order in which these sub-problems were presented represents a logical sequence. However, in terms of the development process itself, the measurement methodology was a source of development for the other sub-problems and was therefore the chronological starting point.

1.2 BACKGROUND TO THE PROBLEM

The Motor Vehicle Industry represented the second biggest category of advertising in the South African market during 1987 (10,7% of spend), surpassed only by Chain Stores &

Retailers (20,8% of spend) and ahead of Financial Institutions (8,4% of spend). The relative size and importance of motor vehicle advertising expenditure in the various media is summarised in Table 1.1 below.

Table 1.1
Advertising Expenditure in the Motor Vehicle Industry

Medium	1987 Spend (R millions)	Share of Medium	Rank
Television	28,4	9,2%	4
Daily Newspapers	31,9	16,4%	2
Weekend Newspapers	10,3	12,8%	3
City & Suburban Press	8,3	13,8%	2
Consumer Magazines	14,5	11,8%	1
Trade & Technical	7,7	10,9%	3
Black Print	0,9	2,6%	11
Radio	6,7	5,6	6
Cinema	0,2	1,6%	9
Outdoor	1,2	4,2%	7
All Media	110,1	10,7%	2

(Source: Adindex, MRA)

The absolute amounts of money involved are large indicating the importance of a detailed understanding of advertising effectiveness. This understanding would contribute significantly to the productivity of motor vehicle manufacturers in terms of the effective allocation of their marketing budgets. It would also contribute significantly to advertising agencies in terms of objectively measuring the effectiveness of the primary service that they provide.

1.3 THE PURPOSE OF ADVERTISING

Advertising represents an important means by which organisations communicate with their customers, both current and potential. The specific objectives of an advertising campaign may adopt many forms, e.g.:

- to create awareness of a new product or brand;
- to inform customers of the features and benefits of the product or brand;
- to create the desired perceptions of the product or brand;
- to create a preference for the product or brand;
- to persuade customers to purchase the product or brand.

Such objectives are all aimed at a higher purpose of enhancing the buyers' response to the organisation and its offerings so as to achieve profitable sales in the long run.

1.4 THE HIERARCHY OF EFFECTS MODEL

Many advertising models were developed during the early 1960's, mostly tailored on the Lavidge and Steiner (1961) hierarchy of effects model. This model proposes that consumers who purchase a product move through a sequential hierarchy from awareness, through knowledge, liking, preference,

conviction and ultimately to purchase. This model recognises three distinct stages of response to advertising:

Cognitive stage:	Awareness and knowledge
Affective stage:	Liking and preference
Behaviour stage:	Conviction and purchase.

While most of the audience who have the opportunity to see and/ or hear advertising may reach the cognitive stage, fewer will achieve the affective stage and fewer still the behaviour stage. This model resulted in the development of the "brand loyalty ladder" which assumes five fundamental stages in the communication process. This is illustrated in Figure 1.1 below (adapted from McDonald [1984]).

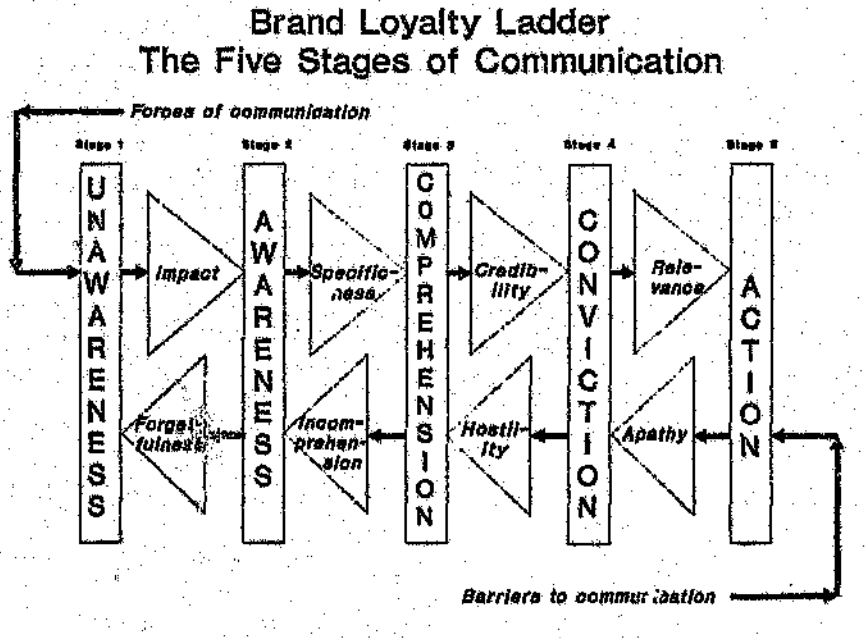


Figure 1.1

1.5 ADVERTISING EFFECTIVENESS

The careful advertiser will attempt to measure the extent to which a particular advertising campaign achieves communication objectives and measurement usually takes the form of either qualitative or quantitative marketing research. In most instances, the earlier stages of communication are assessed via intermediary variables, e.g.:

Stage	Variables
Awareness	Impact, recall
Comprehension	Interpretation of message, difficulty in understanding, perceived image
Conviction	Credibility, alienation, familiarity.

This type research is often supplemented with questions about the consumers' intention to purchase the advertised brand or product. However, these measures are notoriously poor predictors of the actual behaviour stage. While these measurements play a vitally important role in the control of the advertising process, they leave a serious gap in the measurement of true advertising effectiveness. To this end, the actual sales of the product, or surrogate variables such as market share, may be regarded as the only true reflection of the behaviour stage of the communication process. Thus,

advertising effectiveness measurement is concerned with the quantitative description and in rpretation of the advertising sales response function. In addition, partly as a result of the fact that sales and advertising statistics are typically aggregated for monthly intervals, the measurement of advertising effectiveness relates to the long term rather than to specific campaigns.

1.6 MEASUREMENT ISSUES

While it is relatively simple to clarify what is to be measured when studying advertising effectiveness, the quantification of the relationship, between advertising and sales for instance, seems likely to be fraught with problems despite the formidable arsenal of statistical techniques available to the modern analyst. The following is a list of the most apparent problems that may be encountered.

1. The relationship can be expected to be of a complex form involving lag structures in the presence of auto-correlation in both the dependent (sales) and independent variables (advertising expenditure).

2. Advertising expenditure is but one of many micro- and macro-economic variables that may influence sales.

3. The possibility of reverse causality is a real one, i.e. advertising expenditure may influence sales, but sales levels may in turn influence the level of advertising expenditure.

4. Other macro-economic effects, such as the business cycle or inflation, may dominate the behaviour of the variables being studied. On the one extreme this may result in the development of inappropriate models and on the other result in conditions of spurious independence.

5. Advertising may be used for tactical marketing gains. Individual advertising campaigns may thus be short lived and possibly out of character with the mainstream of communications effort directed at the product. This may result in a dynamically unstable relationship

between advertising and sales.

6. Different advertising media may be used for different tactical and strategic reasons. Also, the relative importance and significance of the various media may change with time. Thus, changes in media mix may result in changes in the structural relationship between advertising and sales over time.

1.7 "QUO VADIS"

The scenario thus far described is characterised on the one hand by the intrigue of unravelling, and thus shedding some light on, the relationship between advertising and sales and on the other hand by the danger of entering a statistical minefield. The rationale for pursuing research in this area stems from the statements of two earlier studies in the field: Leone (1983, p291):

> "Since Palda's pioneering work investigating the dynamic relationship between sales and advertising, the marketing literature has contained many articles on the topic of sales response model building."
> "Recent applications of multivariate time series extensions of the work by Box and Jenkins have shown the usefulness of this methodology in building sales response models."

These encouraging words seem to indicate that at least portions of the minefield have been explored and some of the possible dangers overcome or at least reported.

Assmus, Farley, and Lehman (1984, p73):

> **"..... more studies are needed for relatively new products, in locations other than the U.S. and Europe, and for products other than packaged goods - e.g. durable goods and industrial products."**

The South African market for new passenger vehicles appears to meet these criteria adequately. Besides being located outside the first and new world economies, passenger vehicles are a durable good with significant private, public and individual purchasing segments.

CHAPTER 2

SIGNIFICANT PRIOR RESEARCH INTO THE MEASUREMENT OF ADVERTISING EFFECTIVENESS

2.1 INTRODUCTION

Advertising effectiveness modelling has developed along two distinctly different courses, viz. the traditional econometric approach and the time series analysis approach. Leone (1983, p291) summarises the position as follows:

> "Until recently, the two groups were viewed as competitors. The pure econometricians were concerned with the relationships between variables and constructed their models on the basis of some economic theory, whereas the time series analysts initially used unconstrained univariate models on a single series and investigated primarily the time structure. This distinction has changed with the introduction of multivariate time series analysis and the realization by some econometricians that they can improve model building by combining the better aspects of the two methods and integrating the two approaches."

In order to exploit the best of both worlds, it is necessary to examine the historical development of both approaches.

2.2 THE ECONOMETRIC APPROACH

Palda (1964) is recognised as the pioneer in the field of advertising effectiveness modelling when he applied the Koyck (1954) specification of the distributed lag effect of

advertising on sales. This model adopts the following form:

$$S_t = a + b(A_t + \lambda A_{t-1} + \lambda^2 A_{t-2} + \ldots\ldots) + e_t \qquad (1)$$

where:

S_t = sales during period t

A_t = advertising expenditure during period t

λ = geometric decay constant

e_t = normally distributed error term for period t

a,b = constant parameters of the model.

A simple manipulation allows equation (1) to be expressed in the following reduced form:

$$S_t = (1-\lambda)a + \lambda S_{t-1} + A_t + e_t - \lambda e_{t-1} \qquad (2)$$

The geometric decay or "carryover" aspect of this model was lent credence by several behavioral theories, such as those of Lavidge and Steiner (1961), Kuehn, McGuire and Weiss (1964) and Dean (1966). As a consequence, the model stimulated substantial research over a wide range of product categories. Clarke (1976) reviewed published studies in which the geometric decay constant was measured for products ranging from fast moving consumer goods through alcoholic beverages and airline market share. He established from a theoretical basis, supported by substantial empirical evidence, that the

length of the data interval (e.g. weekly or annual data) was responsible for a significant bias in the estimate of the geometric decay constant. This data interval bias remains a topic of considerable interest to researchers in the field, e.g. Srinivasan and Weir (1988).

The form of the lag structure was also the subject of investigation. Bass and Clarke (1972) and Montgomery and Silk (1972) included additional lagged terms to the simple geometric lag model. Mann (1975), Weiss, Houston and Windal (1978) and Bultez and Naert (1979) studied the possib lities of a Pascal lag structure while Ward (1976) introduced a generalised polynomial lag structure.

Clarke and McCann (1972) challenged Palda's (1964) original empirical results demonstrating the carryover effects of advertising. They showed that the "current effects" hypothesis could not be rejected in favour of the "carryover effects" hypothesis. The current effects model adopts the form:

$$S_t = a + bA_t + e_t \qquad (3)$$

The protagonists of these two diverse theories conducted an academic battle for some time which resulted in a compromise model, incorporating both effects, being developed. Griliches (1967) developed a test to distinguish between the basic forms

of these two models. This test was extended by Bass and Clarke (1972), Clarke (1976) and Parsons and Schultz (1976) to incorporate variations on the basic model forms and "generalised" by Weiss and Windal (1980). The latter researchers propose the following advertising effectiveness model form as being useful because all the common models are nested into it:

$$S_t = \frac{bA_t}{(1-\lambda B)} + \frac{e_t}{(1-\alpha B-\beta B^2)} \qquad (4)$$

where B, the backshift operator, operating on a time series X_t, is defined by:

$$B^n X_t = X_{t-n} \qquad (5)$$

The commonly used models are as follows:

Current effects model:

where: $\alpha=\beta=\lambda=0$

$$S_t = bA_t + e_t$$

Current effects auto-regressive model:

where: $\beta=\lambda=0; \alpha\neq 0$

Geometric lag model:

$$S_t = bA_t + \frac{e_t}{(1-\alpha B)}$$

where: $\alpha = \beta = 0, \lambda \neq 0$

$$S_t = \frac{bA_t}{(1-\lambda B)} + e_t$$

Geometric lag auto-regressive model:

where: $\alpha \neq 0, \beta = 0, \lambda \neq 0$

$$S_t = \frac{bA_t}{(1-\lambda B)} + \frac{e_t}{(1-\alpha B)}$$

Partial adjustment or brand loyal model:

where: $\alpha = \lambda \neq 0, \beta = 0$

$$S_t = \frac{bA_t}{(1-\lambda B)} + \frac{e_t}{(1-\lambda B)}$$

Auto-regressive partial adjustment model:

where: $\alpha \neq 0, \beta \neq 0, \lambda \neq 0$

$$S_t = \frac{bA_t}{(1-\lambda B)} + \frac{e_t}{(1-\alpha B-\beta B^2)}$$

The auto-regressive terms in the econometric models may create substantial problems in the estimation of the parameters. In addition, the assumption of normally distributed error terms assumes that no other variables besides advertising expenditure have any influence on sales. These both represent severe limitations to the econometric approach to advertising effectiveness modelling.

2.3 THE TIME SERIES APPROACH

The times series approach to advertising effectiveness modelling was pioneered by Helmer and Johansson (1977). They recognised that the underlying logic of transfer function analysis as developed by Box and Jenkins (1970) was ideally suited to modelling the advertising - sales relationship. The bivariate Box - Jenkins transfer function adopts the following form:

$$S_t = v_0 A_t + v_1 A_{t-1} + v_2 A_{t-2} + \ldots\ldots + N_t \qquad (6)$$

where:

v_i = impulse response parameters

N_t = noise term accommodating the effect of other variables outside the model as well as normally distributed random error.

This model may be written in the more parsimonious polynomial form:

$$S_t = \frac{\omega_s(B)}{\delta_r(B)} A_{t-m} + \frac{\theta(B)}{\phi(B)} e_t \qquad (7)$$

where:

$$\omega_s, \delta_r, \theta, \phi$$

are polynomials in B, adopting the following form:

$$\omega_s(B) = \omega_0 - \omega_1 B - \omega_2 B^2 - \ldots\ldots$$

$$\delta_r(B) = 1 - \delta_1 B - \delta_2 B^2 - \ldots\ldots$$

$$\theta(B) = 1 - \theta_1 B - \theta_2 B^2 - \ldots\ldots$$

$$\phi(B) = 1 - \phi_1 B - \phi_2 B^2 - \ldots\ldots$$

The values of r,s and m specify the order of the transfer function.

Hanssens (1980a) demonstrated that this approach was limited in that it did not allow for feedback effects, i.e. advertising expenditure affecting sales and sales simultaneously affecting advertising expenditure. The more generalised Granger and Newbold (1977) modelling approach was necessary to accommodate these simultaneous relationships.

Numerous empirical studies followed using multivariate time series analysis, including intervention analysis. The studies of Bass and Pilon (1980), Hanssens (1980b), Moriarty and Salamon (1980), Jacobson and Nicosia (1981), Aaker, Carman and Jacobson (1982), Leone (1983), Didow and Franke (1984), Krishnamurthi, Narayan and Raj (1986) and Hooley, Wilson and Wigodsky (1988) are significant in this regard.

Besides the handling of the error term and the robust estimation procedures, the unconstrained format of transfer function models of the advertising - sales relationship distinguishes them from econometric models. While this unconstrained format is useful from an empirical viewpoint, the theoretical basis of the resulting model forms may be readily challenged as being without theoretical foundation.

2.4 CONCLUSIONS

The theoretical appeal of the econometric models and the flexible form and robust estimation procedures of the transfer function models make their combination seem ideal. Leone's (1983) proposition for the integration of the procedures, as quoted in section 2.1, has until recently largely been unrealised, except in the extension of the time series approach to multivariate rather than univariate models. Hooley, Wilson and Wigodsky (1988, p52) recognise the potential of this combination of procedures and propose the

following approach:

> "Under our approach, termed ADTRAC (ADvertising TRACking) the Box - Jenkins ARIMA method is used for identifying and estimating a univariate model of the dependent variable (sales) and if necessary the independent variable [(advertising)]. The resulting error terms from the pre-whitened variables are then modelled using OLS or some non-linear regression estimator. This we refer to as the noise model."

In fact, the "noise model" developed under this approach is used to forecast the error term in the univariate ARIMA model for sales. While this represents a significant step toward the integration, it is lacking in the theoretical treatment of possible advertising effects. Broadbent (1988) and OHerlihy (1988), traditional econometric modellers, have severely criticised this latter work, demonstrating that the perennial rift between econometric and time series modellers persists.

CHAPTER 3

TOWARD AN INTEGRATED MODEL

3.1 THE AIM

It is apparent from Chapter 2 that the integration of the theoretical aspects of econometric models and the methodological aspects of time series models would represent the best of both worlds. The aim of this chapter is to propose a model form that integrates both approaches to the modelling of advertising effectiveness.

3.2 BIVARIATE MODEL BUILDING WITH UNIDIRECTIONAL CAUSALITY

This section follows and extends the model-building procedure developed by Granger and Newbold (1977, p230-244). Consider a generalised single equation transfer function model describing the influence of advertising on sales:

$$S_t = \frac{\omega_s(B)}{\delta_r(B)} A_{t-m} + \frac{\theta(B)}{\phi(B)} e_t \qquad (8)$$

The problem of spurious correlation makes it hazardous to identify the orders r,s and m of this model from the cross correlogram of the raw data. This is overcome by filtering (i.e. pre-whitening) the variables S_t and A_t by their own univariate ARIMA models. Assume that these ARIMA models are of

the form:

$$S_t = \frac{\theta_S(B)}{\phi_S(B)} e_{S,t} \qquad (9)$$

and

$$A_t = \frac{\theta_A(B)}{\phi_A(B)} e_{A,t} \qquad (10)$$

The traditional approach is then to identify a model linking the residuals from the univariate models, i.e.

$$e_{S,t} = \frac{\omega^*(B)}{\delta^*(B)} e_{A,t-m} + \frac{\theta^*(B)}{\phi^*(B)} e_t \qquad (11)$$

This will establish the true form of the relationship between advertising and sales. By manipulating this equation Granger and Newbold showed that:

$$\delta^*(B) = \phi^*(B)$$

and

$$Order[\theta^*(B)] \leq MaximumOrder[\delta^*(B), \omega^*(B)]$$

Equation (11) can thus be written in the simplified form:

$$\delta^*(B)\, e_{S,t} = \omega^*(B)\, e_{A,t-m} + \theta^*(B)\, e_t \qquad (12)$$

Once this model has been identified and the parameters estimated, attention can again be focused on the form of the original transfer function model, equation (8). Substituting equations (9) and (10) into equation (12) yields:

$$\omega_s(B) = \omega^*(B)\phi_A(B)\theta_S(B) \tag{13}$$

$$\delta_r(B) = \delta^*(B)\phi_S(B)\theta_A(B) \tag{14}$$

$$\theta(B) = \theta^*(B)\theta_S(B) \tag{15}$$

$$\phi(B) = \delta^*(B)\phi_S(B) \tag{16}$$

The parsimony of the transfer function model defined by these four equations immediately comes into question. However, cancellation of identical factors in the ratio of these polynomials reduces the effective number of parameters. Additionally, when the polynomials are multiplied, several of the parameters are likely to be very small and probably statistically insignificant on estimation. Both of these effects will ensure the necessary parsimony of the transfer function model.

3.3 ECONOMETRIC INTERPRETATION OF THE BIVARIATE MODEL FORM

The interpretation of the time series model developed in the previous section in terms of the generalised econometric model (equation (4) of Chapter 2) is fundamental to the integration of the two approaches.

3.3.1 Pure Delay

A comparison of the forms of equations (4) and (12) predicates that m=0, i.e. the econometric model form does not allow for a pure delay before advertising has any effect. This is of little consequence for many fast-moving consumer goods where advertising effects are likely to be instantaneous because of short periods involved in the purchase decision. Semi-durable and durable goods as well as certain services are characterised by a considered purchase decision and therefore a pure delay before advertising has any effect. The pure delay term may also be of considerable significance when studying the advertising effects of different media. For instance, television and magazine advertising are often only used for long-term brand building. In contrast, newspaper advertisements are often used for short-term promotions.

For the reasons cited above, it would therefore be more appropriate for a pure delay term to be included in an integrated model.

3.3.2 Moving Average Noise Term

Again comparing equations (4) and (12), the econometric model requires that:

$$\theta^*(B) = 1$$

This is difficult to interpret meaningfully but it can be seen as being unnecessarily restrictive. An integrated model should allow greater complexity in this term as predicated by the data. The inclusion of this term at least has mathematical significance while the inclusion of auto-regressive terms in the econometric models is a matter of convenience.

3.3.3 Allowed Model Forms

Only two of the commonly used econometric models (listed in Chapter 2) are nested into equation (12), viz. the current effects model where:

$$\alpha=\beta=\lambda=0$$

or

$$\delta^*(B)=\theta^*(B)=1$$

$$\omega^*(B)=b$$

and the brand loyal or partial adjustment model where:

$$\alpha=\lambda\neq 0, \beta=0$$

or

$$\delta^*(B) = 1 - \lambda B$$

$$\theta^*(B) = 1$$

$$\omega^*(B) = b$$

This is, at first, a surprising finding indicating an inadequacy in one or both of the approaches and/ or an incompatibility in the model forms.

3.4 DEVELOPMENT OF AN INTEGRATED MODEL

The theoretical appeal of the econometric model forms hinges on the distinction between three generic advertising effects, viz. brand loyalty, current effects and carryover effects of advertising. Any integrated model should accommodate these three effects and possible combinations of these effects.

3.4.1 Brand Loyalty

The momentum of prior sales or the habitual buying patterns of consumers give credence to a brand loyal model. In an advertising context, it may be argued that current sales are inherently related to prior sales and advertising is irrelevant. Hence, a pure brand loyal model requires that:

$$\omega^*(B) = 0$$

i.e. sales are best described by a univariate model and not a bivariate model which incorporates advertising as an independent variable. The nature of brand loyalty can be established from the form of the univariate model. An auto-regressive (AR) model would indicate short-term brand loyalty where sales are driven by the momentum of previous sales at small lags. A moving average (MA) model would imply long-term brand loyalty as a consequence of the infinite memory property of MA models. A mixed ARMA model would indicate the presence of both long and short term brand loyalty. When a univariate random walk or martingale is the most appropriate model form, neither advertising nor brand loyalty effects are present.

This latter proposition regarding brand loyalty implies that the econometric brand loyal or partial adjustment model is in fact a misnomer as the equation contains an advertising term.

3.4.2 Current Effects

There is an exact correspondence between the econometric and time series model for simple current effects, as noted in section 3.3.3. However, this simple model probably verges on naivety. If one distinguishes current effects by the lack of any decay pattern in the distributed lag structure, then current effects must be able to accommodate effects beyond the current period. This factor was recognised by econometric modellers as early as 1976 when Clarke (1976) included an

additional current effects term in his test equation. It is proposed, for the sake of parsimony, that:

$$Order[\omega^*(B)] \leq 2$$

Hence:

$$\omega^*(B) = \omega_0 - \omega_1 B - \omega_2 B^2 \qquad (17)$$

Note that not all of the parameters of this equation need be significant for current effects to be present. Models of this form will be classified as displaying <u>simple</u> current effects when:

$$Order[\omega^*(B)] = 0$$

and <u>compound</u> current effects when:

$$Order[\omega^*(B)] \geq 1$$

<u>3.4.3 Carryover Effects</u>

Palda's (1964) specification of the Koyck (1954) geometric lag model is equivalent to setting the order of $\delta^*(B)$ at 1.

More complex carryover effects, including sinusoidal exponential decay, can be accommodated by increasing the order of this polynomial to 2, and for the sake of parsimony it

seems sensible to restrict the order to this level. Hence:

$$\delta^*(B) = 1 - \delta_1 B - \delta_2 B^2 \qquad (18)$$

Note that is not necessary for both of the parameters in this equation to be significant.

3.4.4 Final Model Form

$\delta^*(B), \omega^*(B)$ are both second order polynomials, hence, the maximum order of $\theta^*(B)$ is also 2, i.e.

$$\theta^*(B) = 1 - \theta_1 B - \theta_2 B^2 \qquad (19)$$

Again, note that it is not necessary for both the parameters in this equation to be significant. Combining equations (17), (18) and (19) into equation (12) and allowing for a pure delay in advertising effect for the reasons put forward in section 3.3.1, the final model form is:

$$(1 - \delta_1 B - \delta_2 B^2)\, e_{S,t} = (\omega_0 - \omega_1 B - \omega_2 B^2)\, e_{A,t-m} + (1 - \theta_1 B - \theta_2 B^2)\, e_t \qquad (20)$$

3.5 BIVARIATE MODEL BUILDING WITH FEEDBACK

When there is reverse causality or feedback, i.e. advertising influences sales and sales influences advertising, a

simultaneous equation approach is necessary. The Granger and Newbold (1977,p244-245) procedure requires that the sales and advertising time series be pre-whitened by their respective univariate ARIMA models and the following simultaneous equation system be estimated:

$$e_{S,t} = \frac{\omega_1(B)}{\delta_1(B)} e_{A,t} + \frac{\theta_1(B)}{\phi_1(B)} e_{1,t}$$

$$e_{A,t} = \frac{\omega_2(B)}{\delta_2(B)} e_{S,t} + \frac{\theta_2(B)}{\phi_2(B)} e_{2,t} \qquad (21)$$

Unfortunately, unlike the case of unidirectional causality, no simplification exists in terms of the relationship between various noise polynomials. In addition, this model form is both difficult to estimate and to interpret. This is compounded by the current lack of any theory base covering the influence of sales on advertising.

It is therefore proposed that the possibility of feedback be accommodated in a single equation representation of the form:

$$(1-\delta_1 B-\delta_2 B^2)\, e_{S,t} = (\omega_0-\omega_1 B-\omega_2 B^2)\, e_{A,\,t-m+n} + (1-\theta_1 B-\theta_2 B^2)\, e_t \qquad (22)$$

where a value of n>0 would indicate the presence of feedback. The terms of the polynomial with orders up to and including n would represent the feedback portion of the relationship while

the higher order terms would represent causality in the usual sense. This approach is similar in concept to the modelling technique used by Leskinen and Terasvirta (1976 and 1977) for the estimation of dynamic price elasticities.

3.6 MODEL INTERPRETATION

Time series modellers have traditionally used the transfer function model relating the original sales and advertising variables (equation 8) to interpret the advertising response function, e.g. Helmer and Johansson (1977) and Leone (1.83). However, the form of equations (13) and (14) indicate that this transfer function is related to both the form of the transfer function between the filtered residuals and the univariate filters used to generate the residuals. Thus, in order to interpret the pure advertising response function, free from the possible influence of other variables, it is the transfer function relating the filtered residuals, i.e. equation (22), that should be interpreted.

CHAPTER 4

FRAMEWORK FOR ADVERTISING EFFECT

4.1 INTRODUCTION

The integrated econometric - time series model developed in Chapter 3 allows three generic forms of advertising effectiveness, viz. brand loyalty, current effects and carryover effects. While this is useful, it lacks any framework to predict under what circumstances these different effects can be expected. Also, these are consumer behaviour effects and other market effects may also be present, e.g. the effects of competitive advertising. This chapter will focus on these issues.

4.2 THE FCB GRID

Besides the consumer behaviour models discussed in Chapter 1, four traditional theories of advertising effectiveness, prevalent in the 1950's, are still part of the marketing literature. Vaughn (1980, p28) summarises these as follows:

> "Economic - a rational consumer who consciously considers functional cost-utility information in a purchase decision.
>
> "Responsive - a habitual consumer conditioned to thoughtlessly buy through rote, stimulus-response learning.
>
> "Psychological - an unpredictable consumer who buys compulsively under the influence of unconscious thoughts and

indirect emotions.

> "Social - a compliant consumer who continually adjusts purchases to satisfy cultural and group needs for conformity."

During the late 1970's, after research had failed to verify the hierarchy of effects models, two significant new theories emerged, not models per se but rather explanations of conflicting results from consumer research. Rothschild (1979) developed the consumer involvement theory which suggests that products and services lie on a continuum of consumer interest. Vaughn (1980, p29) summarises this theory as follows:

> "On the high side are those [products and services] that are important in money cost, ego support, social value or newness; they involve more risk, require paying more attention to the decision and demand greater use of information. Low involvement decisions are at the other extreme; they arouse little consumer interest or information handling because the risk is small and effort can be reduced accordingly."

Davis (1978) applied the theory of the specialised functions of the left and right cerebral hemispheres to explain the selective perception of communication messages by consumers. Vaughn (1980, p30) summarises as follows:

> "The left side is relatively more capable of handling linear logic, language and analysis - in short, the cognitive (thinking) function. The right side is more intuitive, visual and engages in synthesis - the affective (feeling) function. The implication: advertising response will vary depending upon the thinking or feeling communication task involved."

