RETAIL PURCHASING PATTERNS DURING ECONOMIC CYCLES

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DECLARATION

I hereby declare that this dissertation is my own unaided work, and that it has not, and will not be submitted to any other University for any examination or degree.

30 MARCH 1984

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ABSTRACT

The study investigates the behaviour of Retail Purchasing Patterns during Economic Cycles and concentrates on the Liquor Market with special emphasis on the Spirit Liquor and Beer Markets.

The basic hypothesis centres on the widespread belief that the Liquor Market is immune to Economic Cycles and that there is a general growth trend in Liquor sales in times of both economic growth and decline.

A secondary hypothesis proposed is that Liquor with a perceived high status will be less influenced by economic cycles than will Liquor with a low status.

In order to test these hypothesis, data was obtained to reflect total Retail Liquor Sales. Economic Cycles were established from Government and other recognised sources including the University of Stellenbosch Bureau of Economic Research.

The data was then processed in a form acceptable for statistical testing. A linear correlation was carried out between the data representing the total Retail Sales and selected indicators of the South African Economy. The results of this correlation indicated a

relatively high level of positive correlation between the two variables.

On the basis of these results it was concluded that the Retail Sales of Spirit Liquor and Beer follow the economic cycle pattern but exhibit lead characteristics.

In addition the perceived status of Spirit Liquor and Beer has no noticeable affect on the retail sales behaviour pattern. This implied that both the basic and the secondary hypothesis were invalid and consequently were rejected.

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TO THE MEMORY OF MY FATHER LOUIS GOWER

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CHAPTER 1

I N T R O D U C T I O N

1.1 INTRODUCTION AND BASIC HYPOTHESIS

This report aims to investigate Retail Purchasing Patterns during Economic Cycles. In particular, this report will consider the behaviour of the Liquor Market in South Africa and focus on the Spirit Liquor and Beer Markets.

There is a wide spread belief that the Liquor Market is generally unaffected by economic cycles. It is felt that in "good times" or economic growth and prosperity, Liquor is consumed to celebrate this state of success. Conversely, in times of economic downturn, alcohol is consumed in an attempt to "drown one's sorrows". Thus the consumption of alcohol would, (based on the above premise) appear to be independent of the performance of the general economy as a whole.

This concept of Liquor being immune to the behaviour of economic cycles is supported by the

finding of C.E.V. Lesser (1) where he notes on page 32,

> "Income elasticities of about 0.3 to 0.7 are found for the remaining groups including "Alcoholic drink" and "Tobacco" which thus seem to rank as conventional necessities according to the pattern of consumer behaviour".

Since the Liquor Market (i.e. Alcoholic drink) can be considered as a "necessity", the behaviour of this market can be expected to be similar to that of other basic necessities, e.g. Food and Groceries.

With the exception of a period of twelve months during 1977/1978 when percent change of GDP was of the order of 0,1 per cent, both Food and Groceries showed a positive year on year volume growth varying between 5 per cent and 12 per cent over the period 1976 to 1982. (2) During this time period the economy moved through a decline phase up to the end of 1977 a growth phase up to mid 1981, after which it moved back into state of decline.

Thus the original generalisation of "good time celebration and bad time consolation", supported by categorisation as a necessity product, resilient to the effect of economic cycles gives rise to the hypothesis on which this paper is based. This can be stated as follows:

> "The Retail Spirit Liquor and Beer Market Sales are largely independent of Economic Cycles".

1.2 THE NATURE OF THE LIQUOR MARKET AND THE SECONDARY HYPOTHESIS

The Liquor Market can be broken into four major categories,

Spirits
Unfortified (or natural) Wines
Fortified Wines
Beer

These will be defined more closely later on.

Drinking is usually a social occasion. Over the years certain types of alcoholic beverages have become associated with certain social occasions, and more specifically, certain social classes.

As a result there is a definite level of status attached to each class of alcohol. Generally speaking, the ranking is as given above, with Spirits having the highest status and Beer the lowest. This will also be examined and tested in this paper.

This perceived status gives rise to a secondary hypothesis which is based on the concept of higher status Liquor being sssociated with upper income consumers. As these consumers' incomes will be less likely to be affected by economic cyclical activity and they will be less likely to give up their luxury status in times of economic downturn than low income consumers, the secondary hypothesis can be stated as follows:

> "High Status Liquor will be less affected by Economic Cycles than Low Status Liquor".