Foote, Cone & Belding Communications Inc. (FCB) explored and developed a comprehensive communication model integrating the traditional, hierarchy of effects, consumer involvement and brain specialisation theories. The so called FCB model as described by Vaughn (1980, 1986) is illustrated in Figure 4.1 overleaf.

4.3 POSITIONING THE ADVERTISING EFFECTS

The task now remains to integrate the consumer advertising effects into this model. The LEARN - FEEL - DO categorisation in this model is central to this development. The "Habitual" and "Satisfaction" quadrants are both characterised by the behavioral stage (DO) preceding either the affective (FEEL) or the cognitive (LEARN) stages. This corresponds closely to the brand loyal effect described in section 3.4.1 and it is proposed that products and services that are positioned in the lower reaches of these two quadrants are most likely to display a brand loyal effect. Conversely, the real advertising effects, i.e. current and carryover effects, are most likely

The FCB Grid

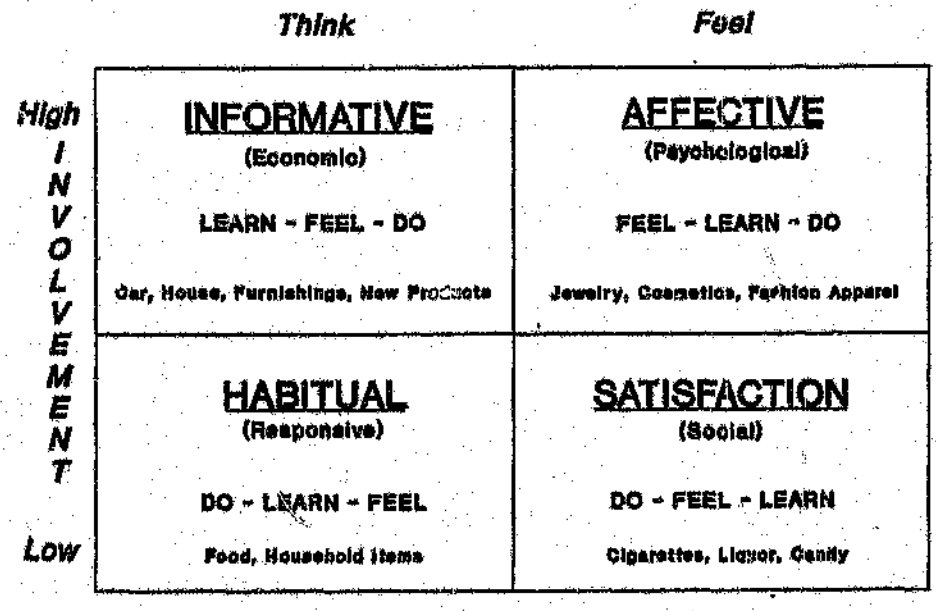


Figure 4.1

to be found in the remainder of the matrix. In order to distinguish between current and carryover effects, it is necessary to examine the involvement dimension. The greater the extent of consumer involvement, the greater the length of time it takes to make the purchase decision and the less frequently the product or service will be purchased. A more considered decision implies that potentially brand loyalty can be overcome on the basis of rational or emotional rhetoric. This in turn implies that current effects are most likely to be found in the upper reaches of the "Informative" and "Affective" quadrants. The central band on the involvement dimension, spanning all four quadrants, implies relatively

frequent purchases that demand some consideration. It is in this region that carryover effects are most likely to be found.

These propositions as to where the various advertising effects can be expected on the FCB grid are illustrated in Figure 4.2 overleaf.

4.4 MARKET ADVERTISING EFFECTS

Schultz and Wittink (1976, p71-72) established an analytical framework for assessing the nature of different market advertising effects. They initially distinguish between primary and selective advertising:

> "Primary advertising is defined as the effort expended by the collective firms in an industry either as an ad hoc attempt or systematically through a trade association for the express purpose of increasing primary demand by means of mass communication.
>
> "Selective advertising is defined as the effort expended by individual companies to influence sales for a brand or for the firm by means of mass communication."

Selective advertising is further categorised into primary sales, primary demand and competitive advertising effects, defined as follows:

"When the effect of a brand's advertising is to increase its own sales without affecting competitive sales, we call this the primary sales effect of selective advertising. When the effect of a brand's advertising is to increase its own sales and that of its competitors, we call this the primary demand effect of selective advertising. In addition, the situation where the effect of a brand's advertising is to increase its own sales and to decrease sales of its competitors can be referred to as competitive advertising."

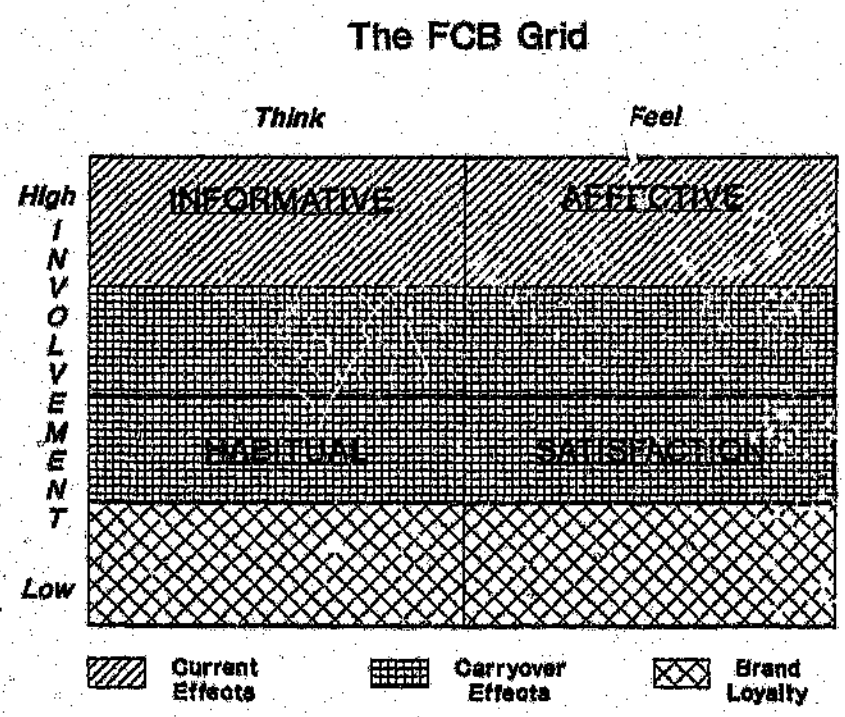


Figure 4.2

This represents a useful framework for assessing market advertising effects and will be used in conjunction with the framework developed for consumer behaviour effects. It will be

assumed that these two classes of advertising effects are independent and no attempt at integration will be made.

CHAPTER 5

THE RESEARCH HYPOTHESES

5.1 INTRODUCTION

Now that advertising effectiveness has been defined, frameworks developed for distinguishing different forms of advertising effects and an integrated method of measurement derived, attention can be focused on the specific details of the research problem.

5.2 CONSUMER EFFECTS

The purchase of a new motor vehicle may be characterised as an infrequent decision requiring substantial involvement by the consumer. This involvement stems from the high cost, the prestige and newness of the purchase and is likely to be the case whether consumers finance the purchase themselves or whether they receive any assistance from their employers. The decision is also likely to display both cognitive and affective characteristics. Factors such as technical specifications, safety, reliability and affordability support the cognitive characteristic of satisfying needs. In contrast, factors such as the image of the vehicle as perceived by the consumer's social set and the materialistic symbols of reward play an important role. Thus, it may be postulated that a new motor vehicle is placed high on the involvement dimension of the FCB grid and lies at the boundary of the Informative and

Affective quadrants. This is confirmed by the findings reported by Vaughn (1986). Consequently, it is likely that only current advertising effects will be present. This forms the basis of the first hypothesis:

HYPOTHESIS 1:

Advertising effects in the motor industry will be dominantly of the "current" effect form.

5.3 MARKET EFFECTS

The structure of the South African motor industry is that of an oligopoly of manufacturers who support a body of brand specific franchised dealerships. The manufacturers are by far the largest advertisers, primarily supporting their brands but offering some co-operative support to their dealerships. Several trade associations have been formed, e.g. National Association of Automobile Manufacturers of South Africa (NAAMSA) and the Motor Industries Federation (MIF), but none of these have indulged in co-operative advertising for the purpose of stimulating total market growth. Thus, primary advertising effects are not of concern. For the same reason, the primary demand effects of selective advertising are also of little interest.

The various authorities controlling advertising in South

Africa, e.g. the Advertising Standards Authority (ASA) and the South African Broadcasting Corporation (SABC), have not allowed any form of comparative advertising. This limits the possibilities of competitive advertising although a clever campaign may well achieve such results. The primary sales effect of advertising is thus likely to be the main objective of the majority of advertising campaigns in the industry. This leads to the formulation of two further hypotheses:

HYPOTHESIS 2:

> Competitive advertising effects are present in the motor industry.

HYPOTHESIS 3:

> The primary sales effect of selective advertising is the dominant competitive advertising effect for the motor industry.

5.4 MEDIA EFFECTS

The results of previous research have frequently found a weak or non-existent relationship between advertising and sales. Aaker, Carman and Jacobson (1982, p123) comment as follows:

> "Such a conclusion is substantively most interesting but is not as unintuitive and unexpected as it might seem. An extensive review of empirical studies by Aaker and Carman (1981) reveals that findings of no

> significant advertising effects are not uncommon. Among the cited reasons is the possible 'overadvertising' among advertisers of established brands and the difficulty of modeling their relationship."

It is contended that two other effects may underlie these findings. In the first instance, the majority of research has been focused on consumable goods with a short or very short repurchase cycle. Such products are also characterised by impulse or habitual purchasing patterns, and certainly by a short period of decision making by the consumer. Both of these periods may be shorter than the data interval used for the advertising and sales series which may effectively mask any structural relationships.

Secondly, almost all of the studies have been conducted using total advertising expenditure, ignoring the possible effects of media mix. That is to say that individual media may in fact have strong advertising effects, but when aggregated, these effects are masked. This is particularly the case as different media are traditionally used for different tactical and strategic purposes, e.g. television or magazine advertising for long term brand development, newspaper and radio advertising for short term promotional effects.

The purchase of new motor vehicles is characterised by a long repurchase cycle (2 - 10 years) and a relatively long purchase

decision period (1 - 6 months). The masking effects should thus be less pronounced but still of considerable importance. This leads to the last hypothesis:

HYPOTHESIS 4:

The advertising effects of different media in the motor industry are of different magnitude, duration and lag.

CHAPTER 6

RESEARCH METHODOLOGY

6.1 RAW DATA

It is neither feasible nor desirable to examine the motor industry exhaustively in order to either prove or disprove the hypotheses formulated in Chapter 5. Consequently, sample time series will be analysed over a time period that is sufficiently long to satisfy the demands of the analytical techniques and represents some degree of product continuity. The period January 1977 through June 1985 represents such a period for small passenger vehicles. Box and Jenkins (1970) recommend a minimum of 50 data points for analysis and the selected period exceeds this minimum substantially. The term "small" is used cautiously as the different manufacturers use different methods of segmenting the market, but, irrespective of the classification, all are likely to agree that the following vehicles competed directly over that period: Mazda 323, Toyota Corolla, Ford Escort and Volkswagen Golf/ Jetta. Over the period to be studied, unlike subsequent years, Volkswagen marketed the Golf and the Jetta basically as hatchback and sedan variants of the same product thus providing continuity.

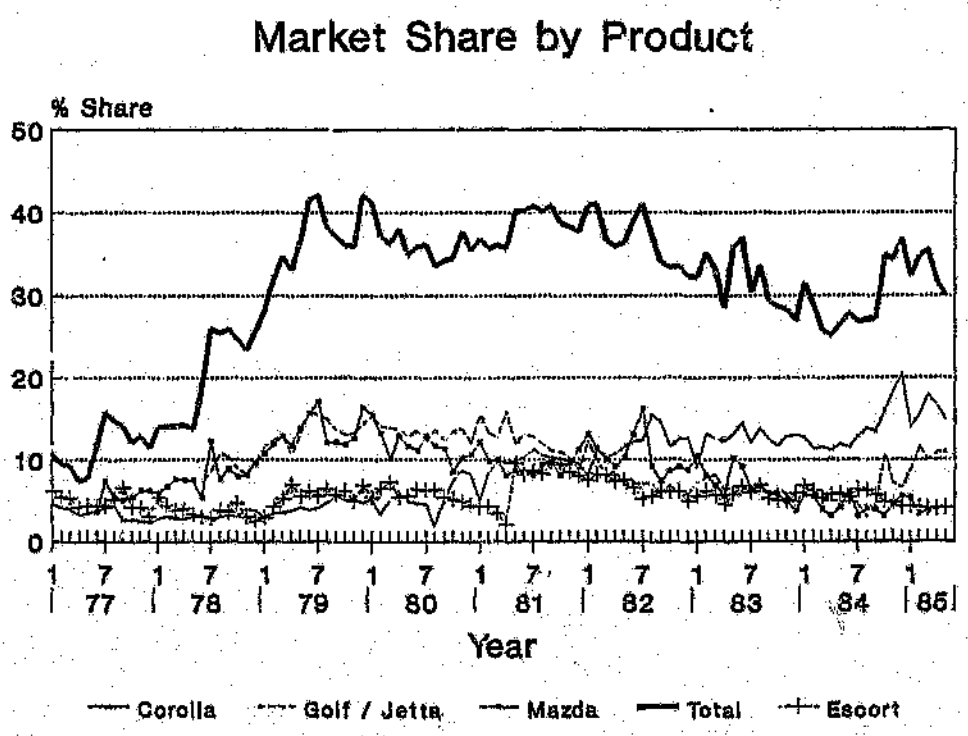


Figure 6.1

The sales volume data was taken as reported in the monthly statistics produced by NAAMSA. All model derivatives of the products studied will be combined for the purpose of the analyses. As can be seen from Figure 6.1 below, the four products chosen typically represent 20 - 40% of the total market by volume over the period when all four products were available for sale.

Advertising expenditure is taken from the monthly estimates produced by MRA in Adindex. The latter source of data is

is derived from measurements of actual advertising and evaluated using standard media costs rather than reported in absolute terms. The following different "media" are discernible over the period studied:

Retail: Mainly newspaper advertisements used by motor dealerships announcing special offers;

Magazines: Weekly, fortnightly and monthly consumer magazines as well as trade journals;

Newspapers: Daily and weekly newspapers with both national and regional distribution;

OCR: Outdoor (e.g. billboards), Cinema and Radio; it is necessary to combine these diverse media so as to achieve a consistent reporting basis over the period studied;

Television: All channels of national and regional television services.

The data used for the analyses is presented in Appendix 1.

6.2 DATA MANIPULATION

It is undesirable to analyse the data in its raw form for several reasons. Firstly, both sales volumes and advertising expenditure may display heteroscedasticity. This phenomenon is known to interfere in the estimation processes used in transfer function modelling. While power transformations of

the form developed by Box and Cox (1964) are useful in eliminating this problem, the optimal transformation may result in considerable difficulties in interpretation. For instance, describing the relationship between the logarithm of advertising expenditure and the inverse square root of sales volumes has little interpretive value.

Secondly, the sales volumes of new passenger vehicles, a durable good, is likely to be subject to cyclical variation. Thus, a decline in sales volumes for cyclical reasons with increasing real advertising expenditure would inevitably lead to the development of an erroneous model with a negative relationship between advertising expenditure and sales.

Thirdly, this effect will be compounded if advertising expenditure is measured in nominal rather than real values. The deflation of the time series is possible but it is purely subjective as to what deflator to use. These effects are illustrated for the Ford Escort data in Figure 6.2 overleaf.

The use of relative measures of sales volume and advertising expenditure is therefore proposed, viz. market share and share of advertising expenditure. These relative measures are illustrated for the Ford Escort data in Figure 6.3 overleaf.

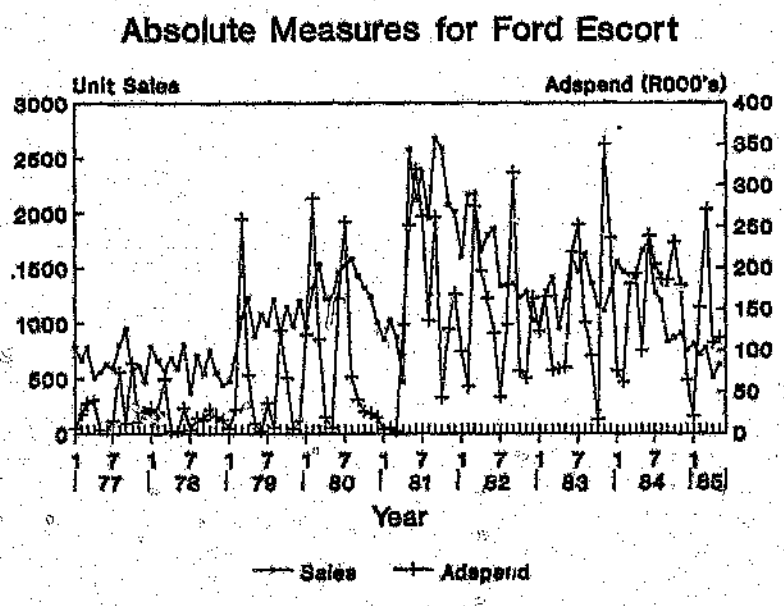


Figure 6.2

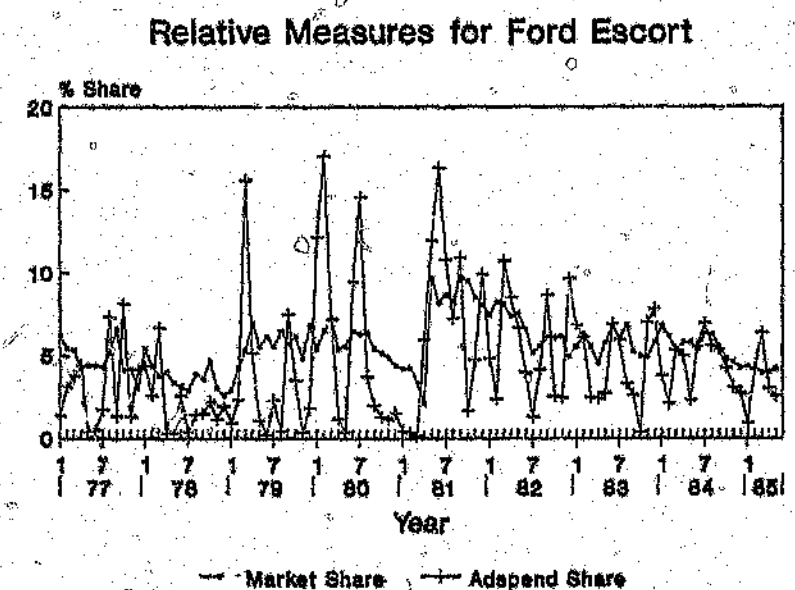


Figure 6.3

6.3 MODEL FORM

Based on the theory developed in Chapter 3, the following model form will be applied to the appropriate data:

$$S_t = \frac{\theta_S(B)}{\phi_S(B)} e_{S,t}$$

$$A_t = \frac{\theta_A(B)}{\phi_A(B)} e_{A,t}$$

$$(1-\delta_1 B-\delta_2 B^2)\, e_{S,t} = (\omega_0-\omega_1 B-\omega_2 B^2)\, e_{A,t-m+n} + (1-\theta_1 B-\theta_2 B^2)\, e_t \quad (23)$$

A_t = advertising expenditure share for a particular medium for a particular product for period t;

S_t = volume market share for a particular product for period t.

(The remaining parameters are as defined in Chapters 2 and 3.)

All model parameters will be estimated at a 10% significance level.

The form that this particular model takes for the different products and different media will make the testing of each of the four hypotheses developed in Chapter 5 possible. All modelling will be conducted using the AUTOBOX PLUS software package. This package, produced by Automatic Forecasting Systems, Hatboro, Pennsylvania, U.S.A., is capable of handling

univariate and multivariate Box - Jenkins models on a DOS based personal computer. While this software package is capable of handling both univariate and multivariate model development automatically, all models will be developed manually. Manual model development is used so that the desired model form, i.e. equation (23) above, can be forced on the data.

6.4 SAMPLE MODEL DEVELOPMENT

In order to illustrate the modelling procedure, the model for total advertising (i.e. all media) will now be presented for the Ford Escort.

6.4.1 Univariate Model for Market Share

The auto- and partial auto-correlation co-efficients (ACF and PACF) for this time series for 24 lags are illustrated in Figures 6.4 and 6.5 overleaf, the dashed lines representing the 90% confidence limits.

The ACF and PACF are characteristic of an auto-regressive model. The fact that the PAC's are significant for the first 2 lags is indicative of a second order model, i.e. of form $(2,0,0)(0,0,0)^{12}$. The model has the following parameters when estimated using AUTOBOX PLUS:

$$(1-0,596B-0,186B^2)S_t=5,43+e_{s,t}$$

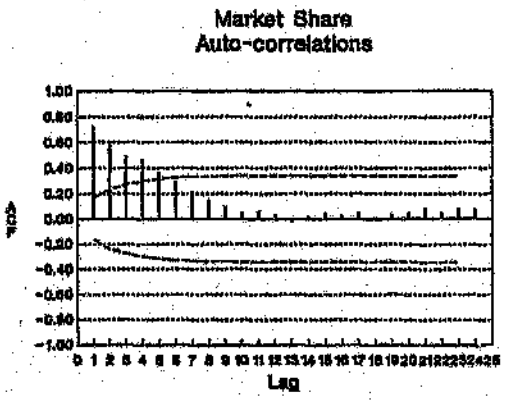


Figure 6.4

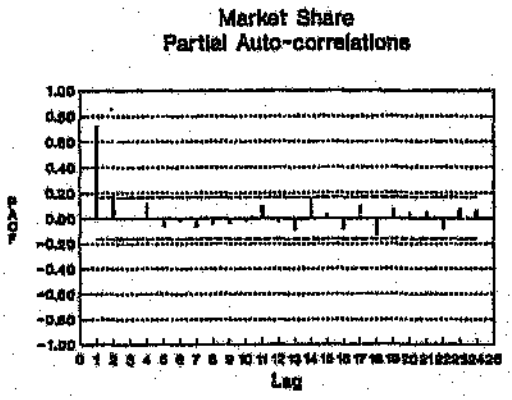


Figure 6.5

6.4.2 Univariate Model for Advertising Expenditure Share

The auto- and partial auto-correlation co-efficients (ACF and PACF) for this time series for 24 lags are illustrated in Figures 6.6 and 6.7 overleaf.

This model form is less obvious from the ACF and PACF but ignoring the disturbances at larger non-seasonal lags, a first order moving average model is fitted, i.e. of form $(0,0,1)(0,0,0)^{12}$. The model has the following parameters when estimated using AUTOBOX PLUS:

$$A_t = 4,37 + (1 + 0,450B)\, e_{A,t}$$

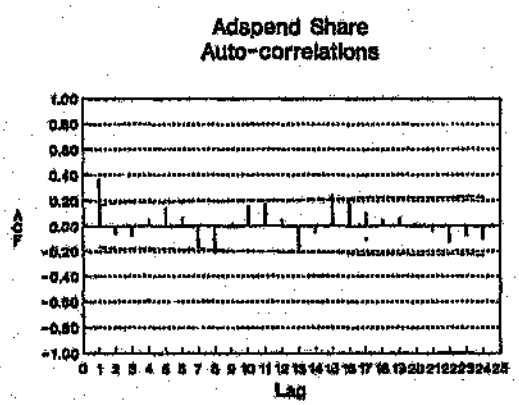


Figure 6.6

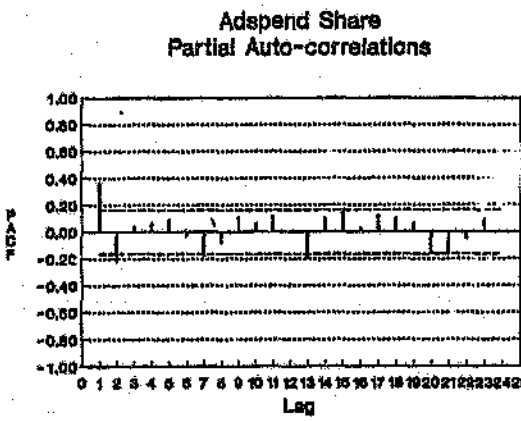


Figure 6.7

6.4.3 Transfer Function Model of Residuals

The time series S_t and A_t are filtered by their own univariate models to generate the residual series $e_{S,t}$ and $e_{A,t}$. The cross-correlations between these residuals are illustrated in Figure 6.8 overleaf.

Significant advertising effects are discernible at lags 0 and 1 while feedback is apparent from the significant cross-correlation at lag -1. Fitting equation (23) to the data, with the two residual series lagged by 1 period to accommodate the feedback, yields the following model:

$$e_{S,t} = (0,097 + 0,063B + 0,125B^2)\, e_{A,t+1} + (1 - 0,304B)\, e_t$$

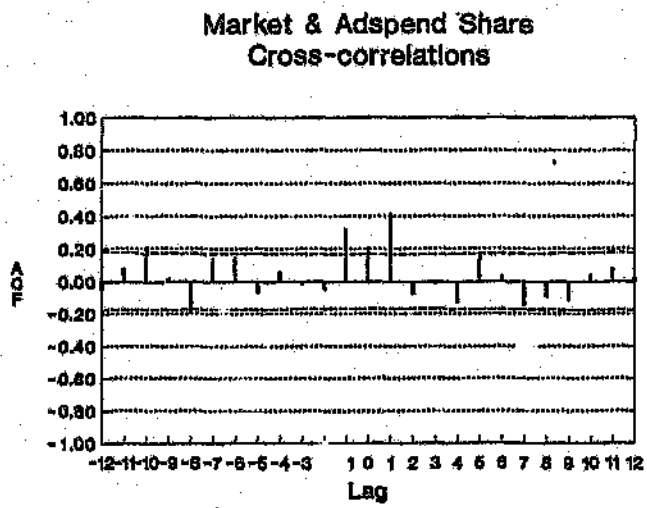


Figure 6.8

Combining this model with the univariate models for the original series and using AUTOBOX PLUS to estimate parameters that are significant at a 10% level, yields the following model:

$$S_t = \frac{(0,\ 01+0,084B+0,131B^2)}{(1-0,571B^2)} A_{t+1} + \frac{(1-0,413B)}{(1-0,743B)} e_t$$

It is important to point out the interpretation of these models in terms of advertising effectiveness at this stage. Firstly, the fact that a positive lag is attributed to $e_{A,t}$ and A_t in the transfer functions for the residual and original series respectively warrants specific attention. Intuitively, the future cannot cause the past and hence this term indicates that feedback is present in the system. The nature and extent

of this feedback is given by the first term in the transfer function relating the residual series, i.e. 0,097. This indicates that a 1% increase in market share predicates and increase in total advertising expenditure share of 0,097% one month later.

The remaining two terms in the transfer function relating the residual series describes the advertising effect. The fact that there are no significant output lag parameters, i.e. the term:

$$(1-\delta_1 B-\delta_2 B^2)$$

has no significant parameters, means that the advertising effect is of a current rather than a carryover form. The fact that there are two significant input terms means that the effect is compound rather than simple. The "size" of the effect is an increase in market share of 0,063% in the month that the advertising appears and a further increase of 0,125% in market share one month later resulting from an increase of 1% in total advertising expenditure share. The <u>total advertising effect</u> for all media is the sum of the input terms divided by the sum of the output terms, i.e.:

$$\frac{(0,063+0,125)}{1}=0,188\%$$

increase in market share for a 1% increase in advertising expenditure share.

Notice that entirely different, and erroneous, conclusions would have been reached if the model relating the original series had been interpreted. Firstly, because there are output terms in the transfer function, the advertising effect would have been described as being of the carryover type. Secondly, the total advertising effect would be measured as:

$$\frac{(0,084+0,131)}{(1-0,571)}=0,501\%$$

These differences are ascribed to the influence of the original univariate models on the form of the transfer function through equations (13) and (14) described in Chapter 3.

Mason and Bramble (1978, p3) define a theory as "a set of formulations designed to explain and predict phenomena". In the case of this research, the essential theory lies in the explanation and prediction of advertising effects based on the positioning of the product or service on the FCB grid as described in Chapter 4. The integrated model form developed in Chapter 3 represents a means of achieving this end and as such does not constitute the theory to be tested in this research. Consequently, the comparison of forecasting error associated

with the proposed integrated model form relative to other model forms would not contribute to the testing of the predictive ability of the proposed theory and was therefore not undertaken.

CHAPTER 7

RESEARCH RESULTS

7.1 FORMAT OF RESULTS

The application of the research methodology outlined in Chapter 6 to each of the four vehicles studied for each of the five media categories and in total, yields a substantial volume of information. In order to conserve space and to overcome the problem of monotonous presentation, a summary table of only the pure delay, total effect and type of effect and the models are reported here. The relevant cross - correlograms are presented in Appendix 2.