1.3 SELECTION OF THE LIQUOR MARKET

In order to test these hypotheses, use will be made of the categories of the Liquor market at either end of the spectrum i.e. Spirits and Beer. Wines, both Fortified and Unfortified will be omitted for the following reasons;

- as a group, Wines contains products that range from very low status to very high status. As such, wines do not represent any single level of status.

- the number of sub-groups of varying price and status would require an analysis beyond the scope of this report.

A breakdown, based on data provided by E. Snell and Co. (3) is as follows;

Size (ml)	5 000	2 000	1 500	1 000	750	375	200
WINE TYPE							
Fortified	2	22			111	23	9
Unfortified Low priced	51	51	38	5	43		
Unfortified Medium priced					217		
Unfortified High priced					116		
Sparkling					24		

The Unfortified Wines are further subdivided into the generic subdivision of White, Rose and Red.

In summary therefore, the objective of this paper is to examine the behaviour of Retail

Purchasing Patterns during Economic Cycles, by concentrating on the Spirit Liquor and Beer Segments of the Liquor Market. It is suggested that the Liquor Market, because its consumption is associated with both growth periods (celebration) and recession times ("drowning ones sorrows") and because of its nature as a necessity product is largely unaffected by Economic Cycles. A secondary hypothesis presents the idea that higher status Liquor being associated with higher income consumers will show less correlation with economic cycles than low status Liquor.

In order to test the validity of these hypothesis it will be necessary to research two major areas.

These are;

- the Spirit and Beer Markets
- Economic Cycle Indicators

The data for the Spirit and Beer Markets will be based largely on information provided by the A.C. Nielsen Company (Pty) Ltd. (4) The Economic Cycle Indicators will be those published in Trends. (5)

(1) Lesser C.E.V. "Commodity Group Expenditure Functions for the United Kingdom 1948-1957". Econometrica Vol.29 No.1 January 1961.

(2) A.C. Nielsen Company "Recessions don't last for ever" Presentation by A.C. Nielsen Company August 1981.

(3) Computer printout of all Liquor Products, produced by Data Generics (C) 1981.

(4) A.C. Nielsen Company (Pty) Ltd.: Data based on a 10% sample with a 95% confidence level was provided by A.C. Nielsen. This is data provided to the Liquor Manufacturers and is accepted by the industry as a true reflection of the market place.

(5) Laubscher J.J., Trends. Bureau for Economic Research University of Stellenbosch.

CHAPTER 2

DEFINITION OF THE SOUTH AFRICAN SPIRIT AND BEER MARKETS

2.1 INTRODUCTION

By covention the South African Liquor Market is broken up into four main categories,

- Spirits
- Unfortified (or Natural) Wines
- Fortified Wines
- Beer

These are briefly defined as follows: (1)

SPIRITS

There are five main products in this group being Brandy, Whisky, Cane Spirit (Cane), Gin, and Vodka. The remainder are classified as "Other Spirits". All have as their common base alcohol which is produced by distillation of a fermented fruit, grain or cane product.

BRANDY is distilled natural wine

CANE SPIRIT (or Cane as it is now called) is a crystal clear spirit distilled from fermented

molasses (a by-product of sugar).

GIN is a neutral spirit of either grain, sugar cane or grapes, distilled or redistilled with juniper berries and other aromatics.

VODKA is a colourless grain spirit without aroma or taste.

WHISKY is the spirit obtained by distillation (in Scotland) from a mash of cereal grains saccharified (converted to sugar) by the enzyme deastase.

OTHER SPIRITS include American, Canadian, South African and Irish Whiskeys, Rum, Tequila, Liquers, Bourbon.

UNFORTIFIED (NATURAL) WINE

NATURAL WINE is the fermented juice of freshly picked grapes.

SPARKLING WINE is a natural wine that has undergone a second fermentation process either in the bottle or in fermentation tanks.

FORTIFIED WINE

FORTIFIED WINE is wine to which grape spirit has been added.

There are four main types of fortified wine - Sherry, Port, Vermouth and Dessert.

BEER

BEER is the generic term covering all malt drinks. It is brewed from malted barley, flavoured with hops.

As stated in Chapter 1, this report deals only with the Spirit and Beer Market as defined above.

2.2 THE NATURE OF THE SPIRIT MARKET

The five products which will be considered in this report are Whisky, Brandy, Cane, Vodka and Gin. Other Spirits, which comprise numerous hybrid and speciality distillations such as Rum or Tequila will not be included. This omission will not affect the results as Other Spirits comprise less than 0.8% by volume of the total Liquor Market. (2)

The five products can be further broken up into three sub groups;

1. Whisky
2. Brandy
3. Cane Gin and Vodka

Sometimes Whisky and Brandy are grouped together and referred to as Brown Spirits. Group 3, Cane, Gin and Vodka are referred to as White Spirits.

2.2.1 THE BROWN SPIRITS

Whisky and Brandy differ from the White Spirits in that their quality is judged primarily by their age (or maturity). This gives rise to three loosely defined groups;

Premium lines
Proprietary (or Prop) lines
Non Proprietary (Non Prop or Rebate) lines

It must be stated that there are no hard and fast lines distinguishing the three groups, other than the minimum maturation period which is three years. A Premium product is a well matured (eight years or longer well established expensive product. Typical examples are Chivas Regal Whisky or K.W.V. Brandy.

A Proprietary line is a well established product, blended to conform with the minimum legal age and strength requirements (3). This

requires a minimum age of three years and an alcohol content of 43 per cent by volume.

A Non Proprietary line is usually a newer, less established product. Its blending will probably comprise a higher proportion of the less matured components making it less expensive. The product will not be supported by the level of advertising for a Proprietary line and will therefore retail at a lower price.

2.2.2 THE WHITE SPIRITS

White Spirits differ from Brown Spirits primarily in that there is no ageing and hence no true blending. The basic alcohol for all three White Spirits is often from the same source. Product differentiation is achieved by further refinement and addition of certain flavouring agents. The major product differentiating factor is the pack and the accompanying advertising.

As White Spirits do not improve with ageing or maturity, there are no Premium White Spirits. There is however the same differentiation into Proprietary and Non-Proprietary Brands as for Brown Spirits.

2.2.3 THE DIFFERENCE BETWEEN PROPRIETARY AND NON PROPRIETARY LINES

Whilst there is a discernable quality difference in the Premium brands there is no similar difference between Proprietary and Non Proprietary brands. The only factor which distinguishes one from the other is price, with Proprietary brands being more expensive. An examination of the structure of these two classes reveal the following facts;

- the cost price of all Proprietary brands are the same irrespective of supplier.
- the retail price of all Proprietary brands within any one outlet is the same. Thus one Proprietary brand will not have any price advantage over any other.
- there is no absolute definition of what constitutes a Proprietary brand other than price. Thus a supplier, wishing to upgrade a product into a Proprietary brand will increase the wholesale price to bring the product into line with other Proprietary brands. It is now deemed to be a Proprietary brand. The reason for doing this will usually be to take advantage of the increased profit associated with the increased whole-

sale price. Naturally there will be increased costs, the main being advertising and promotion, to maintain the Proprietary brand image.

The number of labels in each category varies continually as products enter and leave the market. An estimation of the breakdown is given in Table 1.

TABLE 1

BREAKDOWN OF THE SPIRIT MARKET BY PRODUCT QUALITY (4)

(Number of Labels)

Spirit	Premium	Proprietary	Non-Proprietary	Total
Brandy	9	12	21	42
Cane	-	3	10	13
Gin	-	6	6	12
Vodka	-	2	9	11
Whisky	43	14	13 (1)	70
Other Spirits				136 (2)

Notes: (1) This figure does not include house brands i.e. Whiskies imported for the importers sole use.

(2) This figure includes imported exotic liquers and local aperitifs which do not fit into any of the three headings identified.

2.2.4 SPIRIT PACKING

Spirits are packed in three sizes by volume, as follows:-

Size (ml)	Common Trade name
750	Bottle or quart
375	Half bottle or pint
200	Nip

Note: The pint and quart listed here are the reputed type and are commonly used in the trade to describe the 375ml and 750ml bottles. The actual metric measures of these reputed types are 378,8ml and 757,6ml respectively. (5)

Other standard but less popular packs include the miniature (50ml) the litre (1000ml) the two litre (2000ml) and the gallon (4500ml). There are also packs in various shapes such as motor cars, figurines and oddly shaped bottles, all containing various amounts by volume. These unusually shaped packs are however usually restricted to exotic imported liquers and aperitifs and as such do not constitute as a large percentage of the market by volume. - less than 0,5% by volume. (Source A.C. Nielsen ref. 901-001-L51-0004-1311)

2.3 THE NATURE OF THE BEER MARKET

The Beer market is unique in that there is only one local supplier - the South African Breweries Ltd. The major brand names are Castle Lager, Lion Lager and Carling Black Label, which together make up approximately 80 per cent of the Beer Market. The remainder of the market is made up of Lion Ale, Hansa, Amstel and Castle Milk Stout, as well as some imported lines. With the exception of Amstel and Castle Milk Stout, each of which comprises less than 5 per cent of the market, all of the locally produced beers retail at the same price. There is therefore no price incentive for the consumer to switch brands and selection of a particular product will be made on criteria other than price.