7.2 TOTAL ADVERTISING EFFECTS

The model results for total advertising effects are summarised in Table 7.1 below.

Table 7.1

Total Advertising Effects

Make	Total Effect	Pure Delay	Type of Effect
Toyota Corolla	0,156	1 month	Simple current effec
Mazda 323	0,148	4 months	Simple current effec
VW Golf/ Jetta	0,198	Instantaneous	Compound curren effect
Ford Escort	0,188	Instantaneous	Compound curren effect with feedback

The cross - correlograms of the residual market share series and advertising expenditure series are presented in Figures 1 through 4 in Appendix 2.

The model forms are as follows:

Toyota Corolla:

$$e_{S,t} = 0,156\, e_{A,t-1} + e_t$$

Mazda 323:

$$e_{S,t} = 0,148\, e_{A,t-4} + e_t$$

VW Golf/ Jetta:

$$e_{S,t} = 0,197\, e_{A,t} + e_t$$

Ford Escort:

$$e_{S,t} = (0,097 + 0,063B + 0,125B^2)\, e_{A,t+1} + (1 - 0,304B)\, e_t$$

A total advertising effect is present for all four products. It is interesting to note that in every instance a current effect is modelled with varying pure delay but a similar magnitude of approximately 0,15.

7.3 RETAIL ADVERTISING EFFECTS

The model results for retail advertising effects are presented in Table 7.2 below.

Table 7.2

Retail Advertising Effects

Make	Total Effect	Pure Delay	Type of Effect
Toyota Corolla	1,355	Instantaneous	Compound current effect
Mazda 323	0,922	Instantaneous	Simple current effect with feedback
VW Golf/ Jetta	-	-	No effect
Ford Escort	-	-	No effect.

The cross - correlograms of the residual market share series and advertising expenditure series are presented in Figures 5 through 8 in Appendix 2.

The model forms are as follows:

Toyota Corolla:

$$e_{S,t} = (0,779+0,670B+0,705B^2-0,799B^4)\, e_{R,t} + (1+0,229B^3+0,333B^4)$$

Mazda 323:

$$e_{S,t} = (-0,919 - 0,804B + 0,922B^2)\, e_{R,t+2} + e_t$$

A retail advertising effect is present only for the Toyota Corolla and the Mazda 323. In both instances a current effect is modelled with the magnitude of the effect being approximately 1,1 and occurring instantaneously.

7.4 MAGAZINE ADVERTISING EFFECTS

The model results for magazine advertising effects are presented in Table 7.3 below.

Table 7.3

Magazine Advertising Effects

Make	Total Effect	Pure Delay	Type of Effect
Toyota Corolla	0,547	12 months	Simple current effect with feedback
Mazda 323	1,739	3 months	Compound current effect
VW Golf/ Jetta	1,061	Instantaneous	Compound current effect with feedback
Ford Escort	-	-	No effect.

The cross - correlograms of the residual market share series and advertising expenditure series are presented in Figures 9 through 12 in Appendix 2.

The model forms are as follows:

Toyota Corolla:

$$e_{S,t} = (0,469+0,547B^{13})\, e_{M,t} + e_t$$

Mazda 323:

$$e_{S,t} = (0,733+1,006B^{5})\, e_{M,t-3} + (1-0,320B^{2})\, e_t$$

VW Golf/ Jetta:

$$e_{S,t} = (1,406+0,536B^{2}+0,525B^{5})\, e_{M,t+2} + e_t$$

A magazine advertising effect is present for all products except the Ford Escort. In all instances a current effect is modelled with the magnitude of the effect varying over a wide range, from 0,5 to 1,7. The pure delay is also highly variable, from 0 to 12 months.

7.5 NEWSPAPER ADVERTISING EFFECTS

The model results for newspaper advertising effects are presented in Table 7.4 below.

Table 7.4

Newspaper Advertising Effects

Make	Total Effect	Pure Delay	Type of Effect
Toyota Corolla	0,028	Instantaneous	Compound current effect
Mazda 323	0,048	2 months	Compound current effect with feedback
VW Golf/ Jetta	0,053	Instantaneous	Compound current effect
Ford Escort	0,177	1 month	Simple current effect with feedback.

The cross - correlograms of the residual market share series and advertising expenditure series are presented in Figures 13 through 16 in Appendix 2.

The model forms are as follows:

Toyota Corolla:

$$e_{S,t} = (0,122 - 0,195B + 0,101B^2)\, e_{N,t} + e_t$$

Mazda 323:

$$e_{S,t} = (0,240 - 0,199B^3 + 0,247B^5)\, e_{N,t+1} + (1 + 0,295B^7)\, e_t$$

VW Golf/ Jetta:

$$e_{S,t} = (0,206 - 0,153B)\, e_{N,t} + (1 + 0,331B^3)\, e_t$$

Ford Escort:

$$e_{S,t} = (0,154 + 0,177B^2)\, e_{N,t+1} + (1 - 0,246B)\, e_t$$

A newspaper advertising effect is present for all products. In all instances a current effect is modelled with the magnitude of the effect being approximately 0,05. The Ford Escort has a particularly strong effect (0,177) relative to this "norm". The pure delay is typically between 0 and 2 months.

7.6 OUTDOOR, CINEMA AND RADIO ADVERTISING EFFECTS

The model results for outdoor, cinema and radio advertising effects are presented in Table 7.5 below.

Table 7.5

OCR Advertising Effects

Make	Total Effect	Pure Delay	Type of Effect
Toyota Corolla	3,192	1 & 8 months	Compound current effect
Mazda 323	4,700	10 months	Compound current effect
VW Golf/ Jetta	2,038	8 months	Simple current effect with feedback
Ford Escort	1,664	Instantaneous	Compound current effect.

The cross - correlograms of the residual market share series and advertising expenditure series are presented in Figures 17 through 20 in Appendix 2.

The model forms are as follows:

Toyota Corolla:

$$(1-B)\,e_{S,t} = (0,968-0,195B+0,988B^{7}+2,431B^{9})\,e_{C,t-1}+(1-0,493B^{10})\,e_{t}$$

Mazda 323:

$$e_{S,t} = (2,331 + 2,369B^2)\, e_{C,t-10} + (1 - 0,256B^2)\, e_t$$

VW Golf/ Jetta:

$$e_{S,t} = (1,851 + 2,038B^{10})\, e_{C,t-2} + e_t$$

Ford Escort:

$$e_{S,t} = (0,974 + 0,690B)\, e_{C,t} + e_t$$

A OCR advertising effect is present for all products. In all instances a current effect is modelled with a wide range in the pure delays, but mainly longer term effects are present. The magnitude of the effect is large, approximately 2,5.

7.7 TELEVISION ADVERTISING EFFECTS

The model results for television advertising effects are presented in Table 7.6 below.

Table 7.6

Television Advertising Effects

Make	Total Effect	Pure Delay	Type of Effect
Toyota Corolla	0,320	7 months	Simple current effect with feedback
Mazda 323	-	-	No effect, feedback present
VW Golf/ Jetta	0,481	Instantaneous	Simple current effect with feedback
Ford Escort	0,352	Instantaneous	Compound current effect.

The cross - correlograms of the residual market share series and advertising expenditure series are presented in Figures 21 through 24 in Appendix 2.

The model forms are as follows:

Toyota Corolla:

$$e_{S,t} = (0,187 + 0,320B^{5})\, e_{T,t+2} + e_t$$

Mazda 323:

$$e_{S,t} = -0,352 e_{T,t+5} + e_t$$

VW Golf/ Jetta:

$$e_{S,t} = (0,256 + 0,418B^3)\, e_{T,t+3} + e_t$$

Ford Escort:

$$e_{S,t} = (0,222 + 0,130B)\, e_{T,t} + e_t$$

A television advertising effect is present for all products except the Mazda 323. In all instances a current effect is modelled the magnitude of the effect being approximately 0,4. The pure delay varies between 0 and 7 months.

7.8 COMPETITIVE ADVERTISING EFFECTS

The assessment of competitive advertising involves the development of the multivariate version of equation (22) (Chapter 3, p27) where the advertising expenditure share of each competitor is treated as an independent variable. An inherent assumption in developing such a model is that the pre - whitened input series are free of cross - correlations at any lag. The presence of significant cross - correlations between the input series interferes with the parameter estimation procedures. This difficulty may be overcome using

the common filter/ least squares method developed by Liu and Hanssens (1982) but generalised identification is more difficult and not as yet a well developed procedure, Reilly (1984). The results presented in Table 7.7 below indicate that significant cross - correlations are present among the input series and consequently model development is inhibited.

Table 7.7

Cross - Correlations between Competitive Advertising Expenditur Shares

(Significant Cross - Correlations Highlighted)

(Legend: C= Toyota Corolla, M= Mazda 323, G= VW Golf/ Jetta, F= Ford Escort)

Lag	CvsG	CvsF	CvsM	GvsF	GvsM	FvsM
-5	-0,026	0,002	0,084	0,019	-0,059	0,099
-4	0,063	0,057	0,061	0,123	0,002	0,135
-3	-0,090	0,071	-0,147	0,034	-0,055	-0,082
-2	-0,093	-0,053	0,065	0,124	-0,054	0,009
-1	**0,261**	-0,017	-0,074	-0,068	**0,290**	0,027
0	0,118	-0,080	-0,171	-0,204	0,084	0,027
1	0,029	0,103	0,018	-0,124	0,092	0,011
2	-0,042	-0,023	0,027	-0,026	0,075	0,006
3	0,162	-0,101	-0,164	0,035	-0,082	0,030
4	-0,134	0,163	-0,073	-0,060	-0,134	0,168
5	**0,229**	0,004	0,066	0,111	0,024	-0,058

While the presence of significant cross - correlations between the input series effectively precludes model development, the cross - correlations between the input (advertising expenditure share) and output (market share) series remains useful as it still describes the nature of the impulse response function as shown in equation (6) (Chapter 2, p14). Consequently, the analysis of competitive advertising effects is restricted to a qualitative description.

7.8.1 Competitive Effects on Toyota Corolla

The cross - correlograms for Toyota Corolla market share and competitive advertising expenditure shares are illustrated in Figures 25 to 27 in Appendix 2.

While Toyota Corolla market share appears not to be significantly affected by Mazda 323 advertising, it is increased by Volkswagen Golf/ Jetta advertising (at lags of 1 and 5 months) and is decreased by Ford Escort advertising (at lags 1 and 7 months). Possible feedback effects at longer lags (8 or more months) are treated as spurious rather than interpreted at face value which intuitively does not make sense.

7.8.2 Competitive Effects on Mazda 323

The cross - correlograms for Mazda 323 market share and competitive advertising expenditure shares are illustrated in

Figures 28 to 30 in Appendix 2.

Mazda 323 market share is not significantly influenced by competitive advertising expenditure. However, there is a significant negative feedback effect on Ford Escort advertising expenditure at a lag of 3 months.

7.8.3. Competitive Effects on Volkswagen Golf/ Jetta

The cross - correlograms for Volkswagen Golf/ Jetta market share and competitive advertising expenditure shares are illustrated in Figures 31 to 33 in Appendix 2.

While Volkswagen Golf/ Jetta market share is not significantly influenced by Toyota Corolla advertising expenditure share, it is negatively influenced by Mazda 323 advertising (at a lag of 2 months) and negatively influenced by Ford Escort advertising (starting instantaneously but continuing for approximately 5 months). There is also a significant positive feedback on Toyota Corolla at a lag of 1 month.

7.8.4 Competitive Effects on Ford Escort

The cross - correlograms for Ford Escort market share and competitive advertising expenditure shares are illustrated in Figures 34 to 36 in Appendix 2.

While Ford Escort market share is not significantly influenced

by Toyota Corolla or Mazda 323 advertising expenditure share, it is negatively influenced by Volkswagen Golf/ Jetta advertising (instantaneously). There are also significant feedback effects:

- negative on Toyota Corolla advertising at a lag of 1 month;
- positive on Mazda 323 advertising at a lag of 5 months;
- negative on Volkswagen Golf/ Jetta at a lag of 7 months.

CHAPTER 8

TESTING THE HYPOTHESES

8.1 INTRODUCTION

The purpose of this chapter is to interpret the research results in light of the hypotheses formulated in Chapter 5. Before progressing, it must be re-emphasised that the measurement of advertising effectiveness relates to the long-term and not to specific advertising campaigns.

8.2 HYPOTHESIS 1

The first hypothesis was stated as follows:

> **Advertising effects in the motor industry will be dominantly of the "current" effect form.**

Of the 24 relationships studied, 20 statistically significant models could be developed. All 20 of these models were of the current effect form, 7 simple and 12 compound in nature. This demonstrates conclusively that the stipulated hypothesis is true.

8.3 HYPOTHESES 2 AND 3

The second and third hypotheses were stated as follows:

> **Competitive advertising effects are present in the motor industry.**

The primary sales effect of selective advertising is the dominant competitive advertising effect for the motor industry.

Significant cross-correlation effects between the input series were measured and consequently it was not possible to develop multivariate models to study competitive advertising effects in detail. However, the signs of significant cross - correlation co-efficients at various lags between input and output series are sufficient to identify which of the forms of competitive advertising effect, if any, are present. If there are no significant cross-correlations, the advertising of a brand does not affect competitive sales. This is equivalent to a primary sales effect according to the Shultz and Wittink (1976) categorisation. If there are significant positive cross-correlations, a primary demand effect is indicated. Significant negative cross-correlations indicate that competitive advertising is present. The positions are summarised in Table 8.1 overleaf.

The primary sales effect of competitive advertising is the dominant form found in this study, occurring in 7 out of 12 instances. However, one instance of the primary demand effect (Volkswagen Golf/ Jetta advertising on Toyota Corolla market share) and four instances of competitive advertising effect (Mazda 323 on Volkswagen Golf/ Jetta, Volkswagen Golf/ Jetta

on Ford Escort and Ford Escort on both Toyota Corolla and Volkswagen Golf/ Jetta) were identified. It is interesting to note that competitive advertising effects are possible despite the regulatory restrictions on comparative advertising. In fact, it is the dominant effect for Ford Escort advertising.

Table 8.1

Type of Competitive Advertising Effect

(XX = Not Applicable, PS = Primary Sales Effect, PD = Primary Demand Effect, CA = Competitive Advertising Effect)

	Advertiser			
Effect on Competitor	Toyota Corolla	Mazda 323	Volkswagen Golf/ Jetta	Ford Escort
Toyota Corolla	XX	PS	PD	CA
Mazda 323	PS	XX	PS	PS
VW Golf/ Jetta	PS	CA	XX	CA
Ford Escort	PS	PS	CA	XX

These findings support the postulated hypotheses 2 and 3.

8.4 HYPOTHESIS 4

The fourth hypothesis was stated as follows:

> The advertising effects of different media in the motor industry are of different magnitude, duration and lag.

The nature of measured effects, viz. magnitude, duration and lag are treated separately in the following sections.

8.4.1 The Magnitude of Media Advertising Effects

The magnitude of the total advertising effect measured for the different models in the different media are summarised in Table 8.2 below.

Table 8.2

Media Advertising Effects - Magnitude

	Media				
Advertiser	Retail	Magazine	Newspaper	OCR	TV
Toyota Corolla	1,355	0,547	0,028	3,192	0,320
Mazda 323	0,922	1,739	0,048	4,700	-
VW Golf/ Jetta	-	1,061	0,053	2,038	0,481
Ford Escort	-	-	0,177	1,664	0,352
Average*	1,139	1,116	0,077	2,899	0,384

(* The averages are only taken over those products for which there is a significant effect).

The measured magnitude of advertising effects spans a range of approximately two orders of magnitude (0,028 to 4,700). If taken at face value, these results indicate that, for instance, newspaper advertising is substantially less effective than OCR advertising. If this phenomenon is

accepted, it may be logically deduced that in the longer term (such as the term over which the advertising effects were measured in this research) the more effective media would be used more extensively than less effective media. However, the actual extent of usage, presented in Table 8.3 below, displays precisely the opposite effect, i.e. advertisers apparently make more extensive use of less effective media!

Table 8.3

Extent of Media Usage

	Media				
Advertiser	Retail	Magazine	Newspaper	OCR	TV
Toyota Corolla	10,22%	12,23%	50,24%	3,52%	23,78%
Mazda 323	18,90%	11,50%	49,00%	1,07%	19,53%
VW Golf/ Jetta	16,04%	11,37%	47,00%	1,79%	23,80%
Ford Escort	6,50%	13,71%	42,12%	10,76%	26,92%

This paradox is readily resolved by making the assumption that the inherent effectiveness of all media is the same and that the measured effectiveness is dictated by the extent of usage of the media. Before proceeding, the meaning of equal effectiveness must be clarified. Two media are said to have the same effectiveness if a unit increase in their advertising expenditure share results in an equal gain in market share. Thus, the aspects of relative cost, reach and target audience

are encompassed in this assumption and not addressed specifically.

This assumption is supported by the law of diminishing returns if advertising is considered to be a factor of production. It is also supported by some empirical evidence from earlier studies, such as Simon and Arndt (1980) and Steiner (1987). The assumption of all media having the same inherent effectiveness may be tested by using multiple regression. An equation of the following form is fitted to the data:

$$\ln Y = b_0 + b_1 X + b_2 D_C + b_3 D_M + b_4 D_R + b_5 D_T$$

where:

Y = the total advertising effect of a medium measured as the increase in market share (%) resulting from an increase of 1% in total advertising expenditure share for that medium;

X = the extent to which the medium is used, measured as a % of total advertising expenditure for the advertiser;

D_C = a dummy variable adopting a value of 1 if the advertising media was OCR and adopting a value of 0 otherwise;

D_M = a dummy variable adopting a value of 1 if the advertising media was Magazines and adopting a value of 0 otherwise;

D_R = a dummy variable adopting a value of 1 if the advertising media was Retail and adopting a value of 0 otherwise;

D_T = a dummy variable adopting a value of 1 if the advertising media was Television and adopting a value of 0 otherwise;

A semi-logarithmic form of the equation was adopted as a result of the apparent negative exponential relationship between effectiveness and extent of usage of a medium. Also, only four dummy variables are necessary to describe the impact of five different media. The co-efficients of the dummy variables in the regression equation would indicate the extent to which advertising effectiveness of the media concerned differed from that of the medium not addressed by a dummy variable (in this case newspaper advertising). The effect of this latter medium would be incorporated in the co-efficient b_0.

On estimation using stepwise regression, the parameters associated with the dummy variables describing the media type are insignificantly different from zero at a significance level of 0,10. This conclusion is apparent from the regression results presented in Tables 8.4 and 8.5 overleaf.

Table 8.4

Stepwise Regression Report

(Before Inclusion of Any Variables)

IN	Variable	R^2-Add	t Value	Probability
No	X	0,943	15,2	",0000
No	D_C	0,389	3,0	0,0099
No	D_M	0,041	0,8	0,4505
No	D_R	0,035	0,7	0,4873
No	D_T	0,012	0,4	0,6822

(R^2-Add is the amount that would be added to R^2 if this variable were included in (or removed from) the model)

Table 8.5

Stepwise Regression Report

(After Inclusion of Variable X)

IN	Variable	R^2-Add	t Value	Probability
Yes	X	0,943	15,2	0,0000
No	D_C	0,002	0,7	0,4804
No	D_M	0,006	1,2	0,2540
No	D_R	0,001	0,5	0,6270
No	D_T	0,000	0,3	0,7911

The following regression equation adequately describes the relationship between advertising effectiveness and the extent to which a medium is used:

Note that only those instances where a significant effect was detected were included in the regression. The data and the regression equation are illustrated in Figure 8.1 overleaf. The finding that none of the co-efficients of the dummy variables are statistically significant implies that the inherent effectiveness of all the media considered may be regarded as being the same.

The fact that this relationship may be logically postulated and demonstrated to be statistically significant leads to the conclusion that the portion of Hypothesis 4 relating to the magnitude of advertising effectiveness should be rejected.

8.4.2 The Duration of Media Advertising Effect

The duration of the advertising effects can be assessed by the type of effect, viz. current, carryover or brand loyal. The results, in terms of type of effect, of the models developed are summarised in Table 8.6 overleaf.

The results presented in Table 8.6 indicate that there is no consistent pattern in the type, and therefore duration, of the advertising effect by media. This leads to the conclusion that the portion of Hypothesis 4 relating to the duration of advertising effects should be rejected.

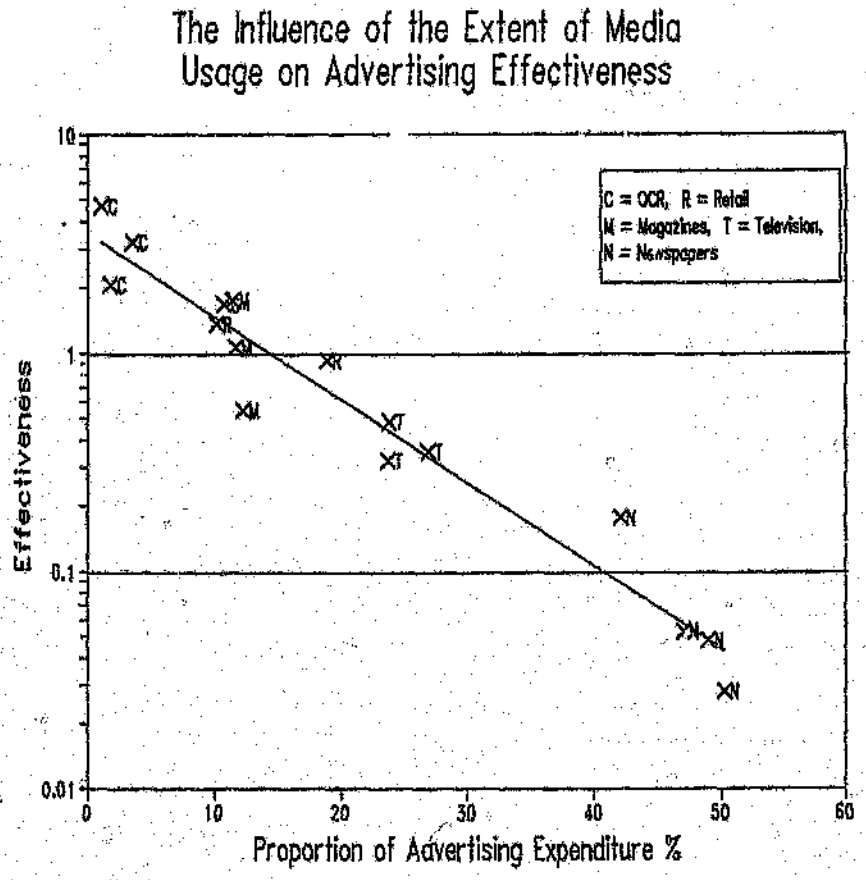

The Influence of the Extent of Media Usage on Advertising Effectiveness
C = OCR, R = Retail
M = Magazines, T = Television,
N = Newspapers
Effectiveness
10
1
0.1
0.01
0
10
20
30
40
50
60
Proportion of Advertising Expenditure %

Figure 8.1

Table 8.6

Type of Advertising Effect

(SC = Simple Current Effect, CC = Compound Current Effect, BL = Brand Loyal Effect)

	Media				
Advertiser	Retail	Magazine	Newspaper	OCR	TV
Toyota Corolla	CC	SC	CC	CC	SC
Mazda 323	SC	CC	CC	CC	BL
VW Golf/ Jetta	BL	CC	CC	SC	SC
Ford Escort	BL	BL	SC	CC	CC

8.4.3 The Lag of Media Advertising Effects

The lag of media advertising effects is nothing more than the pure delay before any advertising effect occurs, i.e. the order of parameter n in the model form expressed in equation (22). The results, in terms of the pure delay, of the models developed are presented in Table 8.7 overleaf.

Table 8.7

Lag in Advertising Effect

Media

Advertiser	Retail	Magazine	Newspaper	OCR	TV
Toyota Corolla	0	12	0	1&8	7
Mazda 323	0	3	2	10	-
VW Golf/ Jetta	-	0	0	8	0
Ford Escort	-	-	1	0	0

Again there is no absolute consistency in this aspect of advertising effect. However, the following observations can be made:

- retail advertising tends to create an instantaneous effect;
- newspaper advertising tends to create an effect with a relatively short lag (of the order 0 - 2 months);
- OCR seems to be able to create effects with both short (0 - 1 month) and long (8 - 10 months) lag; this is likely to stem from the diverse nature of the various media concerned;
- both magazine and television advertising appear to be able to create both short (0 - 3 months) and long (7 - 12 months) lags; this is likely to stem from the

immense flexibility of the media in terms of creative devices that they can accommodate.

The results should be viewed as inconclusive in terms of either proving or disproving that portion of Hypothesis 4 relating to the lag of the advertising effect.

8.5 CONCLUSION

In conclusion, the testing of the hypotheses indicate that advertising effectiveness for new passenger vehicles is characterised by:

- dominantly current effects when an effect is present;
- competitive advertising effects may be present but the primary sales effect of competitive advertising is dominant;
- the magnitude of the advertising effect for a particular medium is determined by the extent to which that medium is used by the advertiser and not by the medium itself.

CHAPTER 9

PROPOSITIONS AND CONCLUSIONS

9.1 INTRODUCTION

While the objective of this research was to study advertising effectiveness for new passenger vehicle sales and specifically to test four hypotheses, there is a considerable richness in the results that warrants further analysis. Integrating these findings from a limited sample in a single industry with other more established theory, allows propositions to be made as to the nature of advertising effectiveness in a more generalised context.

9.2 THE FORM OF THE ADVERTISING EFFECT

The mathematical form of the integrated model developed in Chapter 3 suggests three distinct forms of advertising effects, viz. brand loyalty, current effects and carryover effects. In Chapter 4 it was argued that the extent of consumer involvement in the purchase decision would be instrumental in dictating the form of the advertising effect. These arguments lead to the more generalised propositions:

PROPOSITION 1

(a) Products and services that have a high consumer involvement in the purchase decision, will be characterised by

current advertising effects. The pure delay in the advertising effect will vary directly with the length of the purchase decision.

Products that are high in search qualities and have a significant penalty for a wrong decision (typically high priced durable goods such as a new motor vehicle or house) as well as products that largely satisfy prestige, esteem and self-actualisation needs (typically luxury goods such as jewellery and perfume) would fall into this category. Advertising will play a significant on-going role in the behavioral stage of these infrequently purchased products. This proposition is supported by the findings of this research as far as new passenger vehicles is concerned. Rosen (1989), using the same methodology, established that current effects were dominant in the banking industry which Vaughn (1980) categorises as high in consumer involvement.

(b) Products and services that have an intermediate consumer involvement in the purchase decision, will be characterised by carryover advertising effects.

Examples of such products are motor oils and toilet soaps where psychological differentiation, achieved via branding,

dominates physical or technological differentiation. Again advertising will play a significant on-going role in the behavioral stage of the purchasing process. The researcher was unable to access suitable market share data for any product or service in this category and was thus unable to test this proposition.

(c) Products and services that have a low consumer involvement in the purchase decision, will be characterised by brand loyalty effects.

Habitual products (such as foodstuffs and household goods) and products that largely satisfy social needs (such as cigarettes and alcoholic beverages) would fall into this category. Advertising will play a significant role at the launch of the product to move the consumer through the cognitive, affective and behavioral stages but thereafter sales momentum will dominate any direct advertising effect. The researcher was able to obtain suitable data for three beer brands.Two of these brands are well established and dominate the market. The third brand is young by comparison and is characterised by a small but growing market share. The data and the analysis are presented in Appendices 3 and 4 respectively. (A condition of being provided with the data was that it not be made public and hence it is only graphically represented in Appendix 3.)

The analysis confirms that brand loyalty is present for the two established brands while a current effect is present for the young, growing brand. These results support this proposition.

9.3 THE EFFECT OF DIMINISHING RETURNS

The characteristic total effect of total advertising appears to be of the order of 0,15 and the response time between 1 to 4 months. It is interesting to note that this response time is of the same order as the decision period mooted as being typical for the purchase of a new car. The total advertising effects are well below 1 indicating little leverage and perhaps some saturation in the level of advertising. It is also interesting to consider the economics of the advertising decision at a very superficial level. At the present time the total advertising expenditure by motor manufacturers is of the order of R85 million p.a. Thus, a 1% increase in advertising expenditure share represents about R850 000. The total market for new passenger vehicles is presently about 200 000 units p.a. Thus, an advertising effect of 0,15 would yield incremental sales of 300 units p.a. In order for this to represent a viable proposition, the marginal contribution of an additional new vehicle sale should thus exceed R850 000/300 units which is approximately R2 800 per unit. The class of vehicle examined in this research is typified by a full retail selling price of approximately R20 000. Franchised dealer

margins are usually 17% yielding a net revenue of about R13 600 for the manufacturer. The advertising cost associated with this incremental sale is R2 800 or about 17% of the net price received by the manufacturer. This would represent a very substantial portion (if not all) of the manufacturer's gross margin in this high volume low priced segment of the market, again indicating saturation and achievement of optimum profits when marginal profits are equal to marginal costs.