2.3.1 BEER PACKING AND CONSUMPTION

Beer is supplied in three pack types,

- Returnable bottles 750ml and 340ml
- Non Returnable Bottles (Dumpies) 340ml
- Cans 340ml

In addition, both the Can and the Non Returnable Bottle are supplied in 450ml.

The breakdown for consumption according to pack size is given in Table 2 below.

TABLE - 2

CONSUMPTION OF SOUTH AFRICAN BEER BY PACK SIZE

Pack Size	750ml Bottle	340ml Bottle	340ml N.R. Bottle	340ml Cans	450ml Cans	Total
Percentage of Total Market	44,3	7,8	17,8	18,1	12,0	100,0
Equivalent Price of contents per litre	83c	94c	1,32	1,40	1,35	

(SOURCE A.C. Nielsen ref. 509-001-151-0005)

From the above it can be seen that the market for returnable and disposable packs is roughly equal - 52,1 per cent and 47,9 per cent respectively. It is clear however that the consumer is prepared to pay for the convenience of disposable pack. Whereas Beer in returnable containers costs from 83c to 94c per equivalent litre, Beer in disposable packs varies from R1,32 to R1,40 per equivalent litre. This preference for disposable packing is due mainly to the following characteristics of Beer consumption:.

COMPLETE CONSUMPTION

Unlike Spirits where a drink is poured and the bottle is retained until the next drink is required, the entire contents of a Beer container are consumed. In fact once the bottle is opened, its usefulness as a container is limited. It is not designed to be resealed by the consumer of the exposed product and it will deteriorate to unacceptable standards in less than one hour. From the consumer's point of view there is no practical advantage to a reuseable Beer pack.

CONSUMPTION ENVIRONMENT

Consumption of Beer is very much a social, outdoor affair. This fact is realised by the advertisers who constantly use the outdoor theme, incorporating a number of persons enjoying the product in an environment of friendship and comaraderie. This fact is supported in a study produced by Newsweek (6) of the American Liquor Market, which indicated that Beer was most likely to be consumed at picnics or sporting events. In these situations, people are less likely to want to carry home empty goods after the event. The tendency would

therefore be to look for a pack which would be disposable after consumption.

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(1) S.A. Licensees Guardian 1983. Ramsay Son and Parker Ltd.

(2) Monthly Statistics produced by the A.C. Nielsen Company Ltd. reference 901-001-L51-0004-1311

(3) Wine and Other Fermented Beverages and Spirits Act 1957 - Statutes of the Republic of South Africa.

(4) Computer Printout of all Liquor Produced, Produced by Data Generics (c) 1981. Provided by E. Snell & Co. (Pty) Ltd.

(5) The Licensees Guardian Op Cit Page 3

(6) Total Research Corporation "A Study of Beverage Alcohol Consumption Patterns: Occasions and Lifestyles" Prepared for Newsweek, Inc. Pg. 106-107

Chapter 3

AN EXAMINATION OF THE STATUS OF THE SOUTH AFRICAN LIQUOR MARKET

3.1 INTRODUCTION

In order to test the secondary hypothesis, it is necessary first to define Status in general terms and then to examine this concept in the contest of the South African Liquor Market.

Status is defined in the Shorter Oxford English Dictionary Vol. II as, "Position or standing in society".

This is a very broad definition and as such does not have any clearly defined parameters. Status is also extremely subjective since it is both imposed on, and evaluated by the same body i.e. society. This loose definition coupled to the personal determination of the status of things allows a tremendous amount of leeway in establishing a product's status in society. This chapter will examine this concept as well as some studies on the status attributed to Liquor both in South Africa and in America.

3.2 STATUS IN TERMS OF PERCEIVED BENEFITS

As a truism it is reasonable to state that man will strive for the highest possible status in society. One way of doing this is to surround himself with things (i.e. possessions) which have a high status in society. The difficulty again arises as to how to measure this status. In an attempt to do this, use will be made of concept of SPACED benefits, derived by Talbot E. Smith (1)

S - SAFETY - how does it relate to my security

P - PERFORMANCE - how does it perform

A - APPEARANCE - how does it make me look (to myself and to others).

C - COMFORT - how unconcerned does it allow me to be.

E - ECONOMY - how economically does it achieve its performance

D - DURABILITY - how long will it last.

On a technical level e.g. a piece of machinery, these are relatively easy to measure, on a semi technical level less easy and on an expensive personal consumable item, almost impossible. A comparison for three examples being a specialised piece of machinery, a motor car and perfume or Liquor is given below.

	TECHINICAL MACHINERY	SEMI TECHNICAL MOTOR CAR	EXPENSIVE PERSONAL CONSUMABLE PERFUME/LIQUOR
SAFETY	It is safe	It is safe	No real effect
PERFORMANCE	Does it meet makers specifications	Does it meet makers and my specifications	Does it meet my objectives
APPEARANCE	No real importance	Do I feel good	Do I feel very good
COMFORT	Is it dependable	Is it convenient	No real effect
ECONOMY	Is it economical	Is it reasonably economical	No real objective
DURABILITY	Will it last	Will it last	No real effect

An examination of this table indicates that only the Appearance and Performance benefits appear to be of any consequence when considering Liquor. A further examination of the SPACED benefits reveals that these two benefits are the ones that reflect that status of the product. Safety and Comfort relate to how secure and "untroubled" the product allows the user to be, whereas Economy and Durability relate to the concept of value for money. Thus if Appearance and Performance are in fact the benefits most closely associated with Liquor, then this will serve to indicate the high perceived status of Liquor.

As a first attempt to evaluate the relative importance of the SPACED benefits in the Liquor Market, a number of advertisements were examined. Each benefit was scored as follows:-

- not referred to	0 points
- referred to or mentioned	1 point
- referred to positively	2 points
- main theme	3 points

The results are given in Table 3 below.

TABLE 3

SCORING OF BENEFITS IN 22 RANDOM ADVERTISEMENTS FOR LIQUOR

PRODUCT	S	P	A	C	E	D
KALUA	0	0	3	0	0	0
VICERDY	0	3	1	0	0	0
BOCHENDAL	0	3	1	0	0	0
DROSTDY-HOF	0	3	1	0	0	0
PREMIER GRND CRU	0	3	2	0	0	0
GOLDEN OCTOBER	0	0	2	0	3	0
LA ROCHELE	0	3	2	0	0	0
GATO	0	2	3	0	0	0
CINZANO	0	2	3	0	0	0
OUDE MEESTER	0	3	1	0	0	0
NAPOLEON	0	0	3	0	0	0
GILBEYS GIN	0	2	3	0	0	0
SMIRNOFF	0	3	2	0	0	0
MAINSTAY	0	1	3	0	0	0
JOHNNIE WALKER	0	2	3	0	0	1
LONG JOHN	0	3	1	0	0	0
J & B	0	3	2	0	0	0
BELLS	0	3	1	0	0	0
BLACK & WHITE	0	0	3	0	0	0
WHYLE & MACKAY	0	3	1	0	0	0
IRISH VELVET	0	3	0	0	0	0
CASTLE LAGER	0	3	0	0	0	2
	0	48	41	0	3	3
AVERAGE	0	2,18	1,86	0	0,13	0,13

POINTS TOTALS

3	0	13	8	0	1	0
2	0	4	5	0	0	1
1	0	1	7	0	0	1
0	22	4	2	22	21	20
	22	22	22	22	22	22

Source - Hotelier & Caterer October 1983

Naturally there will be a certain amount of subjectivity in drawing up such an evaluation. Nevertheless, it is clear that (personal)

Performance and Appearance have the highest rankings with Durability and Economy showing a lesser ranking, and Society and Comfort being rated last.

The deductions that can be drawn from this are as follows:-

1. Performance, in terms of how "good" the product is, is rated highest. Words like "highest purity", "selected grains and malt" "the taste of real Scotland" are aimed at implying that the product is the best. By implication, the consumer must be "of the best" i.e. have a high status.

2. Appearance, both subjective ("how will I feel about myself") and objective ("how will I look to others") is a theme expressed by almost all the advertisers. The idea being that those desireable appearances depicted in the advertisement are associated with situations in which the product is consumed.

3. Economy and Durability have very low ratings. This is easily understood for Durability, since there is no need for a consumable product to endure a long life.