This simple illustration of the effect of diminishing returns is supported in the literature by Simon and Arndt (1980) and Steiner (1987) and leads to the following proposition:

PROPOSITION 2

> Advertisers will increase their advertising expenditure to a point where the marginal profits associated with the sales gains are equal to the incremental costs.

9.4 MEDIA EFFECTS

The arguments presented in Chapter 8 lead to the conclusion that in the motor industry the magnitude of the advertising effect for a particular medium is determined by the extent of usage of that medium and not by the medium itself. While this result is not unexpected in terms of the law of diminishing

returns, it does raise some interesting questions as to the role of the creative devices and content of the advertising. Advertising practitioners often argue that specific media are suited to specific communication tasks and thus constrain the creative devices that may be used for a particular medium. The logic underlying these arguments is difficult to refute. However, the conclusion that, as a consequence, different media have different effects, is not supported by the research findings. At a more fundamental level, the strength of the relationship between effectiveness and extent of media usage leaves little room for significant variability being created by other variables such as the creative effect itself. This leads to the following propositions:

PROPOSITION 3

(a) The creative devices and content of an advertisement determine whether or not that advertisement will be effective but not the magnitude of the effect.

(b) The magnitude of the effect of an advertisement is dictated by the extent to which the medium in which it is placed is used. The greater the extent of usage of a medium, the less the effectiveness of that medium.

9.5 FEEDBACK EFFECTS

The possibility of feedback in advertising effectiveness modelling has long been recognised and models developed to allow its measurement, e.g. Hanssens (1980a). However, the literature does not contain any theory as to the form that such feedback can adopt.

The research results presented in Chapter 7 are indicative of two distinctly different feedback effects. The most commonly measured feedback effect may be termed reactive in that it has a positive direction of correlation, i.e. increasing sales result in increasing advertising spend and vice versa, declining sales result in a reduction in advertising spend. This effect can be seen to be in keeping with Proposition 2 and the law of diminishing returns.

A less common form of advertising feedback effect has a negative direction of correlation, i.e. increasing sales result in reduction in advertising spend and vice versa, declining sales result in increasing advertising spend. This effect is of a more pro-active nature and has tactical potential. Advertising may over-stimulate sales in terms of production capacity or inventory in which case a reduction in advertising expenditure would be warranted. Conversely, competitive marketing action may be eroding market share and an increase in advertising spend represents one means of

stimulating sales.

Competitive advertising feedback effects are also noted in the results presented in Chapter 7. Again two distinctly different forms may be discerned. Firstly, sales may have a positive influence on competitors' advertising spend. Thus, increased market penetration as a result of the launch of a new model in the motor industry may stimulate competitive advertising spend in an attempt to dilute these sales gains. This may be contrasted with the opposite effect where a large gain in sales, which is typically associated with a large advertising spend, may result in a decline in competitive advertising expenditure. The rationale behind this feedback effect is that competitors would have to spend significantly more in absolute terms to achieve the same relative advertising expenditure share. Thus, substantial advertising spend would have to be allocated to be seen or heard above an increased noise level.

These arguments lead to the following propositions:

PROPOSITION 4

(a) Advertising feedback effects, when present, may be reactive or tactical in form.

(b) Competitive advertising effects, when present, may take the form of increased

advertising spend so as to dilute competitive activity. Alternatively, the effect may take the form of decreased advertising spend so not to have to overcome the noise created by increased competitive activity.

It must be noted that feedback effects could be the consequence of conscious decisions and planning on the part of the advertiser but could equally as easily be the consequence of actions without being specifically planned.

9.6 COMPETITIVE ADVERTISING EFFECTS

The results presented in Chapter 7 support the Schultz and Wittink (1976) framework for selective advertising effects. This leads to the following proposition:

PROPOSITION 5

Selective advertising may result in either a primary sales effect, a primary demand effect or a competitive advertising effect. In the absence of comparative advertising, the primary sales effect will be the dominant effect.

9.7 CONCLUSIONS

This research has achieved the following:

- established an integrated econometric - time series model form for the measurement of advertising effectiveness;
- established the forms of advertising effectiveness that may be encountered (viz. brand loyalty, current effects and carryover effects) and identified a framework to determine for which products and services these effects are likely to be measured.

The research results have resulted in a deeper understanding of advertising effectiveness as it is experienced in the new motor vehicle market. In addition, a further interpretation of the results has led to the development of additional propositions relating to:

- the role of creativity in advertising effectiveness;
- the role of media in advertising effectiveness;
- the form of advertising feedback effects.

These propositions are made with a view to describing

advertising effectiveness in a more generalised context than merely for the products and industry in which the research was conducted.

Two clear directions for further research are indicated. Firstly, the integrated econometric - time series model developed needs to be tested for other products and services in other industries. It is encouraging to note that the usefulness of this model was demonstrated for the banking industry by Rosen (1989). A second direction for future research relates to the validation of the five propositions. The applicability of these propositions in a generalised context would contribute significantly to the management of an organisation's advertising effort.

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RAW DATA

1. SALES VOLUMES

YEAR	PERIOD	MARKET	ESCORT	COROLLA	GOLF/JETTA	MAZDA
	1	12659	780	571		
	2	12387	668	509		
	3	14598	776	576		
	4	12052	503	394		
	5	12797	559	435		
	6	14280	626	526		512
1977	7	13932	595	564		1030
	8	15662	799	680		842
	9	14400	946	362		722
	10	13661	563	360		731
	11	14770	614	364		918
	12	15566	468	369		958
	1	14630	785	407		860
	2	15223	660	460		1020
	3	15246	569	430		1157
	4	17273	682	468		1303
	5	17718	589	537		1315
	6	26128	801	902	1915	1396
1978	7	13008	371	313	1101	1598
	8	18169	702	564	1966	1387
	9	15336	547	485	1568	1371
	10	16229	750	504	1454	1295
	11	18217	549	724	1497	1487
	12	17559	441	664	1737	1683
	1	16412	473	487	1906	1771
	2	16248	688	546	2021	1944
	3	20141	1055	713	2614	2603
	4	17712	1230	664	1873	2085
	5	16011	885	655	2101	2218
	6	17575	1074	670	2801	2755

YEAR	PERIOD	MARKET	ESCORT	COROLLA	GOLF/JETTA	MAZDA
1979	7	17895	985	725	2756	3058
	8	18893	1215	889	2824	2285
	9	15870	904	888	2167	1926
	10	18665	1142	930	2438	2213
	11	20156	978	1031	2682	2554
	12	17656	1204	800	2535	2893
	1	17974	963	918	2754	2783
	2	20349	1319	663	2888	2705
	3	21118	1534	1038	2936	2155
	4	22642	1222	1336	3121	2924
	5	22251	1223	1090	2851	2597
	6	22717	1462	1055	3083	2549
1980	7	24313	1523	1115	3018	3134
	8	25133	1586	458	3457	2942
	9	26490	1430	1344	3285	3002
	10	25762	1317	1911	3460	2201
	11	25330	1232	2209	3500	2615
	12	22979	1000	1900	2777	2458
	1	20368	854	1004	3169	2480
	2	24311	1028	2014	3247	2389
	3	25993	872	2592	3299	2616
	4	22707	475	2171	3614	1834
	5	26820	2575	2649	3224	2322
	6	25804	2119	2681	3388	2189
1981	7	27384	2368	3101	3508	2203
	8	23649	1955	2497	2826	2210
	9	27626	2680	2832	3084	2680
	10	27394	2593	2774	3017	2219
	11	24470	2082	2402	2496	2378
	12	25002	2016	2401	2197	2816
	1	21478	1606	1700	2626	2821

YEAR	PERIOD	MARKET	ESCORT	COROLLA	GOLF/JETTA	MAZDA
	2	26253	2166	2987	2617	3026
	3	26973	2181	2795	2190	2701
	4	22572	1656	2427	1938	2087
	5	23907	1798	2777	1630	2487
	6	28507	1864	3501	2018	3741
1982	7	25619	1335	3206	1813	4187
	8	24176	1340	3755	1694	2226
	9	22125	1355	3208	1308	1649
	10	20235	1230	2356	1408	1752
	11	20788	1278	2611	1174	1904
	12	20794	1023	2655	1213	1824
	1	18118	1005	1639	1300	1891
	2	20934	1291	2754	1613	1695
	3	25453	1416	3214	2081	1745
	4	21185	953	2598	1320	1161
	5	21134	1217	2781	1412	2159
	6	23727	1604	3445	1556	2171
1983	7	24547	1471	2968	1464	1553
	8	23528	1622	3241	1454	1591
	9	25927	1359	3246	1465	1522
	10	23186	1154	2718	1458	1310
	11	22854	1112	2938	1308	1110
	12	22229	1291	2896	956	818
	1	23024	1557	2922	1486	1296
	2	23696	1460	2687	1419	1266
	3	27024	1436	3120	1341	1049
	4	24584	1417	2761	1255	767
	5	28471	1654	3391	1331	1197
	6	32382	1741	3730	1570	1943
1984	7	20123	1270	2579	922	616
	8	19119	1190	2652	574	756

YEAR	PERIOD	MARKET	ESCORT	COROLLA	GOLF/ JETTA	MAZDA
	9	14822	830	1990	643	571
	10	18154	869	2922	1964	559
	11	19702	906	3585	1388	890
	12	17650	746	3608	1158	970
	1	18551	800	2598	1622	975
	2	17381	714	2720	2021	585
	3	19464	772	3488	1943	709
	4	12849	511	2135	1404	
	5	14942	622	2211	1636	
	6	15472				
1985	7	17656				
	8	17258				
	9	16874				
	10	17204				
	11	17501				
	12	19170				

2. MARKET SHARES

YEAR	PE. IOD	ESCSHAR	CORSHAR	GLFSHAR	MAZSHAR	TOTAL
	1	6.16%	4.51%			
	2	5.39%	4.11%			
	3	5.32%	3.95%			
	4	4.17%	3.27%			
	5	4.37%	3.40%			
	6	4.38%	3.68%		3.59%	
1977	7	4.27%	4.05%		7.39%	
	8	5.10%	4 34%		5.38%	
	9	6.57%	2.51%		5.01%	
	10	4.12%	2.64%		5.35%	
	11	4.16%	2.46%		6.22%	
	12	3.01%	2.37%		6.15%	
	1	5.37%	2.78%		5.88%	
	2	4.34%	3.02%		6.70%	
	3	3.73%	2.82%		7.59%	
	4	3.95%	2.71%		7.54%	
	5	3.32%	3.03%		7.42%	
	6	3.07%	3.45%	7.33%	5.34%	19.19%
1978	7	2.85%	2.41%	8.46%	12.28%	26.01%
	8	3.86%	3.10%	10.82%	7.63%	25.42%
	9	3.57%	3.16%	10.22%	8.94%	25.89%
	10	4.62%	3.11%	8.96%	7.98%	24.67%
	11	3.01%	3.97%	8.22%	8.16%	23.37%
	12	2.51%	3.78%	9.89%	9.58%	25.77%
	1	2.88%	2.97%	11.61%	10.79%	28.25%
	2	4.23%	3.36%	12.44%	11.96%	32.00%
	3	5.24%	3.54%	12.98%	12.92%	34.68%
	4	6.94%	3.75%	10.57%	11.77%	33.04%

YEAR	PERIOD	ESCSHAR	CORSHAR	GLFSHAR	MAZSHAR	TOTAL
	5	5.53%	4.09%	13.12%	13.85%	36.59%
	6	6.11%	3.81%	15.94%	15.68%	41.54%
1979	7	5.50%	4.05%	15.40%	17.09%	42.05%
	8	6.43%	4.71%	14.95%	12.09%	38.18%
	9	5.70%	5.60%	13.65%	12.14%	37.08%
	10	6.12%	4.98%	13.06%	11.86%	36.02%
	11	4.85%	5.12%	13.31%	12.67%	35.94%
	12	6.82%	4.53%	14.36%	16.39%	42.09%
	1	5.36%	5.11%	15.32%	15.48%	41.27%
	2	6.48%	3.26%	14.19%	13.29%	37.23%
	3	7.26%	4.92%	13.90%	10.20%	36.29%
	4	5.40%	5.90%	13.78%	12.91%	38.00%
	5	5.50%	4.90%	12.81%	11.67%	34.88%
	6	6.44%	4.64%	13.57%	11.22%	35.87%
1980	7	6.26%	4.59%	12.41%	12.89%	36.15%
	8	6.31%	1.82%	13.75%	11.71%	33.59%
	9	5.40%	5.07%	12.40%	11.33%	34.21%
	10	5.11%	7.42%	13.43%	8.54%	34.50%
	11	4.86%	8.72%	13.82%	10.32%	37.73%
	12	4.35%	8.27%	12.08%	10.70%	35.40%
	1	4.19%	4.93%	15.56%	12.18%	36.86%
	2	4.23%	8.28%	13.36%	9.83%	35.70%
	3	3.35%	9.97%	12.69%	10.06%	36.08%
	4	2.09%	9.56%	15.92%	8.08%	35.65%
	5	9.60%	9.88%	12.02%	8.66%	40.16%
	6	8.21%	10.39%	13.13%	8.48%	40.21%
1981	7	8.65%	11.32%	12.81%	8.04%	40.83%
	8	8.27%	10.56%	11.95%	9.35%	40.12%
	9	9.70%	10.25%	11.16%	9.70%	40.82%
	10	9.47%	10.13%	11.01%	8.10%	38.71%
	11	8.51%	9.82%	10.20%	9.72%	38.24%

YEAR	PERIOD	ESCSHAR	CORSHAR	GLFSHAR	MAZSHAR	TOTAL
	12	8.06%	9.60%	8.79%	11.26%	37.72%
	1	7.48%	7.92%	12.23%	13.13%	40.75%
	2	8.25%	11.38%	9.97%	11.53%	41.12%
	3	8.09%	10.36%	8.12%	10.01%	36.58%
	4	7.34%	10.75%	8.59%	9.25%	35.92%
	5	7.52%	11.62%	6.82%	10.40%	36.36%
	6	6.54%	12.28%	7.08%	13.12%	39.02%
1982	7	5.21%	12.51%	7.08%	16.34%	41.15%
	8	5.54%	15.53%	7.01%	9.21%	37.29%
	9	6.12%	14.50%	5.91%	7.45%	33.99%
	10	6.08%	11.64%	6.96%	8.66%	33.34%
	11	6.15%	12.56%	5.65%	9.16%	33.51%
	12	4.92%	12.77%	5.83%	8.77%	32.29%
	1	5.55%	9.05%	7.18%	10.44%	32.21%
	2	6.17%	13.16%	7.71%	8.10%	35.12%
	3	5.56%	12.63%	8.18%	6.86%	33.22%
	4	4.50%	12.26%	6.23%	5.48%	28.47%
	5	5.76%	13.16%	6.68%	10.22%	35.81%
	6	6.76%	14.52%	6.56%	9.15%	36.99%
1983	7	5.99%	12.09%	5.96%	6.33%	30.37%
	8	6.89%	13.78%	6.18%	6.76%	33.61%
	9	5.24%	12.52%	5.65%	5.87%	29.28%
	10	4.98%	11.72%	6.29%	5.65%	28.64%
	11	4.87%	12.86%	5.72%	4.86%	28.30%
	12	5.81%	13.03%	4.30%	3.68%	26.82%
	1	6.76%	12.69%	6.45%	5.63%	31.54%
	2	6.16%	11.34%	5.99%	5.34%	28.83%
	3	5.31%	11.55%	4.96%	3.88%	25.70%
	4	5.76%	11.23%	5.10%	3.12%	25.22%
	5	5.81%	11.91%	4.67%	4.20%	26.60%
	6	5.38%	11.52%	4.85%	6.00%	27.74%

YEAR	PERIOD	ESCSHAR	CORSHAR	GLFSHAR	MAZSHAR	TOTAL
1984	7	6.31%	12.82%	4.58%	3.06%	26.77%
	8	6.22%	13.87%	3.00%	3.95%	27.05%
	9	5.60%	13.43%	4.34%	3.85%	27.22%
	10	4.79%	16.10%	10.82%	3.08%	34.78%
	11	4.60%	18.20%	7.04%	4.52%	34.36%
	12	4.23%	20.44%	6.56%	5.50%	36.73%
	1	4.31%	14.00%	8.74%	5.26%	32.32%
	2	4.11%	15.65%	11.63%	3.37%	34.75%
	3	3.97%	17.92%	9.98%	3.64%	35.51%
	4	3.98%	16.62%	10.93%		
	5	4.16%	14.80%	10.95%		
	6					
1985	7					
	8					
	9					
	10					
	11					
	12					

3. TOYOTA COROLLA ADVERTISING DATA

(EXPENDITURE IN R000's)

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	CORTOT
	1	455	2	1	7	0	0	10
	2	766	3	2	19	0	0	24
	3	977	4	0	15	1	0	20
	4	932	3	2	18	3	0	25
	5	1071	5	2	20	5	0	32
1977	6	966	4	2	85	6	0	97
	7	911	6	2	25	1	0	34
	8	1018	4	3	8	1	0	16
	9	955	3	4	3	1	0	12
	10	1051	4	0	20	1	0	25
	11	1055	3	0	13	1	0	18
	12	603	1	0	13	1	0	15
	1	699	1	0	8	1	0	10
	2	1019	1	0	0	1	0	2
	3	975	1	0	13	1	0	16
	4	969	3	3	33	1	0	40
	5	1073	2	4	14	1	0	22
1978	6	1188	5	5	27	1	7	46
	7	1225	11	7	34	1	29	82
	8	1304	11	4	34	1	21	71
	9	1167	11	3	36	1	12	63
	10	1322	10	0	14	1	0	25
	11	1848	9	2	21	1	0	32
	12	837	5	0	0	1	20	26
	1	728	5	3	12	0	34	55
	2	1259	6	1	25	0	0	31
	3	1669	7	6	1	0	22	36

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	CORTOT
	4	1383	6	0	0	0	47	53
	5	1153	4	2	1	0	17	24
1979	6	1499	9	6	6	0	0	21
	7	1623	11	2	30	0	0	43
	8	1826	17	0	174	8	29	226
	9	1677	13	11	186	1	37	247
	10	1943	12	13	138	0	29	192
	11	1630	10	7	36	0	20	74
	12	855	11	12	12	0	0	35
	1	988	11	2	39	0	0	52
	2	1672	13	17	82	0	0	111
	3	1586	15	2	53	0	51	121
	4	1750	41	7	19	2	51	120
	5	1794	22	45	85	3	84	239
1980	6	1726	15	44	75	11	0	145
	7	1766	11	39	2	0	0	53
	8	1856	4	6	2	0	0	12
	9	2068	66	3	115	16	12	212
	10	2182	31	29	228	16	56	359
	11	2142	20	55	54	11	84	223
	12	1281	11	47	9	3	45	115
	1	1094	7	28	9	0	72	116
	2	1967	8	56	110	0	76	251
	3	2127	10	12	92	0	0	114
	4	2207	10	7	102	3	25	148
	5	2115	14	77	138	6	89	325
1981	6	1959	14	67	75	18	75	249
	7	2444	9	78	63	7	61	218
	8	1892	5	48	133	0	42	227
	9	2411	3	18	77	31	40	169
	10	2619	5	1	52	37	0	94

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	CORTC.
	11	2673	7	4	87	0	0	97
	12	1703	4	14	22	0	66	105
	1	2076	5	4	44	0	122	175
	2	2398	4	14	97	0	55	170
	3	2577	13	9	162	0	62	246
	4	2314	13	12	63	1	32	121
	5	2454	16	5	155	2	0	178
1982	6	3086	41	11	91	1	14	158
	7	3443	59	0	182	0	63	304
	8	3181	51	28	267	20	58	424
	9	3649	28	23	183	20	107	361
	10	3000	31	24	187	20	51	313
	11	2794	12	32	183	20	0	247
	12	1704	7	27	38	0	0	72
	1	1817	10	21	122	0	80	233
	2	2695	11	34	36	16	134	231
	3	3093	13	4	44	16	0	77
	4	3303	15	12	57	16	0	100
	5	2981	11	20	63	0	125	239
1983	6	3192	18	6	92	0	49	165
	7	4243	27	6	82	0	108	223
	8	4025	38	8	108	0	99	253
	9	3607	42	10	176	0	0	228
	10	4467	53	11	293	16	73	446
	11	4998	65	26	248	15	65	419
	12	3032	42	42	63	15	103	265
	1	1998	29	21	10	17	124	201
	2	2962	33	46	117	17	96	309
	3	3412	24	87	114	1	128	354
	4	3885	21	94	77	17	144	353
	5	4396	27	26	106	17	174	350

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	CORTOT
1984	6	4329	16	33	68	16	0	133
	7	2944	9	20	119	0	0	148
	8	3333	24	16	82	0	0	122
	9	3464	21	13	64	0	0	98
	10	5442	101	11	244	0	20	376
	11	5870	109	53	1060	40	150	1412
	12	2358	46	31	308	8	106	499
	1	2246	32	108	67	19	136	362
	2	3706	25	11	106	19	203	364
	3	4245	29	118	155	19	189	510
	4	3609	23	146	131	19	60	379
	5	4547	25	115	127	19	0	286
1985	6	4563						
			1797	2150	8832	619	4181	17579
			10.22 %	12.23 %	50.24 %	3.52%	23.78 %	

(ADSPEND SHARE)

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	CORTOT
	1	0.44%	0.22%	1.43%	0.04%	0.00%	2.13%
	2	0.33%	0.30%	2.52%	0.00%	0.00%	3.15%
	3	0.45%	0.00%	1.55%	0.07%	0.00%	2.07%
	4	0.31%	0.17%	1.90%	0.29%	0.00%	2.67%
	5	0.44%	0.21%	1.87%	0.49%	0.00%	3.01%
1977	6	0.41%	0.20%	8.80%	0.61%	0.00%	10.02%
	7	0.65%	0.22%	2.78%	0.12%	0.00%	3.77%
	8	0.36%	0.26%	0.81%	0.13%	0.00%	1.55%
	9	0.31%	0.46%	0.32%	0.14%	0.00%	1.24%
		0.42%	0.00%	1.87%	0.12%	0.00%	2.42%
	11	0.31%	0.00%	1.26%	0.12%	0.00%	1.70%
	12	0.22%	0.00%	2.10%	0.22%	0.00%	2.54%
	1	0.11%	0.00%	1.10%	0.19%	0.00%	1.40%
	2	0.10%	0.00%	0.01%	0.12%	0.00%	0.23%
		0.11%	0.00%	1.35%	0.12%	0.00%	1.59%
		0.26%	0.30%	3.42%	0.13%	0.00%	4.11%
	5	0.22%	0.39%	1.30%	0.12%	0.00%	2.03%
1978	6	0.45%	0.45%	2.23%	0.11%	0.62%	3.87%
	7	0.90%	0.56%	2.77%	0.11%	2.38%	6.72%
	8	0.86%	0.32%	2.57%	0.09%	1.61%	5.45%
	9	0.92%	0.28%	3.10%	0.11%	0.99%	.40%
	10	0.75%	0.00%	1.07%	0.10%	0.00%	1.91%
	11	0.48%	0.09%	1.11%	0.06%	0.00%	1.75%
	12	0.61%	0.00%	0.00%	0.13%	2.28%	3.01%
	1	0.74%	0.40%	1.70%	0.00%	4.73%	7.57%
	2	0.49%	0.04%	1.95%	0.00%	0.00%	2.48%
	3	0.40%	0.38%	0.04%	0.01%	1.34%	2.16%
	4	0.44%	0.00%	0.01%	0.01%	3.36%	3.82%

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	CORTOT
	5	0.32%	0.20%	0.08%	0.01%	1.44%	2.05%
1979	6	0.57%	0.41%	0.43%	0.01%	0.00%	1.41%
	7	0.69%	0.09%	1.86%	0.01%	0.00%	2.65%
	8	0.91%	0.00%	9.50%	0.42%	1.57%	12.40%
	9	0.75%	0.63%	11.10%	0.07%	2.19%	14.74%
	10	0.60%	0.68%	7.11%	0.01%	1.48%	9.87%
	11	0.64%	0.40%	2.23%	0.01%	1.25%	4.52%
	12	1.31%	1.35%	1.40%	0.01%	0.00%	4.07%
	1	1.13%	0.20%	3.95%	0.01%	0.00%	5.29%
	2	0.75%	1.00%	4.88%	0.01%	0.00%	6.64%
	3	0.96%	0.11%	3.31%	0.03%	3.24%	7.65%
	4	2.36%	0.41%	1.06%	0.10%	2.91%	6.85%
	5	1.24%	2.50%	4.72%	0.16%	4.67%	13.29%
1980	6	0.86%	2.57%	4.35%	0.63%	0.00%	8.41%
	7	0.64%	2.20%	0.14%	0.01%	0.00%	2.98%
	8	0.23%	0.32%	0.09%	0.01%	0.00%	0.65%
	9	3.19%	0.15%	5.58%	0.79%	0.56%	10.26%
	10	1.42%	1.32%	10.43%	0.73%	2.57%	16.46%
	11	0.91%	2.55%	2.53%	0.51%	3.91%	10.43%
	12	0.84%	3.69%	0.70%	0.25%	3.48%	8.96%
	1	0.64%	2.60%	0.80%	0.00%	6.56%	10.60%
	2	0.42%	2.85%	5.59%	0.00%	3.88%	12.74%
	3	0.49%	0.55%	4.31%	0.00%	0.00%	5.35%
	4	0.44%	0.33%	4.64%	0.14%	1.15%	6.71%
	5	0.68%	3.62%	6.54%	0.29%	4.21%	15.34%
1981	6	0.73%	3.41%	3.82%	0.93%	3.81%	12.72%
	7	0.38%	3.19%	2.57%	0.29%	2.50%	8.92%
	8	0.24%	2.54%	7.02%	0.00%	2.22%	12.01%
	9	0.12%	0.73%	3.19%	1.30%	1.65%	7.00%
	10	0.17%	0.03%	1.99%	1.40%	0.00%	3.59%
	11	0.25%	0.13%	3.25%	0.00%	0.00%	3.64%

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	CORTOT
	12	0.21%	0.80%	1.30%	0.00%	3.87%	6.18%
	1	0.24%	0.19%	2.12%	0.00%	5.88%	8.43%
	2	0.17%	0.58%	4.05%	0.00%	2.29%	7.09%
	3	0.50%	0.35%	6.29%	0.00%	2.41%	9.55%
	4	0.56%	0.52%	2.72%	0.04%	1.38%	5.23%
	5	0.65%	0.20%	6.32%	0.08%	0.00%	7.25%
1982	6	1.33%	0.36%	2.95%	0.03%	0.45%	5.12%
	7	1.71%	0.00%	5.29%	0.00%	1.83%	8.83%
	8	1.60%	0.88%	8.39%	0.63%	1.82%	13.33%
	9	0.77%	0.63%	5.02%	0.55%	2.93%	9.89%
	10	1.03%	0.80%	6.23%	0.67%	1.70%	10.43%
	11	0.43%	1.15%	6.55%	0.73%	0.00%	8.84%
	12	0.41%	1.58%	2.23%	0.00%	0.00%	4.23%
	1	0.55%	1.16%	6.71%	0.00%	4.40%	12.82%
	2	0.41%	1.26%	1.34%	0.59%	4.97%	8.57%
	3	0.42%	0.13%	1.42%	0.52%	0.00%	2.49%
	4	0.45%	0.36%	1.73%	0.48%	0.00%	3.03%
	5	0.37%	0.67%	2.78%	0.00%	4.19%	8.02%
1983	6	0.56%	0.19%	2.88%	0.00%	1.54%	5.17%
	7	0.64%	0.14%	1.93%	0.00%	2.55%	5.26%
	8	0.94%	0.20%	2.68%	0.00%	2.46%	6.29%
	9	1.16%	0.28%	4.88%	0.00%	0.00%	6.32%
	10	1.19%	0.25%	6.55%	0.36%	1.63%	9.98%
	11	1.30%	0.52%	4.96%	0.30%	1.30%	8.38%
	12	1.39%	1.39%	2.08%	0.49%	3.40%	8.74%
	1	1.45%	1.05%	0.50%	0.85%	6.21%	10.06%
	2	1.11%	1.55%	3.95%	0.57%	3.24%	10.43%
	3	0.70%	2.55%	3.34%	0.03%	3.75%	10.38%
	4	0.54%	2.42%	1.98%	0.44%	3.71%	9.09%
	5	0.61%	0.59%	2.41%	0.39%	3.96%	7.96%
1984	6	0.37%	0.76%	1.57%	0.37%	0.00%	3.07%