Economy does not mean low cost, but rather "value for money".

Since this has a low rating it implies that price is of little importance. The advertisement for J & B Whisky in fact plays on this theme, by showing priceless objet d'art and the words "True pleasure is rare".

4. The concepts of Safety and Comfort which are inter-related have almost no importance. This is of interest in that it implies that even if the product has a certain health hazard it is of little consequence in evaluating its status.

From the above it can be seen that only Appearance and Performance featured in any significant level in the advertisements considered. Economy and Durability played minor rules, whereas Comfort and Safety were completely ignored. Appearance and Performance are major factors in determining status. The conclusion that can be drawn therefore, is that Liquor is a product whose main benefits are perceived as relating to status.

3.1 PERCEIVED STATUS OF LIQUOR IN THE SOUTH AFRICAN MARKET

A study has been carried out by the Bureau of Market Research entitled "Status associated with Product Groups and Retail Outlets, 1980" (BMR Pretoria 1981).

In Chapter 4 of the above mentioned study an attempt is made to answer the question.

"What characteristics differentiate high and low products in the respondents mind?"

The useable sample comprised 275 White and 273 Black persons, both male and female. The Black sample was drawn from Soweto and Umlazi and the White sample from Durban and Pretoria.

The characteristics which differentiate high and low status alcoholic beverages for Whites and Blacks are given in the tables which follow. (Reproduced from "Status associated with Product Groups and Retail outlets 1980" (BMR Pretoria 1981) Pages 50-51.)

WHITE SAMPLES

High Status		Low Status	
Stated Characteristic/type	%	Stated characteristic/type	%
Men			
Whisky	38,7	Beer	35,1
Wines/table wines	11,0	Brandy	22,1
Brandy	9,0	Wine	18,6
Liqueur	9,0	Cane	9,7
Imported Liquor	8,4	Inexpensive/moderately priced liquor	4,1
Beer	4,5	Wine in large containers	2,8
Expensive liquor	3,2	All other responses	7,6
Red Wines	2,6		
Champagne	1,3		
All other responses	12,3		
Total	100,0	Total	100,0

WHITE SAMPLES

High Status		Low Status	
Stated Characteristic/type	%	Stated characteristic/type	%
Women			
Whisky	37,7	Beer	33,8
Wines/table wines	14,4	Wine	32,6
Liqueur	13,0	Brandy	13,4
Brandy	7,2	Cane	7,6
Gin	3,1	Inexpensive/moderately priced liquor	2,9
Champagne	2,7	Sherry	2,5
Sherry	2,4	Whisky	1,4
Expensive liquor	2,4	All other responses	5,8
Vodka	2,1		
Beer	1,7		
'A large variety'	1,6		
All other responses	11,7		
Total	100.0	Total	100,0

BLACK SAMPLES

High Status		Low Status	
Stated Characteristic/type	%	Stated characteristic/type	%
Men			
Whisky	35,5	Sorghum beer (including homemade)	33,8
Beer	13,1	Beer	14,9
Strong taste/strength	10,3	Spirits	14,2
Brandy	9,7	Inexpensive/moderately priced liquor	9,4
Wines	9,0	Wines	9,4
Spirits	4,8	Strong taste/strength	8,8
Expensive	4,1	Brandy	4,1
Large variety	2,1	All other responses	5,4
High quality liquor	2,1		
All other responses	8,3		
Total	100,0	Total	100,0

BLACK SAMPLES

High Status		Low Status	
Stated Characteristic/type	%	Stated characteristic/type	%
Women			
Whisky	27,9	Sorghum beer (including homemade)	27.1
Strong taste/strength	12,4	Beer	17,1
Brandy	10,6	Spirits	14,9
Spirits	9,5	Wines	10,5
Wines	9,0	Strong taste/strength	8,3
Beer	8,4	Inexpensive moderastely priced liquor	7,7
Extensive liquor	6,0	Brandy	3,9
'Discount prices'	3,5	All other responses	10,5
All other responses	12,9		
Total	100,0	Total	100,0

Not all of the responses detailed in the above mentioned tables from the BMR report are directly related to the products themselves e.g. "a large variety", "discount prices". A summary of the results relevant to the scope of this report is given in table 4.