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	CORTOT
	7	0.31%	0.68%	4.04%	0.00%	0.00%	5.03%
	8	0.72%	0.48%	2.46%	0.00%	0.00%	3.66%
	9	0.61%	0.38%	1.85%	0.00%	0.00%	2.83%
	10	1.86%	0.20%	4.48%	0.00%	0.37%	6.91%
	11	1.86%	0.90%	18.06%	0.68%	2.56%	24.05%
	12	1.95%	1.31%	13.06%	0.34%	4.50%	21.16%
	1	1.42%	4.81%	2.98%	0.85%	6.06%	16.12%
	2	0.67%	0.30%	2.86%	0.51%	5.48%	9.82%
	3	0.68%	2.78%	3.65%	0.45%	4.45%	12.01%
	4	0.64%	4.05%	3.63%	0.53%	1.66%	10.50%
	5	0.55%	2.53%	2.79%	0.42%	0.00%	6.29%
1985	6						

4. MAZDA 323 ADVERTISING DATA

(EXPENDITURE IN R000's)

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	MAZTOT
	1	455						
	2	766						
	3	977						
	4	932						
	5	1071						
1977	6	966	6	0	0	0	0	6
	7	911	8	2	137	0	0	147
	8	1018	3	3	38	0	0	44
	9	955	2	1	31	0	0	34
	10	1051	2	1	38	0	0	41
	11	1055	2	0	27	0	0	30
	12	603	2	0	13	0	0	15
	1	699	2	0	0	0	24	26
	2	1019	3	1	1	2	13	20
	3	975	4	1	15	0	0	20
	4	969	9	0	0	0	0	9
	5	1073	8	2	39	10	0	59
1978	6	1188	9	0	113	10	0	132
	7	1225	7	0	67	9	0	83
	8	1304	6	1	92	10	0	109
	9	1167	6	3	61	10	0	80
	10	1322	5	8	35	11	16	76
	11	1848	5	2	55	11	21	94
	12	857	4	0	27	10	4	46
	1	728	5	0	30	11	25	72
	2	1259	5	2	83	10	36	136
	3	1669	12	2	54	6	31	106

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	MAZTOT
	4	1383	12	11	18	1	59	101
	5	1153	17	6	11	0	20	53
1979	6	1499	12	11	58	0	26	107
	7	1623	12	4	22	0	0	39
	8	1826	6	0	63	0	0	69
	9	1677	14	2	100	0	0	116
	10	1943	15	7	43	0	0	65
	11	1630	20	2	53	0	0	74
	12	855	21	2	14	0	0	38
	1	988	23	15	12	0	0	50
	2	1672	31	17	55	0	63	167
	3	1586	25	33	42	0	28	128
	4	1750	34	27	102	0	0	163
	5	1794	28	32	45	0	55	161
1980	6	1726	43	22	104	0	0	168
	7	1766	39	18	45	0	0	102
	8	1856	34	6	110	0	0	149
	9	2068	45	33	71	0	58	207
	10	2182	46	6	43	0	15	109
	11	2142	42	20	114	0	23	199
	12	1281	45	7	109	0	0	161
	1	1094	33	4	47	0	48	132
	2	1967	41	12	179	0	43	274
	3	2127	47	29	99	0	63	237
	4	2207	34	17	80	0	59	221
	5	2115	39	50	67	0	27	183
1981	6	1959	31	23	35	0	35	124
	7	2444	41	3	71	0	29	144
	8	1892	25	0	46	0	33	104
	9	2411	56	48	124	10	86	325
	10	2619	48	66	94	10	48	265

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	MAZTOT
	11	2673	33	47	68	2	0	149
	12	1703	29	19	102	1	48	199
	1	2076	12	12	68	1	102	195
	2	2398	36	22	182	1	55	296
	3	2577	43	7	262	1	86	399
	4	2314	40	25	55	1	83	[illegible]
	5	2454	47	16	63	1	46	173
1982	6	3086	68	2	181	1	32	284
	7	3443	61	10	189	1	46	307
	8	3181	46	10	123	1	90	270
	9	3649	43	0	24	1	87	155
	10	3000	57	19	17	0	63	156
	11	2794	57	3	115	0	0	175
	12	1704	35	10	33	0	0	78
	1	1817	26	26	113	0	71	236
	2	2695	30	56	129	0	104	319
	3	3093	34	42	138	1	71	286
	4	3303	63	0	146	5	87	291
	5	2981	66	27	184	0	77	354
1983	6	3192	60	37	132	0	84	313
	7	4243	45	21	254	0	52	372
	8	4025	85	36	34	0	40	195
	9	3607	63	15	58	1	0	137
	10	4467	34	23	47	3	55	162
	11	4998	36	16	39	0	0	91
	12	3032	21	5	0	0	0	26
	1	1998	25	4	17	0	30	76
	2	2962	48	2	65	0	79	194
	3	3412	38	9	98	0	0	145
	4	3885	18	44	103	0	0	165
	5	4396	55	68	113	0	70	306

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	MAZTOT
1984	6	4329	76	63	108	0	50	297
	7	2944	35	71	43	0	0	149
	8	3333	46	63	117	0	11	237
	9	3464	32	68	219	0	31	350
	10	5442	29	74	191	0	44	338
	11	5870	18	38	74	0	69	199
	12	2358	18	22	31	0	39	110
	1	2246	8	2	13	0	0	23
	2	3706	11	15	18	0	0	44
	3	4245	10	0	1	0	0	11
	4	3609						
	5	4547						
1985	6	4563						
			2700	1643	7000	153	2791	14287
			18.90 %	11.50 %	49.00 %	1.07%	19.53 %	

(ADSPEND SHARE)

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	MAZTOT
	1						
	2						
	3						
	4						
	5						
1977	6	0.62%	0.00%	0.03%	0.00%	0.00%	0.65%
	7	0.88%	0.24%	15.06%	0.00%	0.00%	16.18%
	8	0.31%	0.27%	3.74%	0.00%	0.00%	4.32%
	9	0.20%	0.12%	3.29%	0.00%	0.00%	3.60%
	10	0.22%	0.10%	3.57%	0.00%	0.00%	3.89%
	11	0.22%	0.02%	2.60%	0.00%	0.00%	2.83%
	12	0.40%	0.00%	2.14%	0.00%	0.00%	2.54%
	1	0.24%	0.00%	0.00%	0.00%	3.48%	3.72%
	2	0.32%	0.14%	0.10%	0.19%	1.24%	1.98%
	3	0.43%	0.12%	1.52%	0.00%	0.00%	2.07%
	4	0.93%	0.00%	0.02%	0.00%	0.00%	0.95%
	5	0.73%	0.22%	3.59%	0.91%	0.00%	5.45%
1978	6	0.75%	0.00%	9.48%	0.85%	0.00%	11.08%
	7	0.57%	0.00%	5.43%	0.76%	0.00%	6.76%
	8	0.44%	0.11%	7.07%	0.76%	0.00%	8.38%
	9	0.52%	0.25%	5.24%	0.88%	0.00%	6.89%
	10	0.40%	0.64%	2.66%	0.82%	1.23%	5.75%
	11	0.28%	0.12%	3.00%	0.57%	1.11%	5.08%
	12	0.48%	0.00%	3.16%	1.21%	0.48%	5.33%
	1	0.74%	0.00%	4.12%	1.54%	3.43%	9.84%
	2	0.43%	0.19%	6.59%	0.79%	2.84%	10.83%
	3	0.71%	0.13%	3.26%	0.37%	1.88%	6.36%
	4	0.84%	0.76%	1.29%	0.10%	4.30%	7.29%

	5	1.43%	0.52%	0.97%	0.00%	1.69%	4.62%
1979	6	0.79%	0.73%	3.89%	0.00%	1.74%	7.15%
	7	0.73%	0.27%	1.37%	0.00%	0.00%	2.37%
	8	0.35%	0.00%	3.42%	0.00%	0.00%	3.77%
	9	0.82%	0.14%	5.94%	0.00%	0.00%	6.89%
	10	0.78%	0.38%	2.20%	0.00%	0.00%	3.37%
	11	1.21%	0.09%	3.26%	0.00%	0.00%	4.56%
	12	2.49%	0.28%	1.63%	0.00%	0.00%	4.40%
	1	2.34%	1.50%	1.22%	0.00%	0.00%	5.06%
	2	1.86%	1.02%	3.31%	0.00%	3.79%	9.98%
	3	1.56%	2.07%	2.67%	0.00%	1.74%	8.04%
	4	1.93%	1.55%	5.81%	0.00%	0.00%	9.29%
	5	1.53%	1.76%	2.57%	0.00%	3.09%	8.96%
1980	6	2.47%	1.25%	6.01%	0.00%	0.00%	9.73%
	7	2.20%	1.02%	2.55%	0.00%	0.00%	5.77%
	8	1.82%	0.33%	5.90%	0.00%	0.00%	8.05%
	9	2.17%	1.58%	3.43%	0.00%	2.82%	10.00%
	10	2.10%	0.27%	1.98%	0.00%	0.66%	5.01%
	11	1.97%	0.91%	5.33%	0.00%	1.08%	9.29%
	12	3.54%	0.57%	8.48%	0.00%	0.00%	12.59%
	1	3.03%	0.33%	4.28%	0.00%	4.42%	12.06%
	2	2.08%	0.61%	9.08%	0.00%	2.19%	13.95%
	3	2.20%	1.37%	4.64%	0.00%	2.95%	11.16%
	4	1.54%	2.14%	3.64%	0.00%	2.69%	10.02%
	5	1.83%	2.38%	3.17%	0.00%	1.28%	8.67%
1981	6	1.56%	1.17%	1.81%	0.00%	1.76%	6.30%
	7	1.68%	0.14%	2.89%	0.00%	1.20%	5.90%
	8	1.30%	0.02%	2.44%	0.00%	1.74%	5.50%
	9	2.32%	1.98%	5.16%	0.42%	3.58%	13.47%
	10	1.83%	2.51%	3.60%	0.36%	1.82%	10.13%
	11	1.24%	1.75%	2.52%	0.06%	0.00%	5.58%
	12	1.70%	1.13%	5.99%	0.04%	2.84%	11.70%

	1	0.58%	0.58%	3.28%	0.05%	4.91%	9.39%
	2	1.50%	0.92%	7.59%	0.04%	2.29%	12.34%
	3	1.67%	0.27%	10.17%	0.04%	3.34%	15.48%
	4	1.73%	1.08%	2.38%	0.04%	3.59%	8.82%
	5	1.92%	0.65%	2.57%	0.04%	1.87%	7.05%
1982	6	2.20%	0.06%	5.87%	0.03%	1.04%	9.20%
	7	1.77%	0.29%	5.49%	0.03%	1.34%	8.92%
	8	1.45%	0.31%	3.87%	0.03%	2.83%	8.49%
	9	1.18%	0.00%	0.66%	0.03%	2.38%	4.25%
	10	1.90%	0.63%	0.57%	0.00%	2.10%	5.20%
	11	2.04%	0.11%	4.12%	0.00%	0.00%	6.26%
	12	2.05%	0.59%	1.94%	0.00%	0.00%	4.58%
	1	1.43%	1.43%	6.22%	0.00%	3.91%	12.99%
	2	1.11%	2.08%	4.79%	0.00%	3.86%	11.84%
	3	1.10%	1.36%	4.46%	0.03%	2.30%	9.25%
	4	1.60%	0.00%	4.42%	0.15%	2.63%	8.81%
	5	2.21%	0.91%	6.17%	0.00%	2.58%	11.88%
1983	6	1.88%	1.16%	4.14%	0.00%	2.63%	9.81%
	7	1.06%	0.49%	5.99%	0.00%	1.23%	8.77%
	8	2.11%	0.89%	0.84%	0.00%	0.99%	4.84%
	9	1.75%	0.42%	1.61%	0.03%	0.00%	3.80%
	10	0.76%	0.51%	1.05%	0.07%	1.23%	3.63%
	11	0.72%	0.32%	0.78%	0.00%	0.00%	1.82%
	12	0.69%	0.16%	0.00%	0.00%	0.00%	0.86%
	1	1.25%	0.20%	0.85%	0.00%	1.50%	3.80%
	2	1.62%	0.07%	2.19%	0.00%	2.67%	6.55%
	3	1.11%	0.26%	2.87%	0.00%	0.00%	4.25%
	4	0.46%	1.13%	2.65%	0.00%	0.00%	4.25%
	5	1.25%	1.55%	2.57%	0.00%	1.59%	6.96%
1984	6	1.76%	1.46%	2.49%	0.00%	1.16%	6.86%
	7	1.19%	2.41%	1.46%	0.00%	0.00%	5.06%
	8	1.38%	1.89%	3.51%	0.00%	0.33%	7.11%

	9	0.92%	1.96%	6.32%	0.00%	0.89%	10.10%
	10	0.53%	1.36%	3.51%	0.00%	0.81%	6.21%
	11	0.31%	0.65%	1.26%	0.00%	1.18%	3.39%
	12	0.76%	0.93%	1.31%	0.00%	1.65%	4.66%
	1	0.36%	0.09%	0.58%	0.00%	0.00%	1.02%
	2	0.30%	0.40%	0.49%	0.00%	0.00%	1.19%
	3	0.24%	0.00%	0.02%	0.00%	0.00%	0.26%
	4						
	5						
1985	6						

5. VOLKSWAGEN GOLF/ JETTA ADVERTISING DATA

(EXPENDITURE IN R000's)

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	GLFTOT
	1	455						
	2	766						
	3	977						
	4	932						
	5	1071						
1977	6	966						
	7	911						
	8	1018						
	9	955						
	10	1051						
	11	1055						
	12	603						
	1	699						
	2	1019						
	3	975						
	4	969						
	5	1073						
1978	6	1188	2	0	0	0	0	2
	7	1225	14	9	43	6	29	100
	8	1304	16	14	14	3	0	47
	9	1167	7	5	11	0	6	29
	10	1322	8	6	18	0	15	47
	11	1848	3	1	42	0	0	46
	12	857	2	4	23	0	0	29
	1	728	1	1	24	0	0	26
	2	1259	6	1	18	0	0	24
	3	1669	9	3	2	0	24	39
	4	1383	2	4	41	0	13	60
	5	1158	8	6	14	0	19	47

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	GLFTOT
1979	6	1499	8	4	57	0	10	79
	7	1623	8	8	4	0	18	39
	8	1826	9	6	39	0	26	81
	9	1677	4	10	2	0	0	17
	10	1943	9	8	38	0	0	55
	11	1630	22	6	65	0	24	116
	12	855	8	0	0	0	0	8
	1	988	4	0	45	0	0	49
	2	1672	15	0	33	0	41	89
	3	1586	6	3	2	0	0	11
	4	1750	15	4	105	0	41	165
	5	1794	19	3	36	0	5	62
1980	6	1726	23	6	61	0	0	90
	7	1766	11	0	2	0	34	47
	8	1856	11	7	106	0	26	150
	9	2068	22	0	87	0	23	132
	10	2182	24	3	109	0	30	166
	11	2142	28	0	189	0	0	217
	12	1281	12	15	84	0	0	111
	1	1094	13	19	51	0	17	100
	2	1967	28	23	96	0	66	214
	3	2127	21	28	85	0	76	211
	4	2207	22	18	102	0	77	219
	5	2115	30	23	69	0	25	149
1981	6	1959	23	18	11	0	55	108
	7	2444	26	13	118	0	26	183
	8	1892	34	18	41	0	41	133
	9	2411	44	19	18	0	72	152
	10	2619	33	6	165	0	12	217
	11	2673	45	0	199	10	67	321
	12	1703	20	9	8	10	28	75

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	GLFTOT
	1	2076	6	11	43	10	74	144
	2	2398	32	0	136	0	10	178
	3	2577	35	39	156	0	34	264
	4	2314	14	44	8	0	17	83
	5	2454	31	30	13	0	51	125
1982	6	3086	84	31	140	0	33	288
	7	3443	83	46	64	0	53	246
	8	3181	79	39	6	0	13	137
	9	3649	71	14	85	0	35	205
	10	3000	30	19	86	10	0	145
	11	2794	29	13	2	0	0	44
	12	1704	25	6	2	0	0	33
	1	1817	23	0	73	0	66	162
	2	2695	31	11	106	7	60	215
	3	3093	40	55	60	12	75	242
	4	3303	43	43	164	9	41	300
	5	2981	35	48	187	9	42	321
1983	6	3192	47	32	214	8	38	339
	7	4243	41	54	221	5	35	356
	8	4025	66	46	143	9	54	318
	9	3607	35	49	72	7	39	202
	10	4467	40	21	110	8	26	205
	11	4998	29	24	124	6	38	221
	12	3032	59	0	42	0	8	109
	1	1998	18	9	1	0	34	62
	2	2962	14	6	3	13	35	71
	3	3412	32	15	185	0	62	294
	4	3885	31	30	215	2	81	359
	5	4396	35	24	170	8	34	71
1984	6	4329	35	21	102	8	24	190
	7	2944	27	24	37	6	50	144

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	GLFTCT
	8	3333	33	9	20	6	0	68
	9	3464	30	6	34	2	0	72
	10	5442	63	69	516	9	186	843
	11	5870	69	101	316	6	130	622
	12	2358	35	77	32	9	84	237
	1	2246	12	33	3	0	115	163
	2	3706	28	42	74	4	192	340
	3	4245	35	47	4	1	190	277
	4	3609	24	29	256	47	221	577
	5	4547	61	57	133	2	134	387
1985	6	4563						
			2265	1606	6635	252	3360	14119
			16.04 %	11.37 %	47.00 %	1.79%	23.80 %	

(ADSPEND SHARE)

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	GLPTOT
	1						
	2						
	3						
	4						
	5						
1977	6						
	7						
	8						
	9						
	10						
	11						
	12						
	1						
	2						
	3						
	4						
	5						
1978		0.19%	0.00%	0.00%	0.00%	0.00%	0.19%
	7	1.12%	0.69%	3.50%	0.49%	2.38%	8.19%
	8	1.19%	1.07%	1.07%	0.26%	0.00%	3.60%
	9	0.57%	0.45%	0.93%	0.00%	0.48%	2.44%
	10	0.64%	0.44%	1.35%	0.00%	1.13%	3.56%
	11	0.14%	0.05%	2.29%	0.00%	0.00%	2.48%
	12	0.20%	0.48%	2.72%	0.00%	0.00%	3.40%
	1	0.15%	0.12%	3.28%	0.00%	0.00%	3.56%
	2	0.48%	0.07%	1.39%	0.00%	0.00%	1.94%
	3	0.56%	0.19%	0.12%	0.00%	1.44%	2.32%
	4	0.17%	0.27%	2.98%	0.00%	0.95%	4.32%

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	GLFTOT
	5	0.73%	0.49%	1.23%	0.00%	1.66%	4.10%
1979	6	0.54%	0.27%	3.82%	0.00%	0.66%	5.30%
	7	0.52%	0.50%	0.23%	0.00%	1.13%	2.38%
	8	0.51%	0.35%	2.11%	0.00%	1.43%	4.41%
	9	0.26%	0.58%	0.14%	0.00%	0.00%	0.99%
	10	0.44%	0.42%	1.97%	0.00%	0.00%	2.83%
	11	1.36%	0.35%	3.98%	0.00%	1.45%	7.13%
	12	0.91%	0.00%	0.00%	0.00%	0.00%	0.91%
	1	0.38%	0.00%	4.60%	0.00%	0.00%	4.98%
	2	0.91%	0.00%	1.98%	0.00%	2.45%	5.33%
	3	0.37%	0.19%	0.14%	0.00%	0.00%	0.70%
	4	0.87%	0.25%	6.00%	0.00%	2.33%	9.45%
	5	1.05%	0.15%	2.01%	0.00%	0.26%	3.47%
1980	6	1.33%	0.35%	3.56%	0.00%	0.00%	5.23%
	7	0.64%	0.00%	0.12%	0.00%	1.91%	2.67%
	8	0.59%	0.36%	5.71%	0.00%	1.41%	8.06%
	9	1.05%	0.00%	4.20%	0.00%	1.11%	6.36%
	10	1.08%	0.12%	5.01%	0.00%	1.38%	7.59%
	11	1.29%	0.00%	8.82%	0.00%	0.00%	10.11%
	12	0.96%	1.19%	6.53%	0.00%	0.00%	8.67%
	1	1.22%	1.70%	4.63%	0.00%	1.59%	9.13%
	2	1.43%	1.18%	4.88%	0.00%	3.37%	10.86%
	3	1.01%	1.33%	3.99%	0.00%	3.59%	9.91%
	4	1.00%	0.82%	4.63%	0.00%	3.48%	9.94%
	5	1.42%	1.19%	3.25%	0.00%	1.20%	7.06%
1981	6	1.18%	0.93%	0.56%	0.00%	2.82%	5.49%
	7	1.07%	0.52%	4.82%	0.00%	1.07%	7.48%
	8	1.80%	0.93%	2.17%	0.00%	2.15%	7.05%
	9	1.81%	0.77%	0.74%	0.00%	2.97%	6.29%
	10	1.28%	0.24%	6.30%	0.00%	0.46%	8.28%
	11	1.67%	0.00%	7.44%	0.37%	2.51%	12.00%

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	GLFTOT
	12	1.15%	0.55%	0.45%	0.59%	1.65%	4.38%
	1	0.29%	0.53%	2.07%	0.48%	3.56%	6.94%
	2	1.33%	0.00%	5.67%	0.00%	0.42%	7.42%
	3	1.36%	1.51%	6.05%	0.00%	1.32%	10.24%
	4	0.61%	1.90%	0.35%	0.00%	0.73%	3.59%
	5	1.26%	1.22%	0.53%	0.00%	2.08%	5.09%
1982	6	2.72%	1.00%	4.54%	0.00%	1.07%	9.33%
	7	2.41%	1.34%	1.86%	0.00%	1.54%	7.14%
	8	2.48%	1.23%	0.19%	0.00%	0.41%	4.31%
	9	1.95%	0.38%	2.33%	0.00%	0.96%	5.62%
	10	1.00%	0.63%	2.87%	0.33%	0.00%	4.83%
	11	1.04%	0.47%	0.07%	0.00%	0.00%	1.57%
	12	1.47%	0.35%	0.12%	0.00%	0.00%	1.94%
	1	1.27%	0.00%	4.02%	0.00%	3.63%	8.92%
	2	1.15%	0.41%	3.93%	0.26%	2.23%	7.98%
	3	1.29%	1.78%	1.94%	0.39%	2.42%	7.82%
	4	1.30%	1.30%	4.97%	0.27%	1.24%	9.08%
	5	1.17%	1.61%	6.27%	0.30%	1.41%	10.77%
1983	6	1.47%	1.00%	6.70%	0.25%	1.19%	10.62%
	7	0.97%	1.27%	5.21%	0.12%	0.82%	8.39%
	8	1.64%	1.14%	3.55%	0.22%	1.34%	7.90%
	9	0.97%	1.36%	2.00%	0.19%	1.08%	5.60%
	10	0.90%	0.47%	2.46%	0.18%	0.58%	4.59%
	11	0.58%	0.48%	2.48%	0.12%	0.76%	4.42%
	12	1.95%	0.00%	1.39%	0.00%	0.26%	3.59%
	1	0.90%	0.45%	0.05%	0.00%	1.70%	3.10%
	2	0.47%	0.20%	0.10%	0.44%	1.18%	2.40%
	3	0.94%	0.44%	5.42%	0.00%	1.82%	8.62%
	4	0.80%	0.77%	5.53%	0.05%	2.08%	9.24%
	5	0.80%	0.55%	3.87%	0.18%	0.77%	6.16%
1984	6	0.81%	0.[illegible]	2.36%	0.18%	0.55%	4.39%

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	GLFTOT
	7	0.92%	0.82%	1.26%	0.20%	1.70%	4.89%
	8	0.99%	0.27%	0.60%	0.18%	0.00%	2.04%
	9	0.87%	0.17%	0.98%	0.06%	0.00%	2.08%
	10	1.16%	1.27%	9.48%	0.17%	3.42%	15.49%
	11	1.18%	1.72%	5.38%	0.10%	2.21%	10.60%
	12	1.48%	3.27%	1.36%	0.38%	3.56%	10.05%
	1	0.53%	1.47%	0.13%	0.00%	5.12%	7.26%
	2	0.76%	1.13%	-2.00%	0.11%	5.18%	9.17%
	3	0.82%	1.11%	0.09%	0.02%	4.48%	6.53%
	4	0.67%	0.80%	7.09%	1.30%	6.12%	15.99%
	5	1.34%	1.25%	2.93%	0.04%	2.95%	8.51%
198	-6						

6. FORD ESCORT ADVERTISING DATA

(EXPENDITURE IN R000's)

YEAR	PERIOD	TOTAL MRT	RET	MAG	NEW	OCR	TV	FORDTOT
	1	455	1	2	1	3	0	6
	2	766	0	3	21	0	0	24
	3	977	1	14	20	1	0	36
	4	932	2	10	23	5	0	41
	5	1071	1	0	1	2	0	4
1977	6	966	1	0	2	2	0	5
	7	911	2	0	11	3	0	16
	8	1018	1	0	67	6	0	75
	9	955	4	0	1	8	0	13
	10	1051	5	0	73	7	0	85
	11	1055	1	3	9	1	0	14
	12	603	1	1	19	5	0	25
	1	699	2	7	13	9	0	30
	2	1019	0	7	10	9	0	26
	3	975	2	2	61	0	0	65
	4	969	2	0	1	0	0	3
	5	107	1	2	0	0	0	3
1978	6	1188	1	0	0	5	24	30
	7	1225	2	0	3	0	0	5
	8	1304	4	0	15	0	0	18
	9	1167	4	0	13	0	0	17
	10	1322	3	0	26	0	0	29
	11	1848	3	4	15	0	0	21
	12	857	1	0	15	0	0	16
	1	728	2	5	0	0	0	7
	2	1259	3	0	22	2	3	29
	3	1669	7	12	135	20	86	260

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	FORDTOT
	4	1383	3	13	0	10	45	71
	5	1153	2	11	0	0	0	13
1979	6	1499	3	0	0	0	0	3
	7	1623	3	3	31	0	0	37
	8	1826	2	0	6	0	0	8
	9	1677	4	0	109	12	0	125
	10	1943	1	0	65	1	0	67
	11	1630	2	0	4	0	0	6
	12	855	7	0	1	8	0	15
	1	988	9	2	95	14	0	120
	2	1672	3	0	167	28	88	285
	3	1586	2	2	3	24	83	114
	4	1750	1	2	2	9	6	20
	5	1794	1	5	0	0	0	7
1980	6	1726	1	1	142	18	0	163
	7	1766	3	28	80	31	116	257
	8	1856	2	29	1	35	2	69
	9	2068	1	1	25	15	0	41
	10	2182	2	7	0	19	0	27
	11	2142	3	0	0	21	0	24
	12	1281	3	0	0	16	0	20
	1	1094	1	0	0	4	0	5
	2	1967	3	0	0	5	0	7
	3	2127	3	0	0	0	0	3
	4	2207	4	0	109	18	0	131
	5	2115	7	0	158	48	40	252
1981	6	1959	5	10	246	10	50	320
	7	2444	7	6	200	8	43	263
	8	1892	6	12	1	42	76	137
	9	2411	9	15	106	47	86	263
	10	2619	6	11	16	12	0	44

YEAR	PERIOD	TOTAL MNT	RET	MAG	NEW	OCR	TV	FORDTOT
	11	2673	10	16	93	7	0	126
	12	1703	5	38	122	4	0	169
	1	2076	2	60	3	8	27	100
	2	2398	3	48	2	4	0	57
	3	2577	10	44	170	6	46	276
	4	2314	11	30	115	9	32	197
	5	2454	21	14	3	29	97	164
1982	6	3086	23	14	0	29	56	122
	7	3443	18	0	1	25	0	44
	8	3181	19	0	35	28	49	131
	9	3649	17	4	174	45	76	316
	10	3000	16	6	37	6	10	75
	11	2794	17	2	0	23	25	67
	12	1704	9	1	90	8	56	164
	1	1817	2	5	32	15	70	124
	2	2695	6	5	45	24	85	165
	3	3093	3	3	0	9	61	76
	4	3303	5	7	1	9	56	78
	5	2981	9	0	0	13	58	80
1983	6	3192	17	3	110	16	74	220
	7	4243	14	20	101	16	102	253
	8	4025	19	0	13	16	86	134
	9	3607	8	19	5	0	71	94
	10	4467	16	1	0	0	0	17
	11	4998	12	73	215	9	41	350
	12	3032	21	108	65	9	34	237
	1	1998	11	14	0	10	40	75
	2	2962	15	5	0	8	34	62
	3	3412	21	25	86	11	38	181
	4	3885	17	23	91	12	50	193
	5	4396	19	15	1	7	58	100

YEAR	PERIOD	TOTAL MKT	RET	MAG	NEW	OCR	TV	FORDTOT
1984	6	4329	16	11	134	14	64	239
	7	2944	9	39	90	17	49	204
	8	3333	12	67	92	15	0	186
	9	3464	9	38	51	16	71	185
	10	5442	7	129	61	16	19	232
	11	5870	8	91	3	8	69	179
	12	2358	8	22	4	7	23	64
	1	2246	6	9	0	6	0	21
	2	3706	6	32	0	11	103	152
	3	4245	4	110	58	11	88	271
	4	3609	8	20	46	12	23	109
	5	4547	11	16	15	10	64	116
1985	6	4563						
			664	1401	4305	1099	2751	10221
			6.50%	13.71%	42.12%	10.76%	26.92%	

(ADSPEND SHARE)

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	FORDTOT
	1	0.11%	0.33%	0.22%	0.72%	0.00%	1.38%
	2	0.04%	0.34%	2.72%	0.00%	0.00%	3.09%
	3	0.14%	1.41%	2.07%	0.10%	0.00%	3.73%
	4	0.25%	1.12%	2.49%	0.54%	0.00%	4.39%
	5	0.11%	0.00%	0.09%	0.20%	0.00%	0.40%
1977	6	0.05%	0.03%	0.16%	0.24%	0.00%	0.48%
	7	0.25%	0.00%	1.15%	0.30%	0.00%	1.70%
	8	0.12%	0.00%	6.57%	0.63%	0.00%	7.32%
	9	0.39%	0.00%	0.09%	0.86%	0.00%	1.34%
	10	0.49%	0.00%	6.97%	0.64%	0.00%	8.10%
	11	0.11%	0.27%	0.85%	0.06%	0.00%	1.30%
	12	0.15%	0.08%	3.07%	0.83%	0.00%	4.13%
	1	0.21%	0.93%	1.92%	1.29%	0.00%	4.35%
	2	0.04%	0.66%	1.00%	0.84%	0.00%	2.54%
	3	0.21%	0.17%	6.27%	0.04%	0.00%	6.69%
	4	0.15%	0.00%	0.12%	0.01%	0.00%	0.29%
	5	0.12%	0.18%	0.01%	0.00%	0.00%	0.31%
1978	6	0.08%	0.00%	0.00%	0.45%	2.03%	2.55%
	7	0.15%	0.00%	0.22%	0.00%	0.00%	0.37%
	8	0.28%	0.00%	1.12%	0.00%	0.00%	1.40%
	9	0.33%	0.00%	1.14%	0.00%	0.00%	1.47%
	10	0.22%	0.00%	1.99%	0.00%	0.00%	2.21%
	11	0.15%	0.13%	0.80%	0.00%	0.00%	1.14%
	12	0.16%	0.00%	1.75%	0.00%	0.00%	1.91%
	1	0.27%	0.63%	0.00%	0.00%	0.00%	0.91%
	2	0.22%	0.00%	1.72%	0.14%	0.23%	2.30%
	3	0.42%	0.72%	8.08%	1.22%	5.14%	15.58%
	4	0.18%	0.96%	0.03%	0.69%	3.28%	5.13%

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	FORDTOT
	5	0.14%	0.95%	0.00%	0.00%	0.00%	1.08%
1979	6	0.23%	0.00%	0.00%	0.00%	0.00%	0.23%
	7	0.18%	0.16%	1.92%	0.00%	0.00%	2.26%
	8	0.10%	0.00%	0.32%	0.00%	0.00%	0.42%
	9	0.24%	0.00%	6.49%	0.71%	0.00%	7.45%
	10	0.06%	0.00%	3.35%	0.05%	0.00%	3.46%
	11	0.13%	0.00%	0.23%	0.00%	0.00%	0.37%
	12	0.77%	0.00%	0.08%	0.95%	0.00%	1.80%
	1	0.89%	0.15%	9.62%	1.46%	0.00%	12.12%
	2	0.17%	0.00%	9.97%	1.64%	5.24%	17.03%
	3	0.14%	0.09%	0.21%	1.49%	5.22%	7.16%
	4	0.08%	0.13%	0.09%	0.51%	0.32%	1.13%
	5	0.07%	0.30%	0.00%	0.00%	0.00%	0.37%
1980	6	0.08%	0.08%	8.24%	1.04%	0.00%	9.43%
	7	0.16%	1.61%	4.50%	1.75%	6.54%	14.56%
	8	0.12%	1.55%	0.06%	1.88%	0.10%	3.70%
	9	0.02%	0.04%	1.20%	0.71%	0.00%	1.97%
	10	0.08%	0.30%	0.00%	0.86%	0.00%	1.24%
	11	0.14%	0.00%	0.00%	0.96%	0.00%	1.11%
	12	0.25%	0.00%	0.01%	1.26%	0.00%	1.52%
	1	0.07%	0.02%	0.00%	0.37%	0.00%	0.46%
	2	0.13%	0.00%	0.01%	0.23%	0.00%	0.37%
	3	0.14%	0.00%	0.00%	0.01%	0.00%	0.16%
	4	0.20%	0.00%	4.94%	0.82%	0.00%	5.95%
	5	0.31%	0.00%	7.45%	2.26%	1.91%	11.92%
1981	6	0.23%	0.50%	12.54%	0.53%	2.55%	16.34%
	7	0.28%	0.23%	8.18%	0.34%	1.74%	10.77%
	8	0.33%	0.62%	0.03%	2.22%	4.02%	7.23%
	9	0.39%	0.60%	4.39%	1.94%	3.57%	10.89%
	10	0.21%	0.40%	0.61%	0.45%	0.00%	1.67%
	11	0.38%	0.58%	3.49%	0.25%	0.00%	4.71%

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	FORDTOT
	12	0.30%	2.20%	7.13%	0.26%	0.00%	9.89%
	1	0.10%	2.89%	0.14%	0.39%	1.30%	4.82%
	2	0.13%	2.00%	0.08%	0.17%	0.00%	2.38%
	3	0.39%	1.71%	6.60%	0.23%	1.79%	10.71%
	4	0.48%	1.30%	4.97%	0.39%	1.38%	8.51%
	5	0.86%	0.57%	0.12%	1.18%	3.95%	6.68%
1982	6	0.75%	0.45%	0.00%	0.94%	1.81%	3.95%
	7	0.52%	0.00%	0.03%	0.73%	0.00%	1.28%
	8	0.00%	0.00%	1.10%	0.88%	1.54%	4.12%
	9	0.47%	0.11%	4.77%	1.23%	2.08%	8.66%
	10	0.53%	0.20%	1.23%	0.20%	0.33%	2.50%
	11	0.61%	0.07%	0.00%	0.82%	0.89%	2.40%
	12	0.53%	0.06%	5.28%	0.47%	3.29%	9.62%
	1	0.11%	0.28%	1.76%	0.83%	3.85%	6.82%
	2	0.22%	0.19%	1.67%	0.89%	3.15%	6.12%
	3	0.10%	0.10%	0.00%	0.29%	1.97%	2.46%
	4	0.15%	0.21%	0.03%	0.27%	1.70%	2.36%
	5	0.30%	0.00%	0.00%	0.44%	1.95%	2.68%
1983	6	0.53%	0.09%	3.45%	0.50%	2.32%	6.89%
	7	0.33%	0.47%	2.38%	0.38%	2.40%	5.96%
	8	0.47%	0.00%	0.32%	0.40%	2.14%	3.33%
	9	0.22%	0.28%	0.14%	0.00%	1.97%	2.61%
	10	0.36%	0.02%	0.00%	0.00%	0.00%	0.38%
	11	0.24%	1.46%	4.30%	0.18%	0.82%	7.00%
	12	0.69%	3.56%	2.14%	0.30%	1.12%	7.82%
	1	0.55%	0.70%	0.00%	0.50%	2.00%	3.75%
	2	0.51%	0.17%	0.00%	0.27%	1.15%	2.09%
	3	0.62%	0.73%	2.52%	0.32%	1.11%	5.30%
	4	0.44%	0.59%	2.34%	0.31%	1.29%	4.97%
	5	0.43%	0.34%	0.02%	0.16%	1.32%	2.27%
1984	6	0.37%	0.25%	3.10%	0.32%	1.48%	5.52%

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	FORDTOT
	7	0.31%	1.32%	3.06%	0.58%	1.66%	6.93%
	8	0.36%	2.01%	2.76%	0.45%	0.00%	5.58%
	9	0.26%	1.10%	1.47%	0.46%	2.05%	5.34%
	10	0.13%	2.37%	1.12%	0.29%	0.35%	4.26%
	11	0.14%	1.55%	0.05%	0.14%	1.18%	3.05%
	12	0.34%	0.93%	0.17%	0.30%	0.98%	2.71%
	1	0.27%	0.40%	0.00%	0.27%	0.00%	0.93%
	2	0.16%	0.86%	0.00%	0.30%	2.78%	4.10%
	3	0.09%	2.59%	1.[illegible]%	0.26%	2.07%	6.38%
	4	0.22%	0.55%	1.[illegible]%	0.33%	0.64%	3.02%
	5	0.24%	0.35%	0.33%	0.22%	1.41%	2.55%
1985	6						

YEAR	PERIOD	RET	MAG	NEW	OCR	TV	FORDTOT
	7	0.31%	1.32%	3.06%	0.58%	1.66%	6.93%
	8	0.36%	2.01%	2.76%	0.45%	0.00%	5.58%
	9	0.26%	1.10%	1.47%	0.46%	2.05%	5.34%
	10	0.13%	2.37%	1.12%	0.29%	0.35%	4.26%
	11	0.14%	1.55%	0.05%	0.14%	1.18%	3.05%
	12	0.34%	0.93%	0.17%	0.30%	0.98%	2.71%
	1	0.27%	0.40%	0.00%	0.27%	0.00%	0.93%
	2	0.16%	0.86%	0.00%	0.30%	2.78%	4.10%
	3	0.09%	2.59%	1.37%	0.26%	2.07%	6.38%
	4	0.22%	0.55%	1.27%	0.33%	0.64%	3.02%
	5	0.24%	0.35%	0.33%	0.22%	1.41%	2.55%
1985	6						