TABLE 4

SUMMARY OF THE RESULTS OF THE STATUS ASSOCIATED WITH LIQUOR PRODUCTS

WHITE GROUP

	MEN		WOMEN	
PRODUCT	HIGH STATUS	LOW STATUS	HIGH STATUS	LOW STATUS
Whisky	35,7	-	37.7	1,4
Wines/ Table Wines	11,0	18,6	14,4	32,6
Brandy	9,0	22,1	7,2	13,4
Beer	4,5	35,1	1,7	33,8
Gin	-	-	3,1	-
Vodka	-	-	2,1	-
Cane	-	9,7	-	7,6
Expensive Liquor	3,2	-	2,4	-
Inexpensive/ moderately priced Liquor	-	4,1	-	2,9

BLACK GROUP

PRODUCT	MEN		WOMEN	
	HIGH STATUS	LOW STATUS	HIGH STATUS	LOW STATUS
Whisky	36,5	-	27,9	-
Beer	13,1	14,9	8,4	17,1
Brandy	9,7	4,1	10,4	3,9
Wines	9,0	9,4	9,0	10,5
Spirits	4,8	14,2	9,5	14,9
High quality/ expensive Liquor	6,2+	-	6,0	-
Inexpensive moderately priced Liquor	-	9,4	-	7,7
Sorghum Beer	-	33,8	-	27,1

+ This figure combines the values for High Quality and Expensive Liquor.

The following conclusions can be drawn from the above:

- Whisky is clearly perceived as a high status product.
- Beer is regarded as a low status drink by Whites. This is not so prevalent in the Black sample. This should however be viewed in the light of the fact that the Black group includes Sorghum Beer which is regarded by the majority as a low status drink.

- Wines are seen as both high and low status drinks by a relatively large percentage of both groups. The White group tended to have a greater percentage of low status responses, whereas the distribution in the Black group is relatively uniform.

It should be noted that these results do not give a true picture of the status of all categories of Liquor. This is because the survey is framed around the question of what characteristics (or products) are regarded as high or low status by the respondent. A truer indication would be an assessment of the status attached by the respondent to each particular product type.

3.4 PERCEIVED STATUS OF LIQUOR IN THE AMERICAN MARKET

An in depth study has been commissioned by Newsweek, Inc. (2) into the American Alcohol Consumption patterns. One of the objectives of the study was,

> "..... to determine for upscale adult consumers (aged 21-54):
> -- preferred beverage(s) whether alcoholic or non alcoholic in 17

different situations ranging chronologically from luncheon to after dinner to before retiring".

The research also aimed to establish the relationship between lifestyle characteristics and beverage preferences. Thus although the research was not directly orientated to establishing the status of alcoholic beverages in the American situation, certain conclusions can be drawn from the results.

The method of sampling involved telephone interviews with alcoholic beverage consumers aged 21-54. Respondents were qualified as adults who have at least two drinks of an alcoholic beverage in a week and who are upscale in income. Upscale was defined for those adults in the 23-34 year age group bracket as having household incomes of $25 000 a year or more if they were 35-54 years old. The research was carried out in September 1981.

With regard to the status of Alcoholic Beverages the results of this study into the American Alcohol consumption patterns revealed the following:-

- those that drink beer are more likely to be younger and unmarried and more likely men than women.
- older more affluent college educated people are more likely to drink whisky.
- Beer is most likely to be consumed at picnics barbeques and sporting events (64 per cent of respondents)
- Whisky is primarily drunk at parties, discoteques and night clubs (17-11 per cent of respondents).
- Gin is drunk in a number of situations, but not by more than 10 per cent of respondents in any one situation.
- Brandy was not drunk by more than 3 per cent of respondents in any situation.
- Vodka tends to be preferred by consumers in managerial or administrative occupations.
- Gin is more likely to be chosen by college educated than by rural consumers.

The above would seem to reinforce the concept of Beer being an informal middle class drink whereas Whisky is more usually associated with the upper strata of society. Vodka and Gin both appear to be favoured by the higher levels of society, but not to the same extent as Whisky. No similar evidence was noted for Brandy.

As far as Wines are concerned, the results indicate that

> "Wine appears to be a versatile beverage consumed at casual social meals as well as meals with business associates. It is also consumed at social events both in and outside the home such as,
>
> - Party in the home
> - Friends in the home after dinner
> - Party outside the home
> - Party before dinner" (3)

In all these situations, 26 per cent or more of the respondents consumed wine.

The observation that Wine is a "versatile beverage" consumed at various situations would seem to indicate that Wine can have both high and low status characteristics. This reflects the South African experience where Wine can be associated with a cheap low class product or a noble cultivar blended to satisfy the tastes of the upper echelons of society.