RESEARCH RESULTS - CORRELOGRAMS

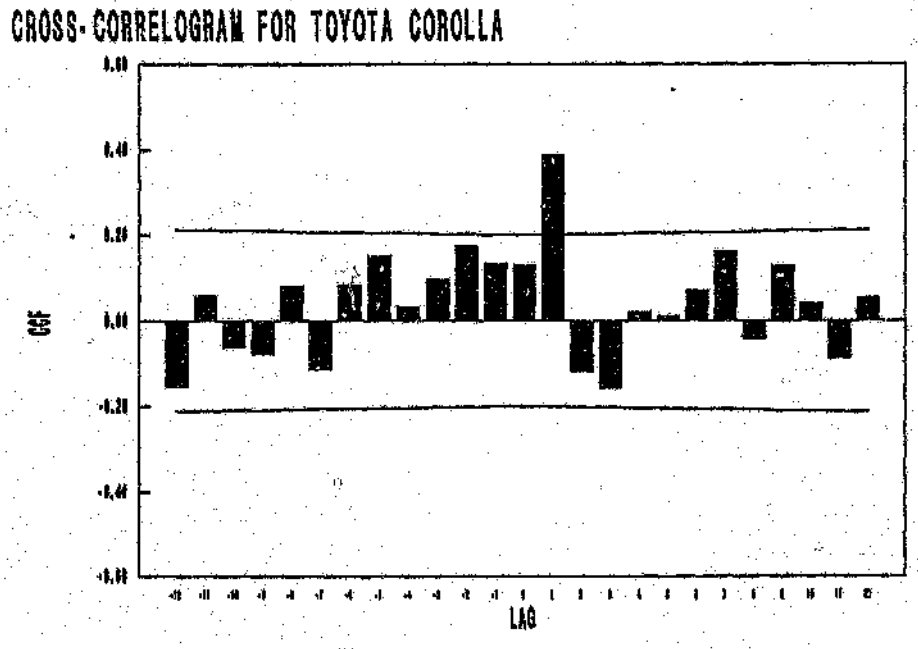


Figure 1

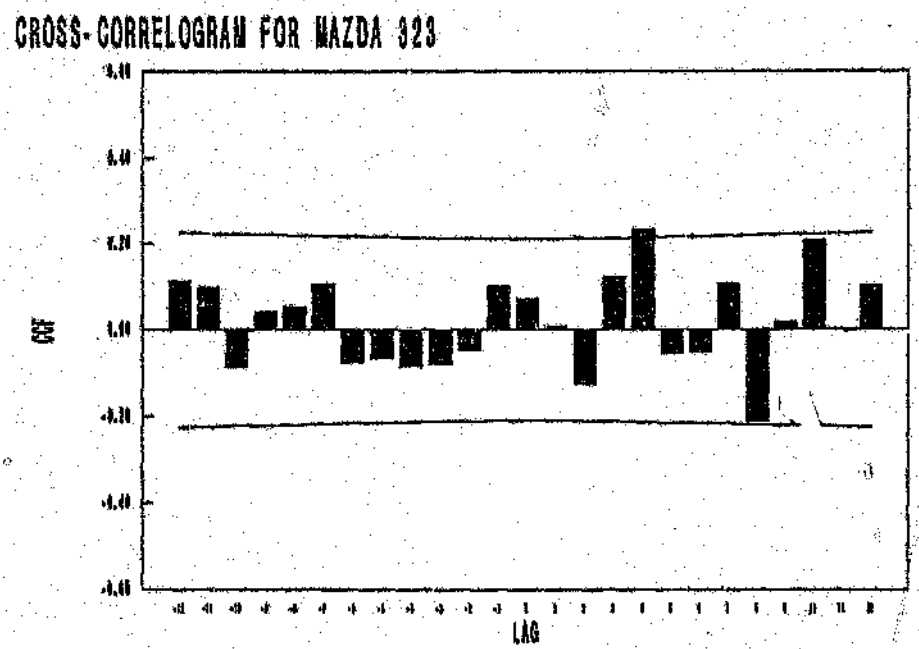


Figure 2

CROSS-CORRELOGRAM FOR FORD ESCORT

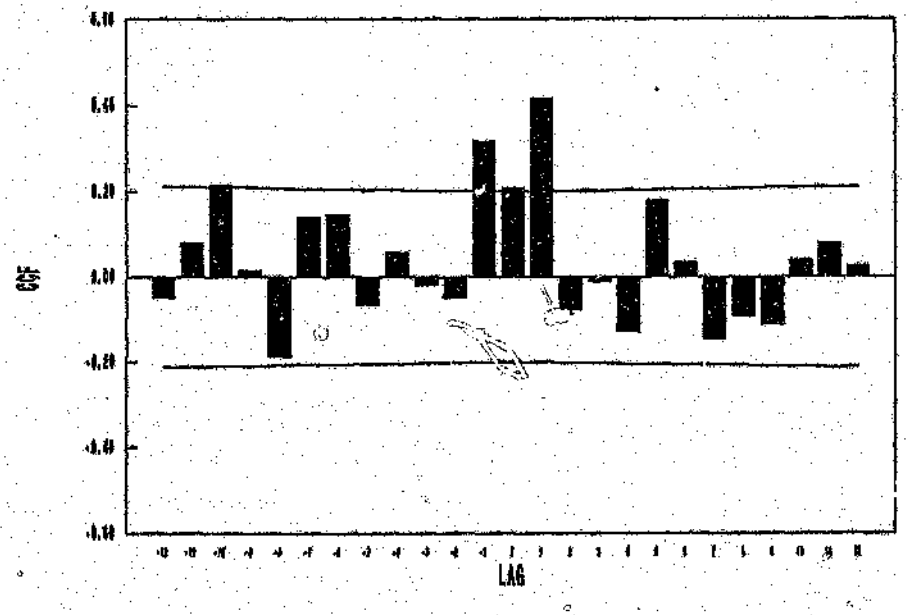


Figure 3

CROSS-CORRELOGRAM FOR VW GOLF/ JETTA

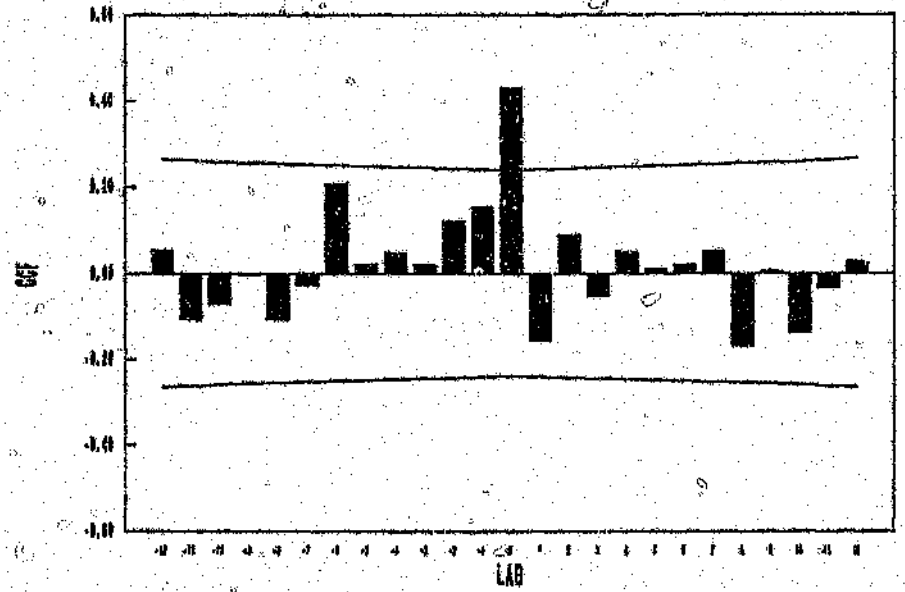


Figure 4

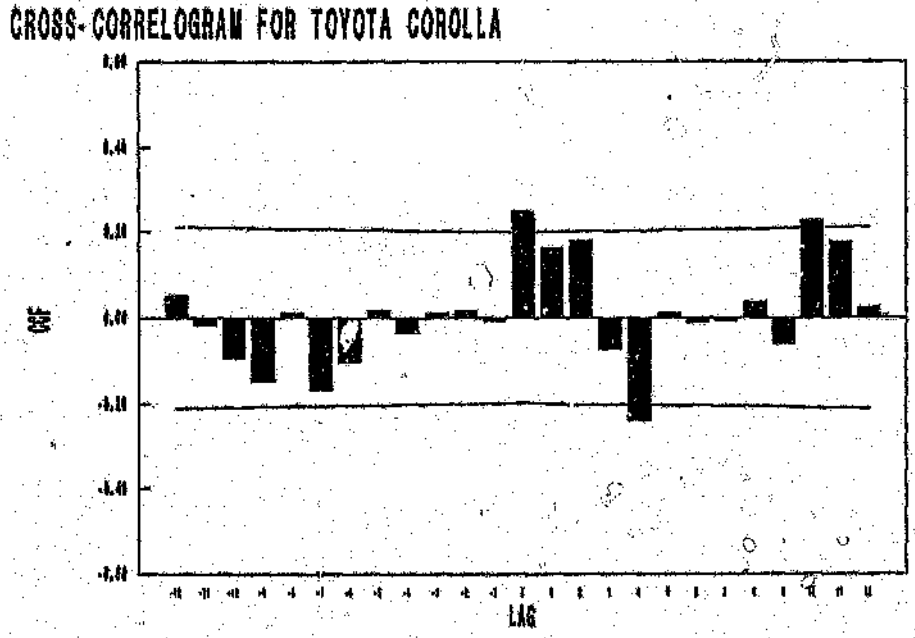


Figure 5

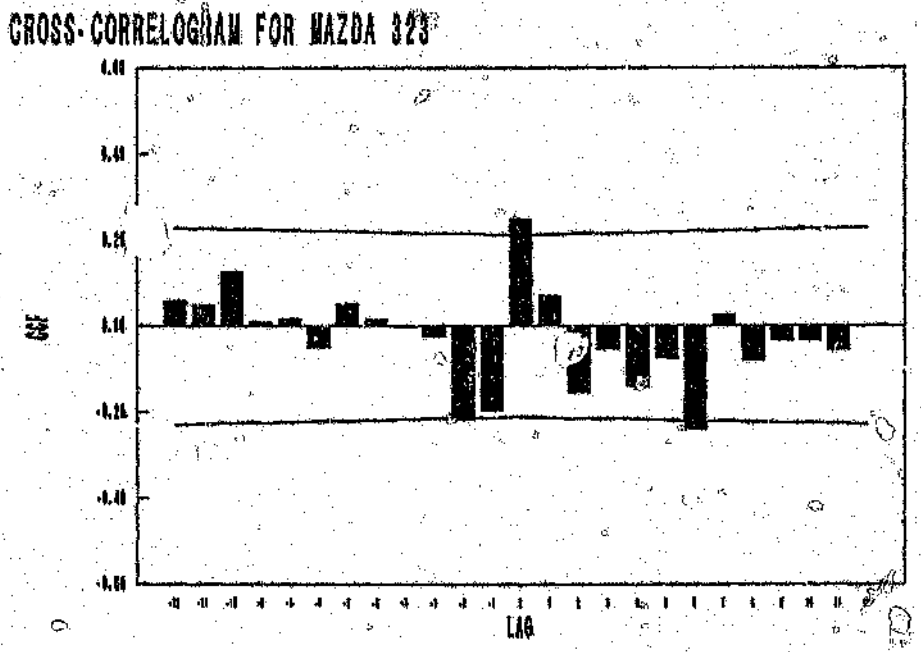


Figure 6

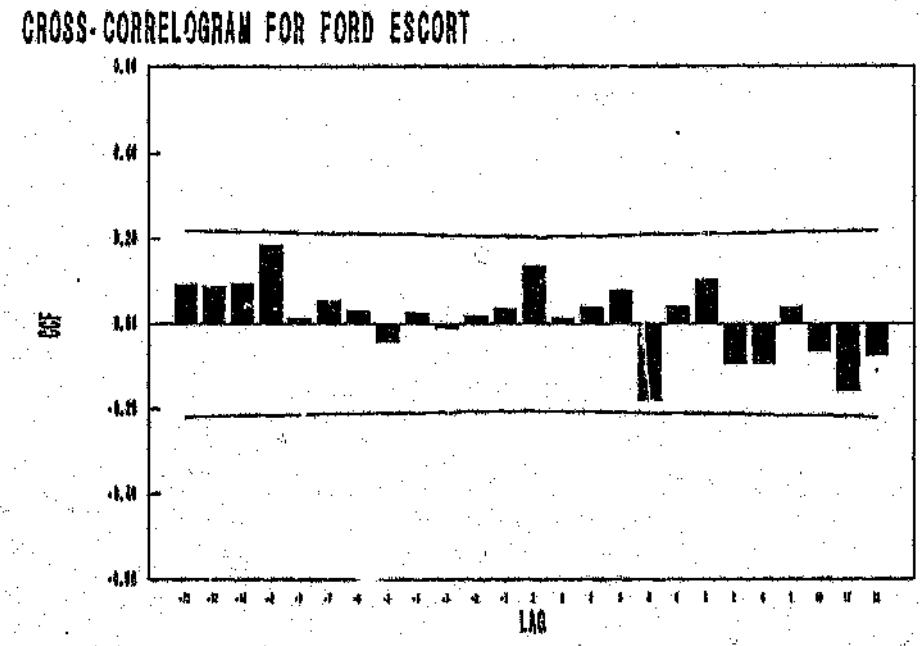


Figure 7

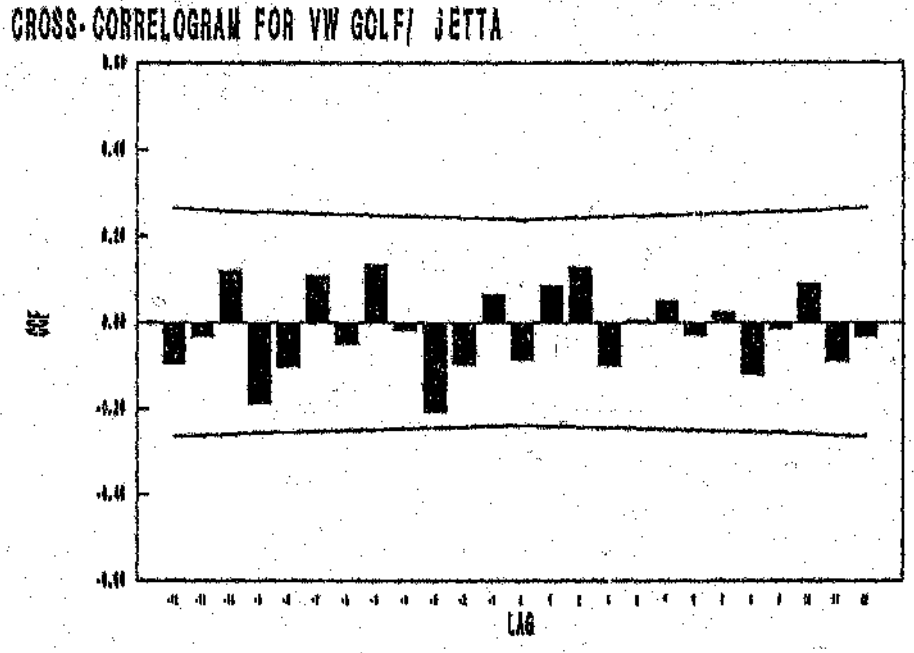


Figure 8

CROSS-CORRELOGRAM FOR TOYOTA COROLLA

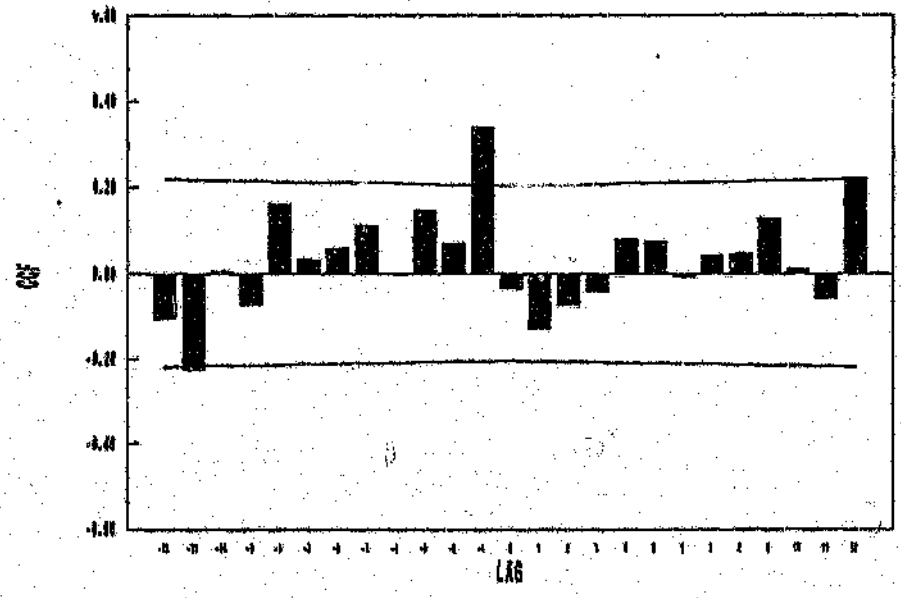


Figure 9

CROSS-CORRELOGRAM FOR MAZDA 323

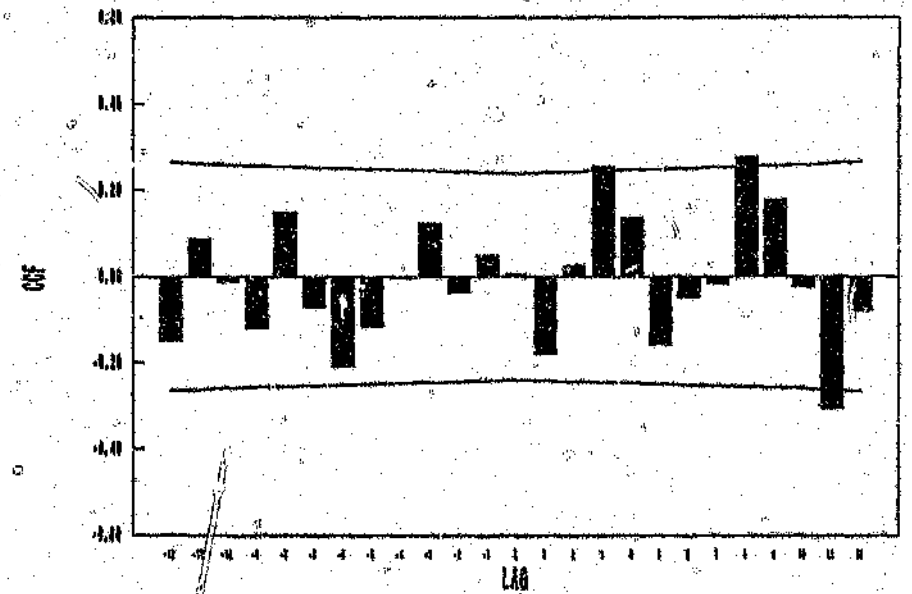


Figure 10

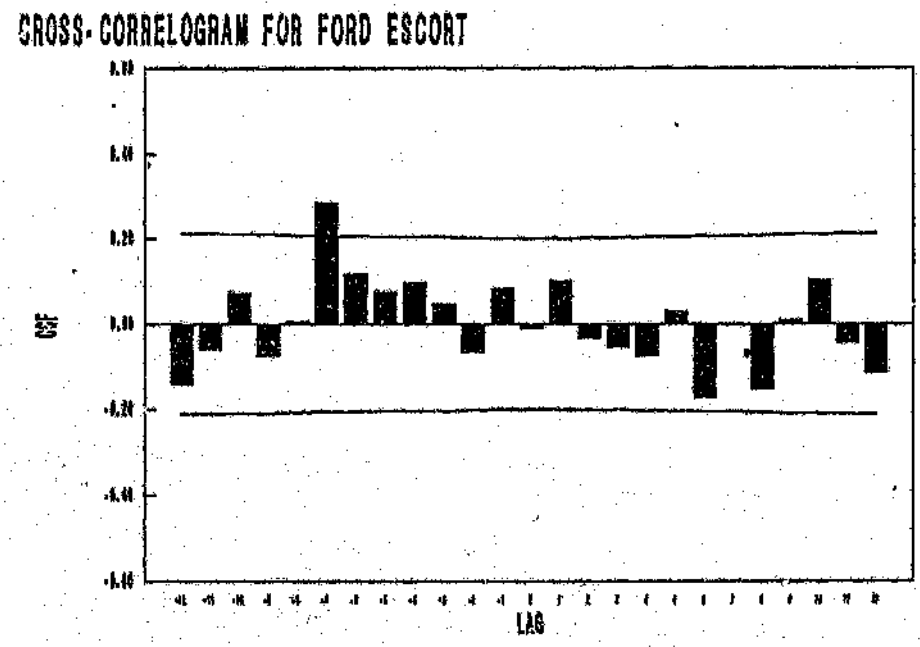


Figure 11

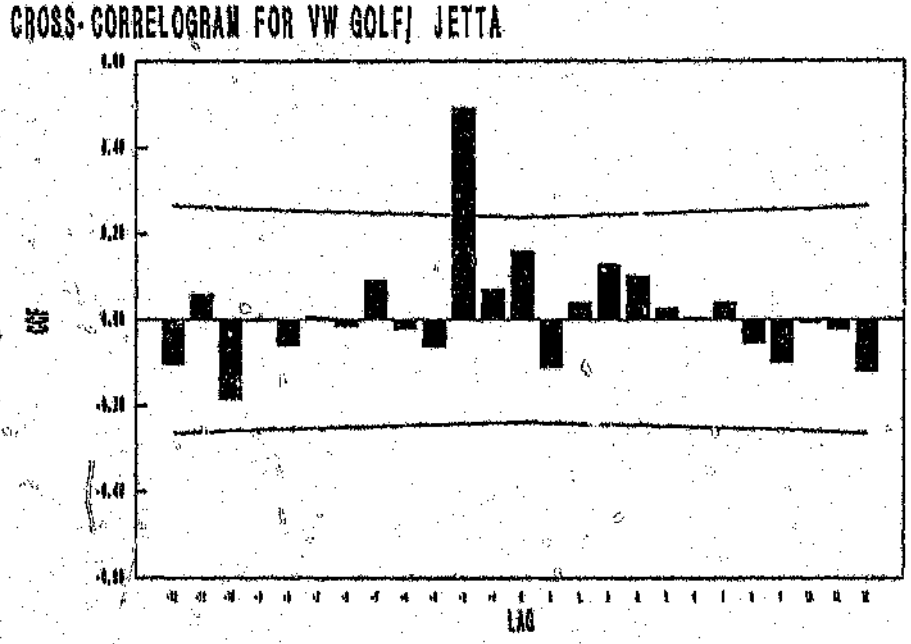


Figure 12

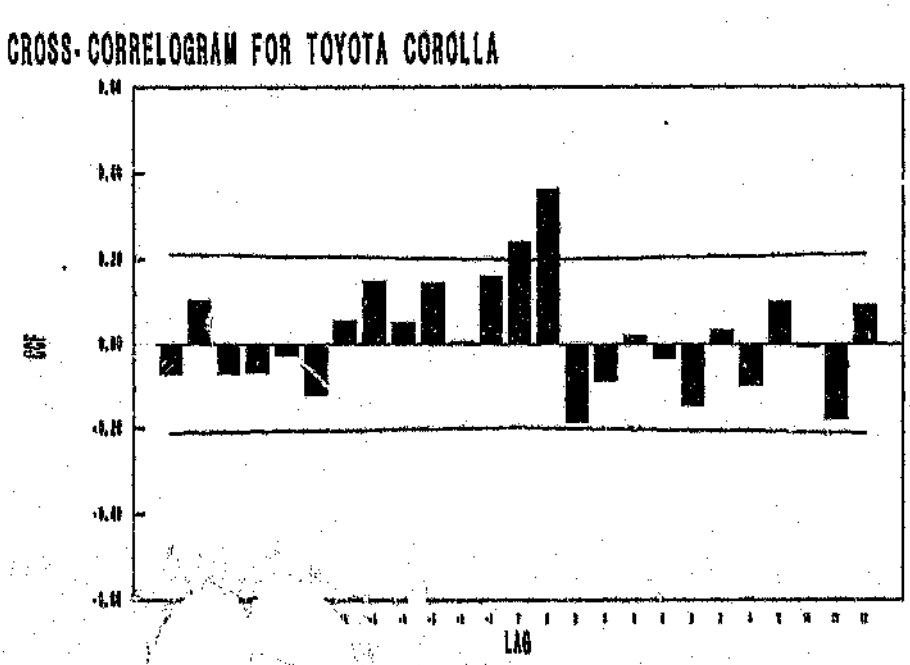


Figure 13

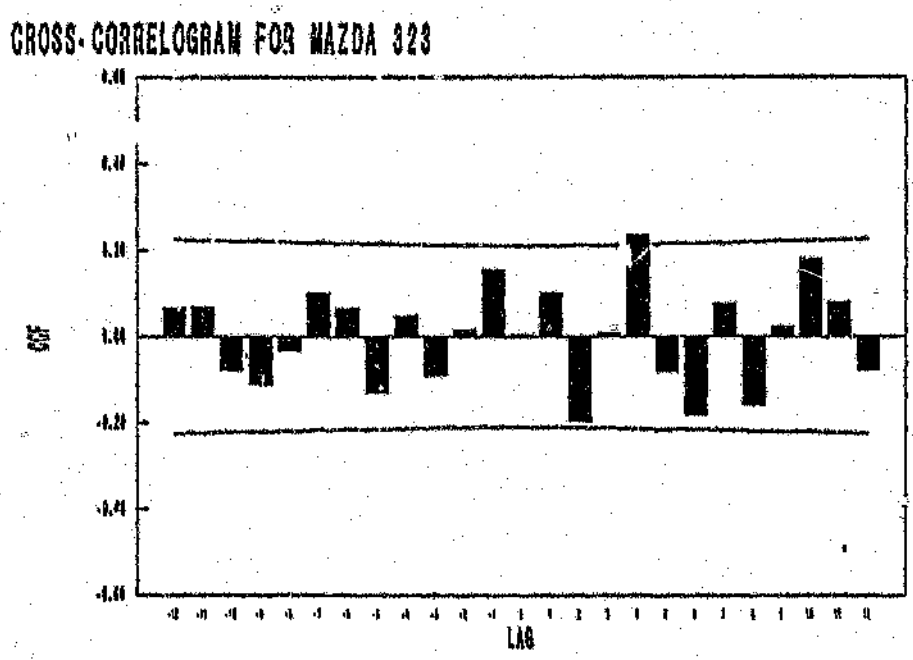


Figure 14

CROSS-CORRELOGRAM FOR FORD ESCORT

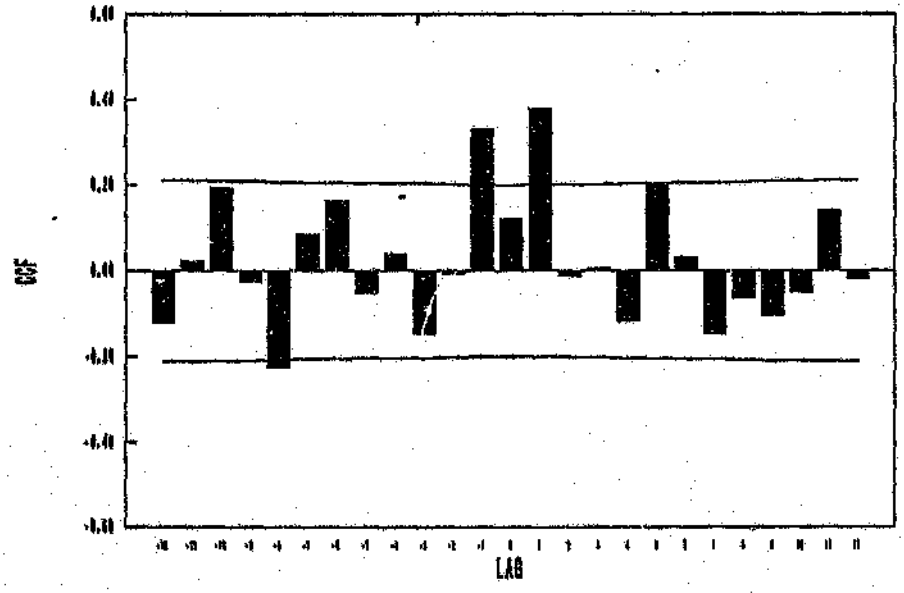


Figure 15

CROSS-CORRELOGRAM FOR VW GOLF/ JETTA

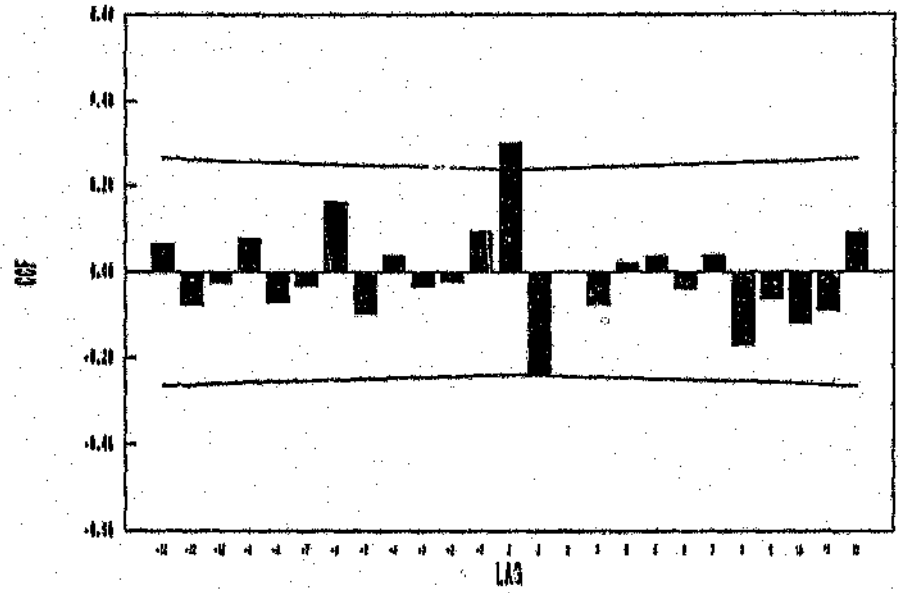


Figure 16

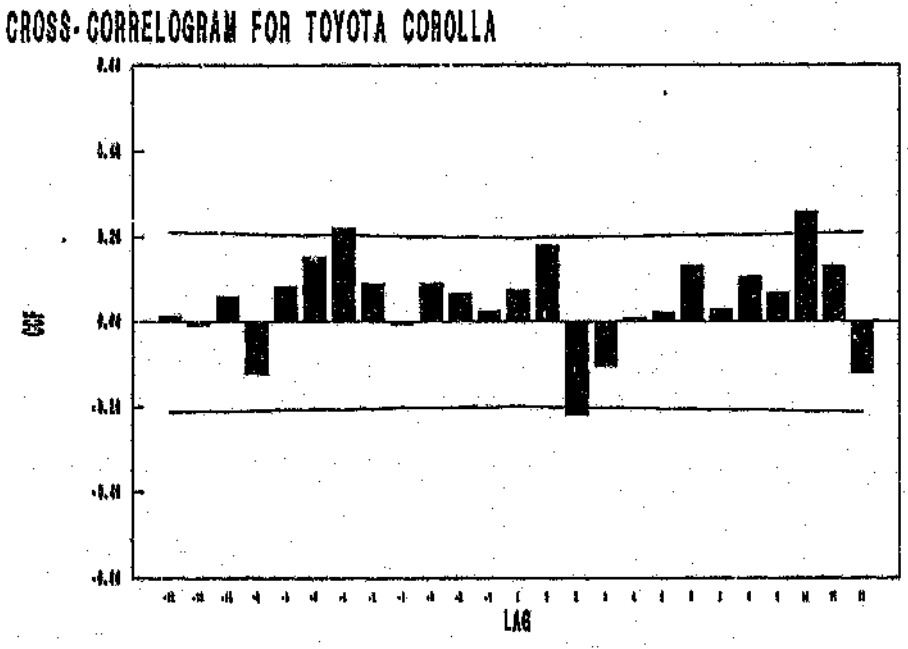


Figure 17

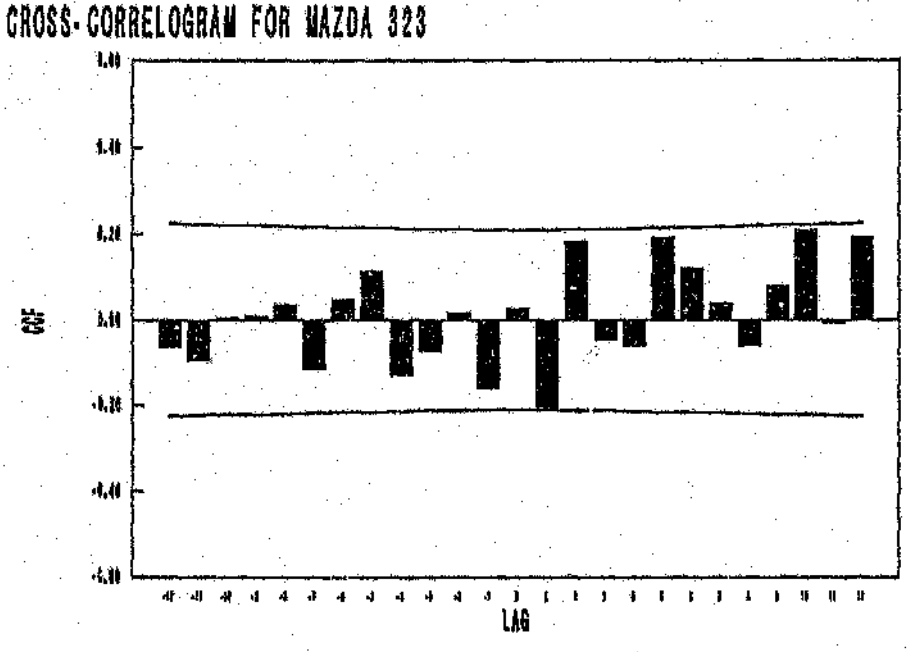


Figure 18

CROSS-CORRELOGRAM FOR FORD ESCORT

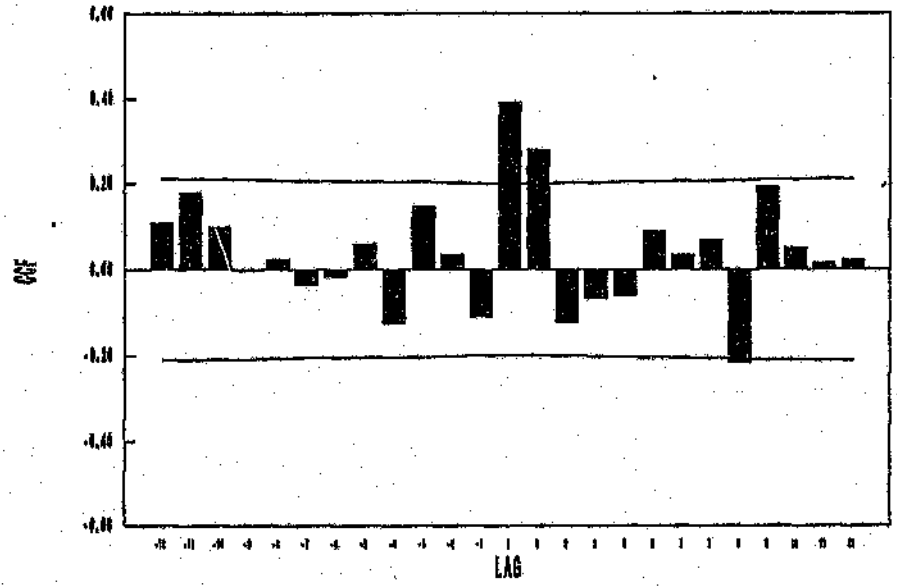


Figure 19

CROSS-CORRELOGRAM FOR VW GOLF/ JETTA

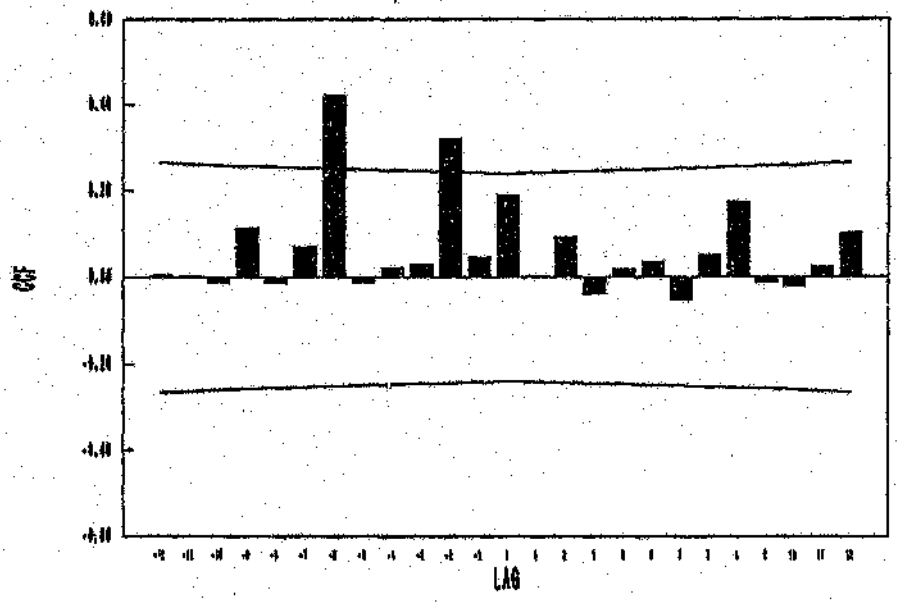


Figure 20

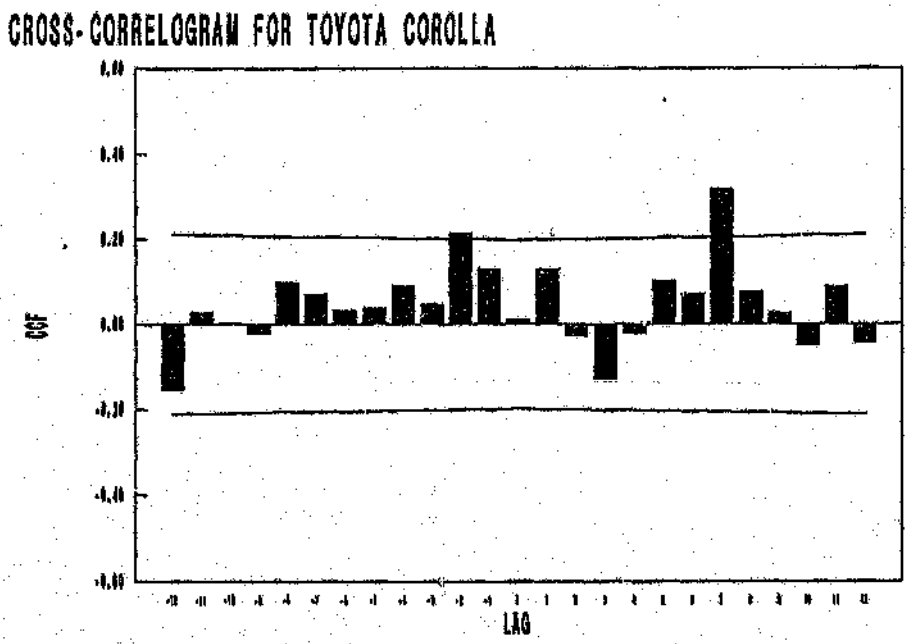


Figure 21

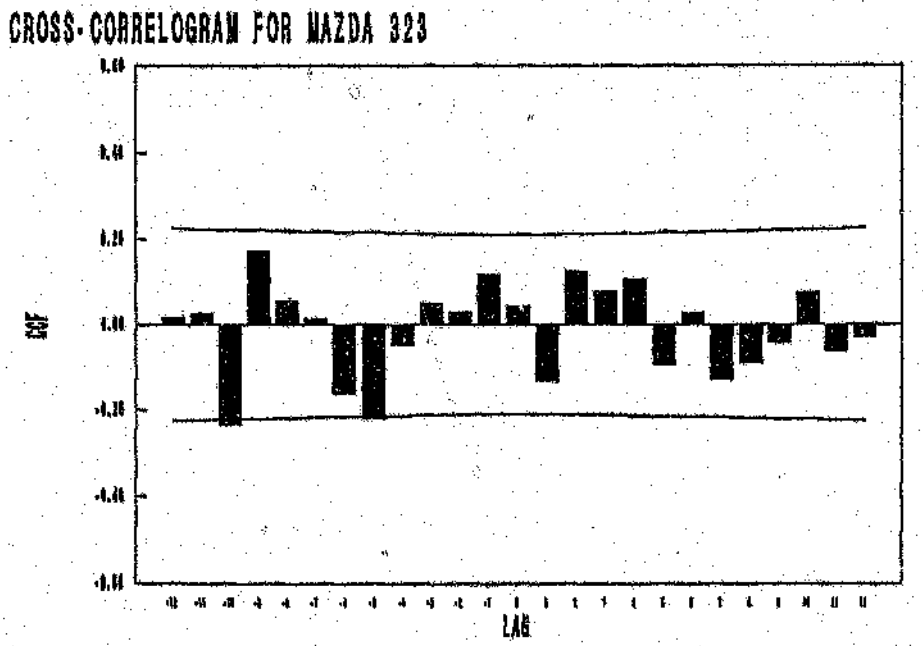


Figure 22

CROSS-CORRELOGRAM FOR FORD ESCORT

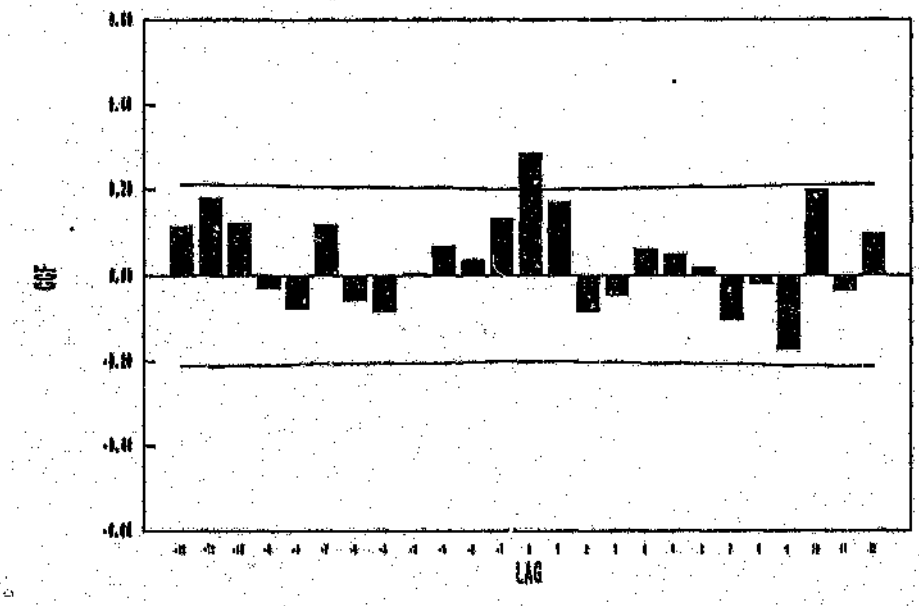


Figure 23

CROSS-CORRELOGRAM FOR VW GOLF/ JETTA

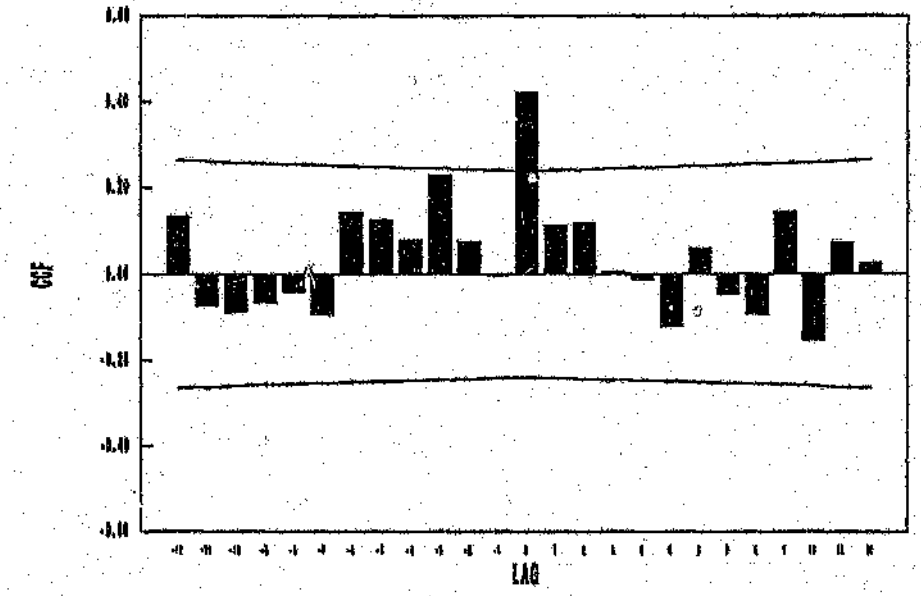


Figure 24

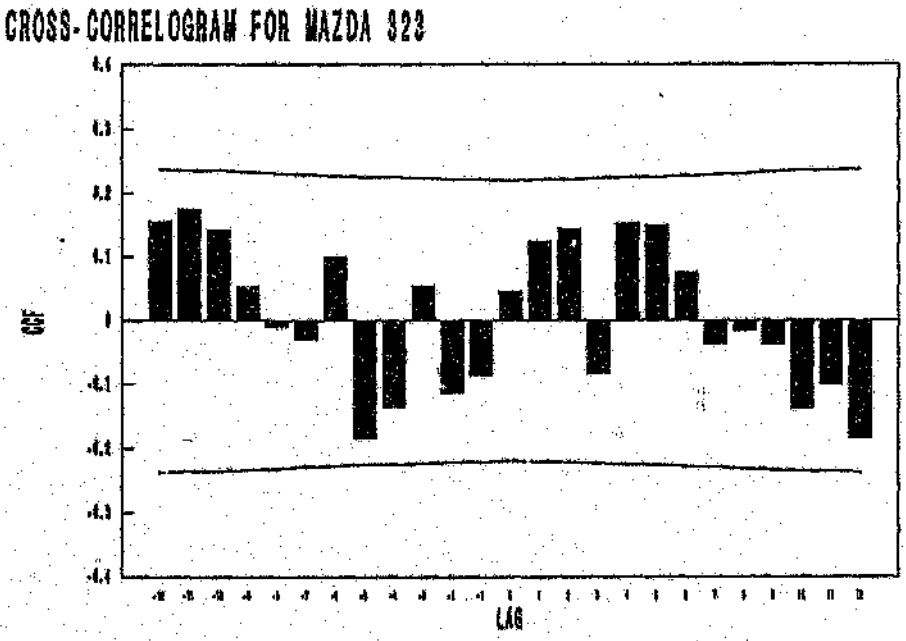


Figure 25

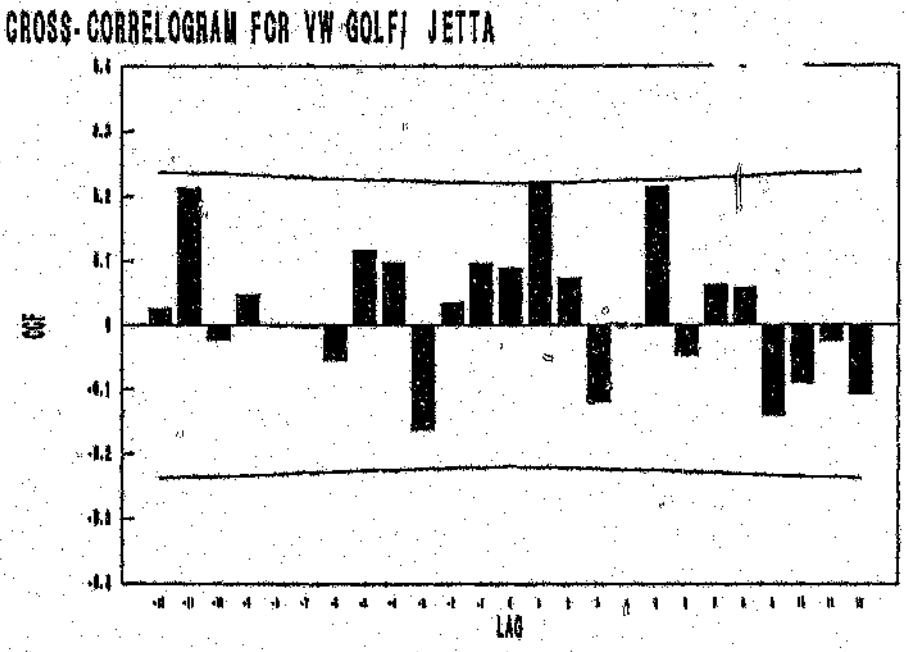


Figure 26

CROSS-CORRELOGRAM FOR FORD ESCORT

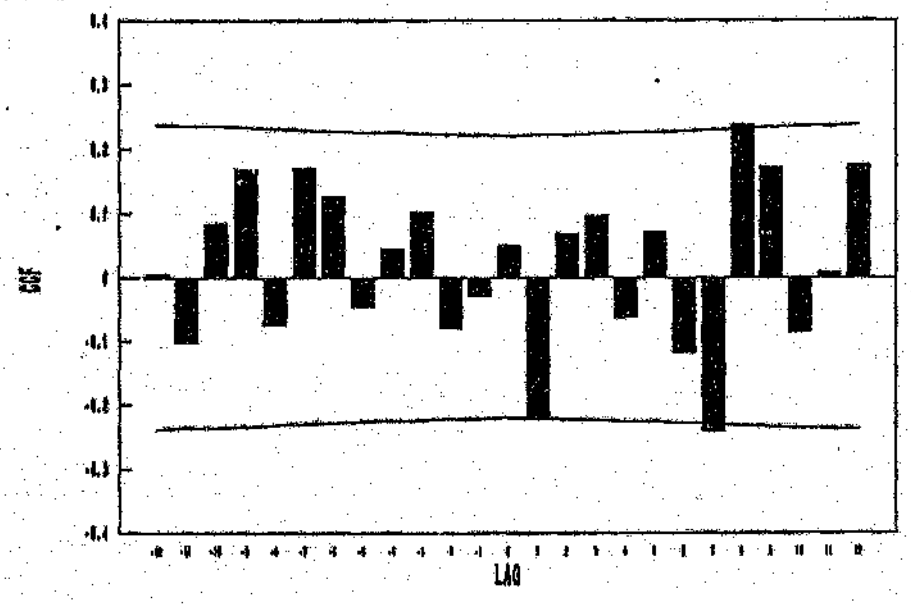


Figure 27

COMPETITIVE ADVERTISING EFFECTS - MAZDA 323

CROSS-CORRELOGRAM FOR TOYOTA COROLLA

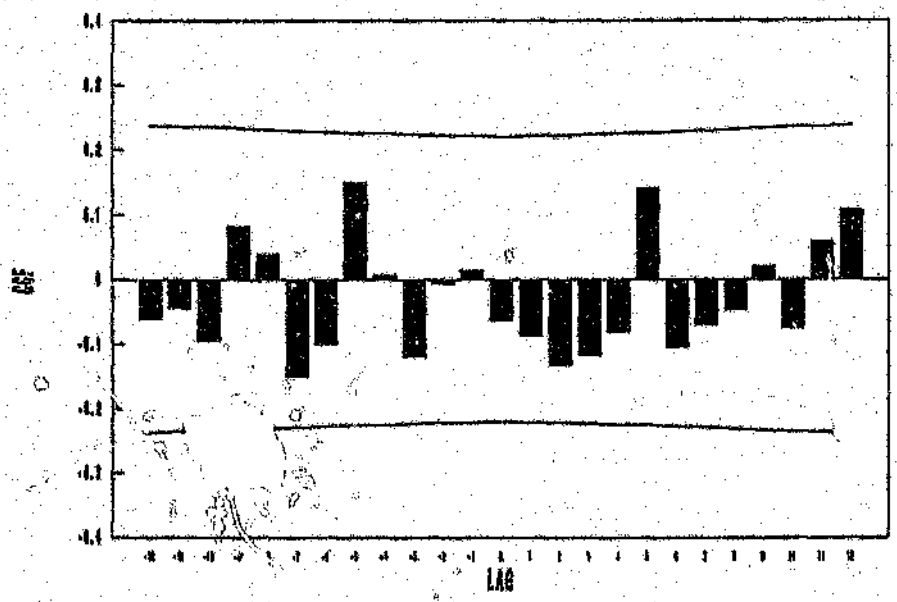


Figure 28

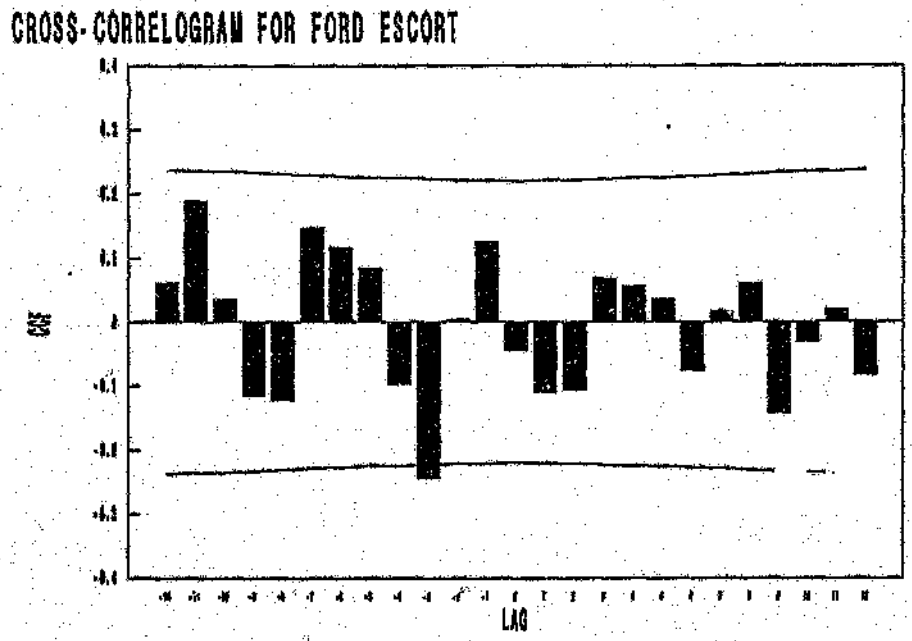


Figure 29

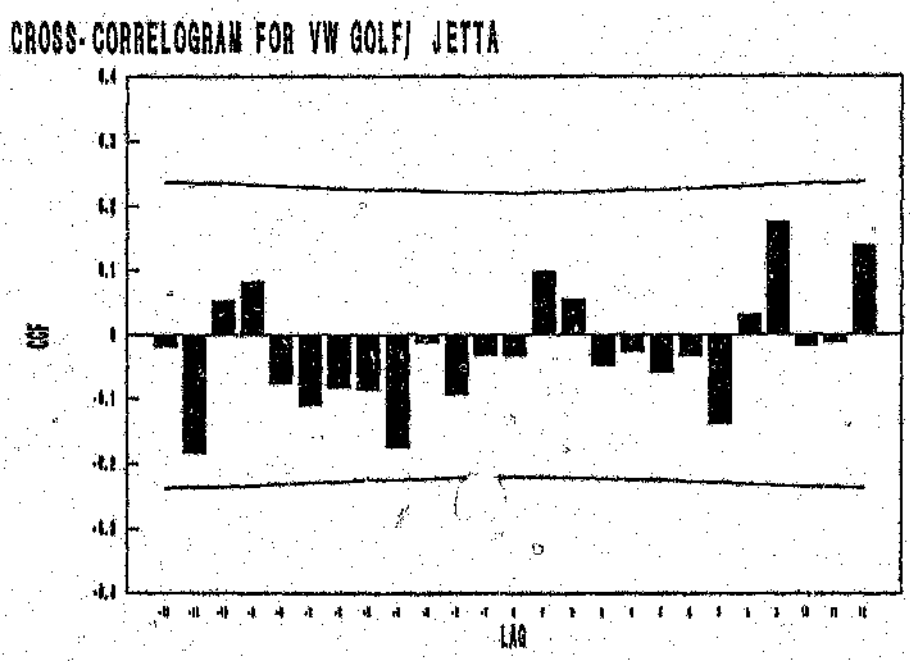


Figure 30

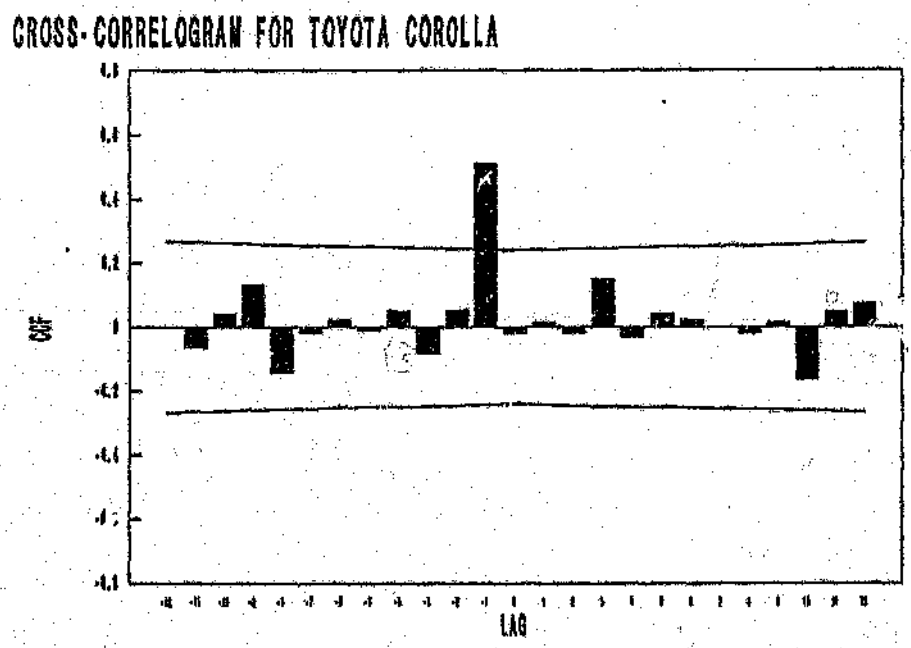


Figure 31

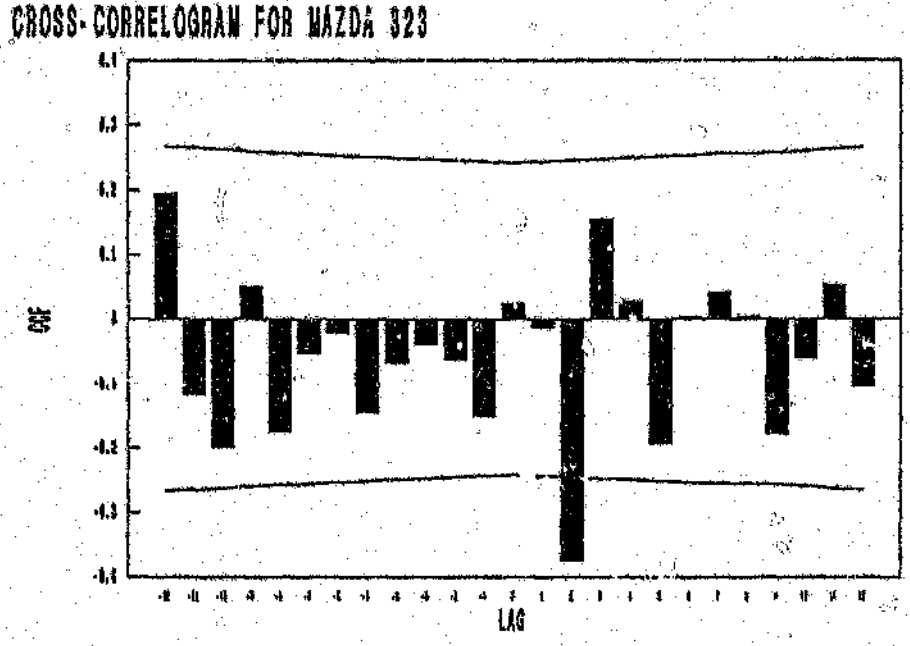


Figure 32

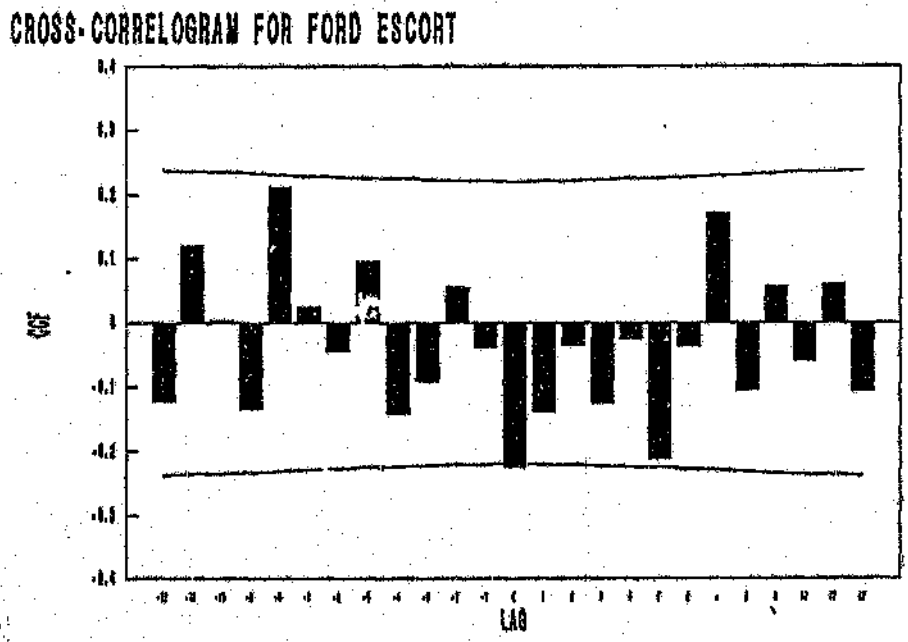


Figure 33

COMPETITIVE ADVERTISING EFFECTS - FORD ESCORT

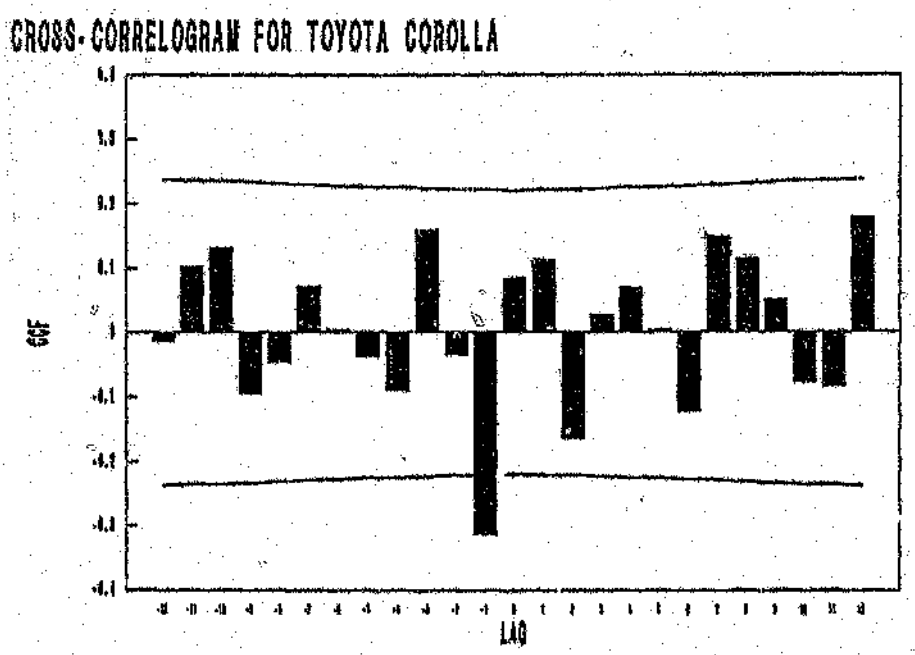


Figure 34

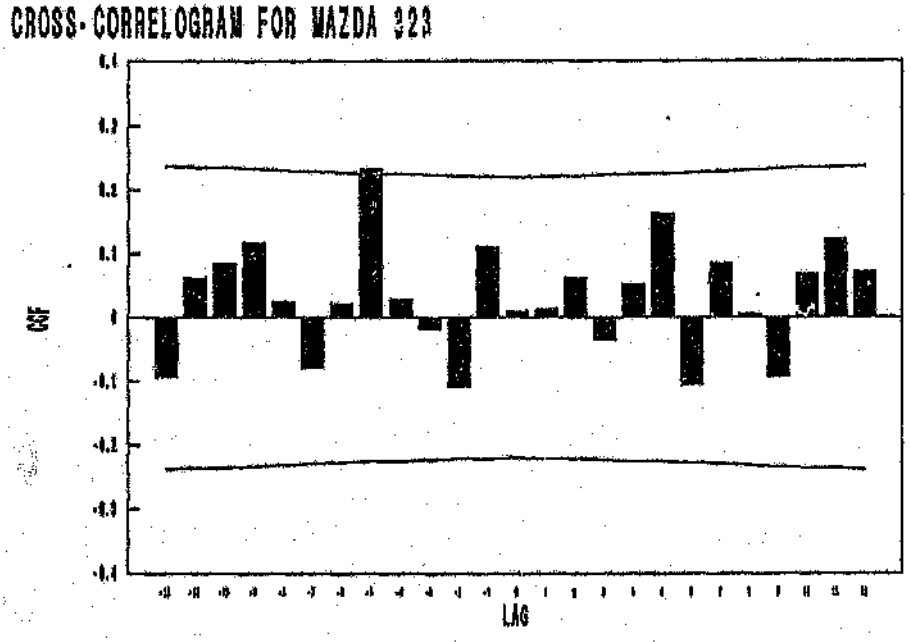


Figure 35

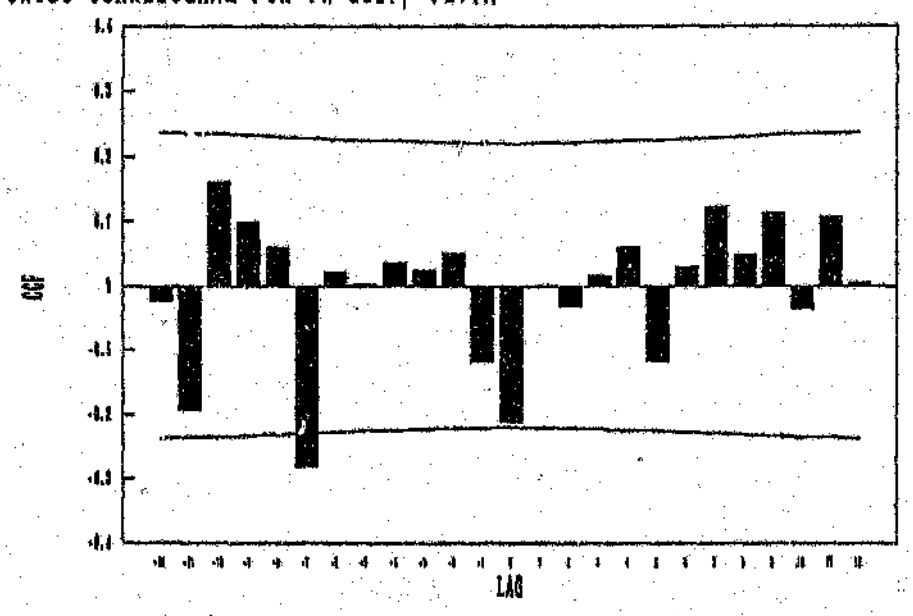
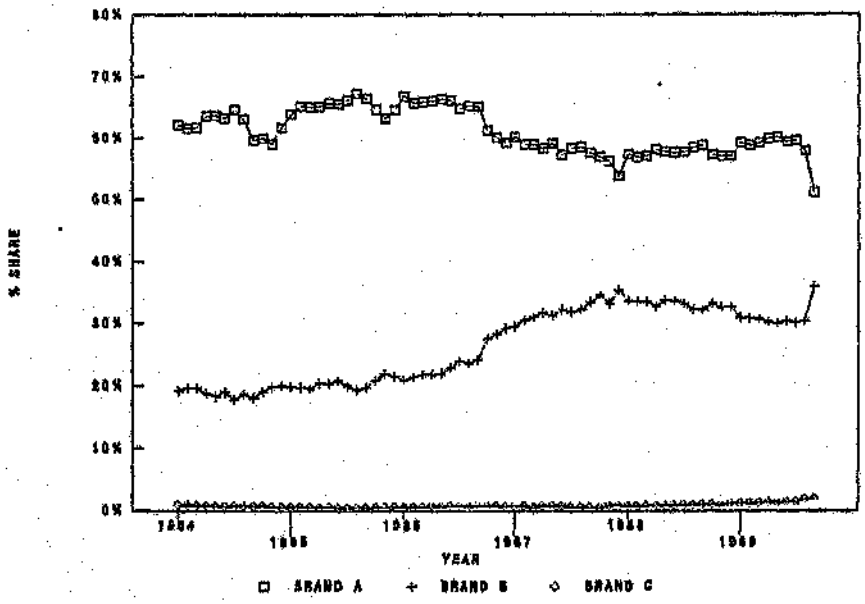


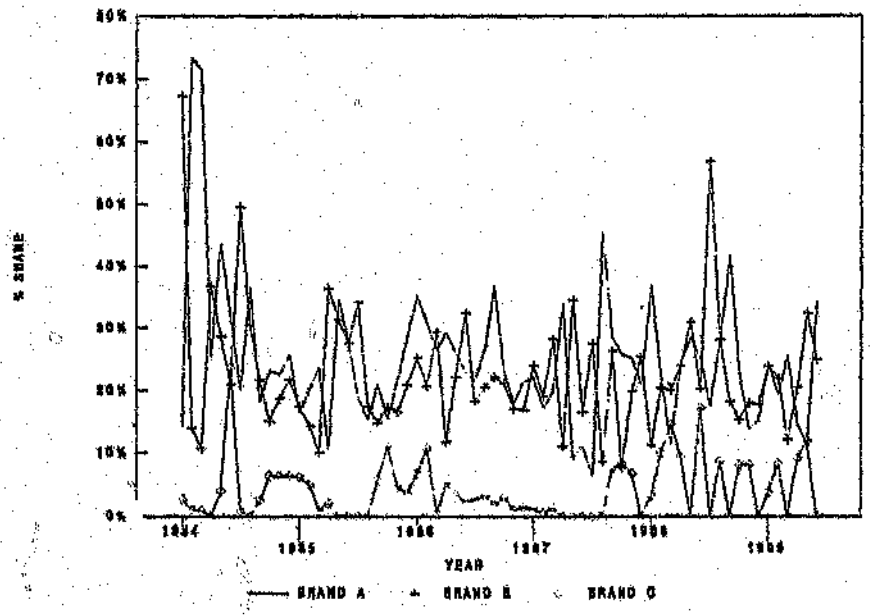
Figure 36

BEER BRAND DATA

MARKET SHARE



ADVERT'SI NG EXPENDI TURE SHARE



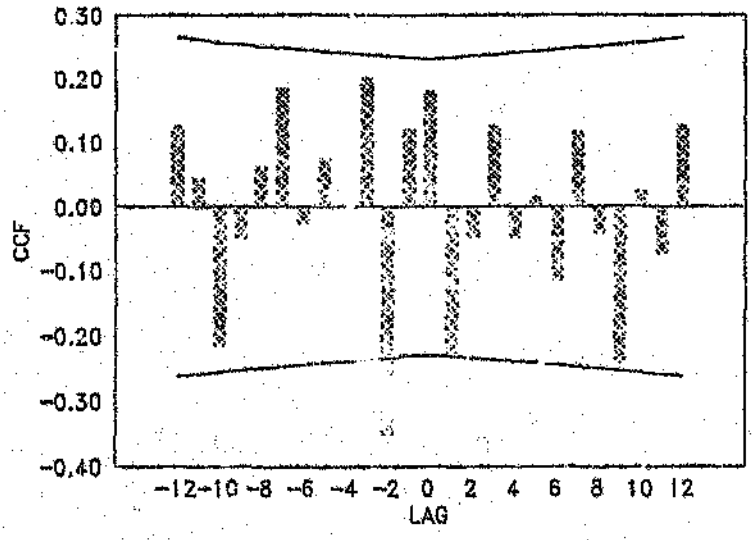
BEER BRAND ANALYSIS

BRAND A

$$(1-B)(1-0,381B^{12})S_t=e_t$$

$$(1-0,238B)A_t=0,254+e_t$$

CROSS-CORRELOGRAM FOR BEER BRAND A

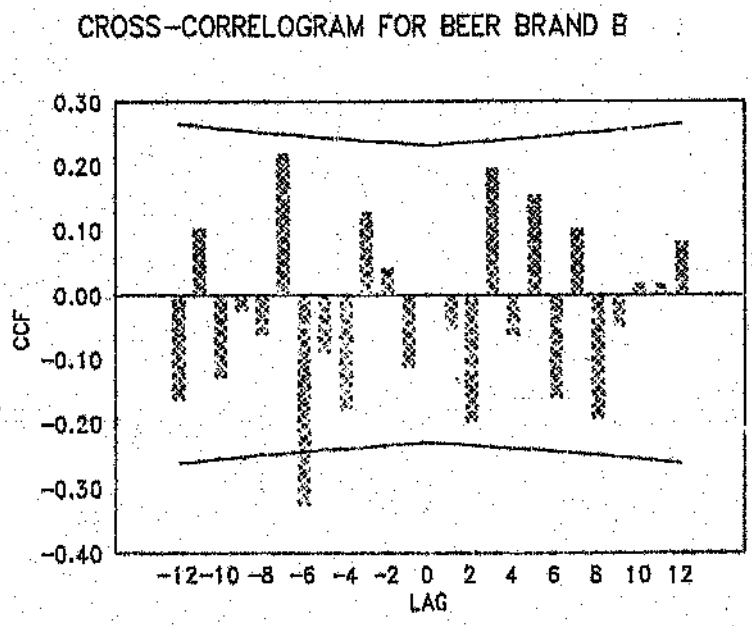


On estimation, the bivariate model form reduces to the univariate model for market share indicating a brand loyal effect.

BRAND B

$$(1-B)(1-0,347B^{12})S_t=e_t$$

$$A_t=0,230+e_t$$



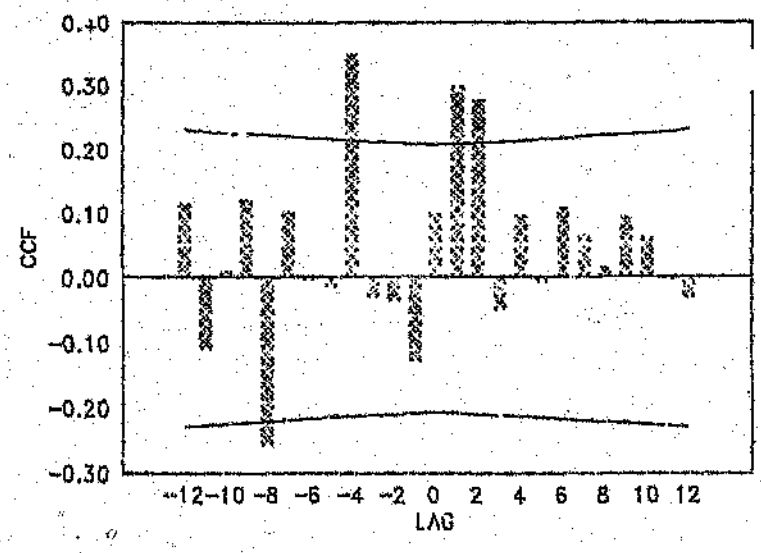
On estimation, the bivariate model form reduces to the univariate model for market share indicating a brand loyal effect.

BRAND C

$$(1-B)\,S_t=(1-0,227B)\,e_t$$

$$A_t=1,042+e_t$$

CROSS-CORRELOGRAM FOR BEER BRAND C



On estimation, the following bivariate model is developed:

$$e_{S,t}=1,188+(0,410+0,409B)\,e_{A,t-1}+e_t$$

This model indicates a current effect of advertising with an advertising effectiveness of 0,819.

Author: Bendixen M.T
Name of thesis: Advertising effectiveness in the South African motor industry

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