CONCLUSIONS

It is clear that Whisky is generally regarded as being a drink associated with the upper classes of society. Although there may be some debate as to the exact ranking of the remaining major Spirits being Gin, Vodka, Brandy (and Cane for the South African market) the conclusion of the findings discussed above would indicate that these beverages are also associated with higher social classes.

Beer on the other hand makes no such claims to a high position on the social status ladder. It is generally regarded as a beverage to be consumed at informal "status-free" occasions.

In terms of status, Beer can be considered to have a "low" status.

The position regarding Wine is not as clear cut. The products of the Wine category are so varied that it is possible for Wine to be positioned at any point on the Alcohol Beverage Status Scale. A cheap wine, bottled from the residual fermentate will be positioned below even Beer. A superbly blended well matured red wine can rate even higher than an aged Whisky. As a

group therefore, it is not possible to attach uniform status to Wine.

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(1) Smith T.E., Success Through Selling. - A program for self-development and salesmanship. Mitchell Press Vancouver, Canada

(2) Total Research Corporation. A study of beverage Alcohol Consumption Patterns: - Occasions and Lifestyles. Prepared for Newsweek Inc.

(3) Op Cit

CHAPTER 4

THE RETAIL MARKET FOR SPIRIT LIQUOR AND BEER IN SOUTH AFRICA

4.1 INTRODUCTION

Chapter 2 dealt with the Spirit Liquor and Beer Market in terms of product-definition. In this chapter, the Retail Market for Spirit Liquor and Beer in South Africa is defined quantitatively. This is dealt with in terms of,

- the total retail market for Spirit Liquor and Beer, in Rand terms and by volume.
- Annual consumption figures for the years 1975 to 1982 inclusive.

This will serve to define the market population within the boundaries of the research. The data will then be processed into an acceptable form for use in testing of the basic hypothesis.

4.2 THE RETAIL MARKET FOR SPIRIT LIQUOR AND BEER IN SOUTH AFRICA

This is detailed in Appendix I and covers all the products in the Spirit Liquor Category (being Whisky, Vodka, Gin, Brandy, Cane) as well

as Beer. The figures are expressed in thousands of litres and each value represents retail sales measured over a period of two months.

This data represents the total South African retail sales for each commodity listed above for the period February/March 1975 to February/March 1983, inclusive. A period of nine years is covered.

Although it would have been useful to go back even further to cover additional business cycles, this was not possible. The A.C. Nielsen Company only began their work in 1975 and so records of Retail Liquor Sales in South Africa prior to 1975 do not exist.

The data is expressed in thousands of litres. Since this is a volumetric and not a monetary measure it is not subject to a change of scale due to the effects of inflation. This implies that the data is a true representation of the retail sales behaviour and does not require to be adjusted relative to a base year.

It should be noted that each data element covers a period of two months. This is the form in which the data is provided by the A.C. Nielsen

Company. The effect of this aggregating two months data into one figure is to create local smoothing at each two month nodal point. To illustrate this point, consider the values for December and January. Where one would expect a very high figure for December followed by a lower figure for January, only a single figure is recorded. The high peak, followed by a trough is thus represented by a single figure.

The fact that the data is presented as a bi-monthly figure presents a problem in view of the fact that the comparative economic growth indicies namely the Composite Leading and Coinciding indicies are presented on a monthly basis. The method of handling this incompatability will be discussed in Chapter 5 'Method'.

4.3 THE BEHAVIOUR OF THE SPIRIT LIQUOR AND BEER MARKETS OVER TIME

Figure 1 is a graphical representation of the data presented in Appendix I, drawn on log/normal scale. An examination of this graph reveals the following:

1. The retail market for Spirit Liquor is unquestionably seasonal with an unmistakable peak being recorded in December/January i.e. the Christmas period.

2. The sales for the remainder of the year are relatively constant. The exception to this is Beer, which shows a definite low point in the middle of the year. This reinforces the fact identified in the report produced by Newsweek (2) that Beer is most likely to be consumed out of doors. Naturally consumers are less likely to be enjoying the outdoors during winter than summer, and Beer sales reflect this downturn accordingly.

3. A further point to note is that irrespective of whether the product's sales are in a growth or decline phase the December/January peak is still present. This is less prevalent for Gin and Vodka sales, but is shown clearly for all the other products. The inference that can be drawn from this is that should a product (or a brand within a product range) not experience an upsurge in sales during December/January, its continued production should be questioned.

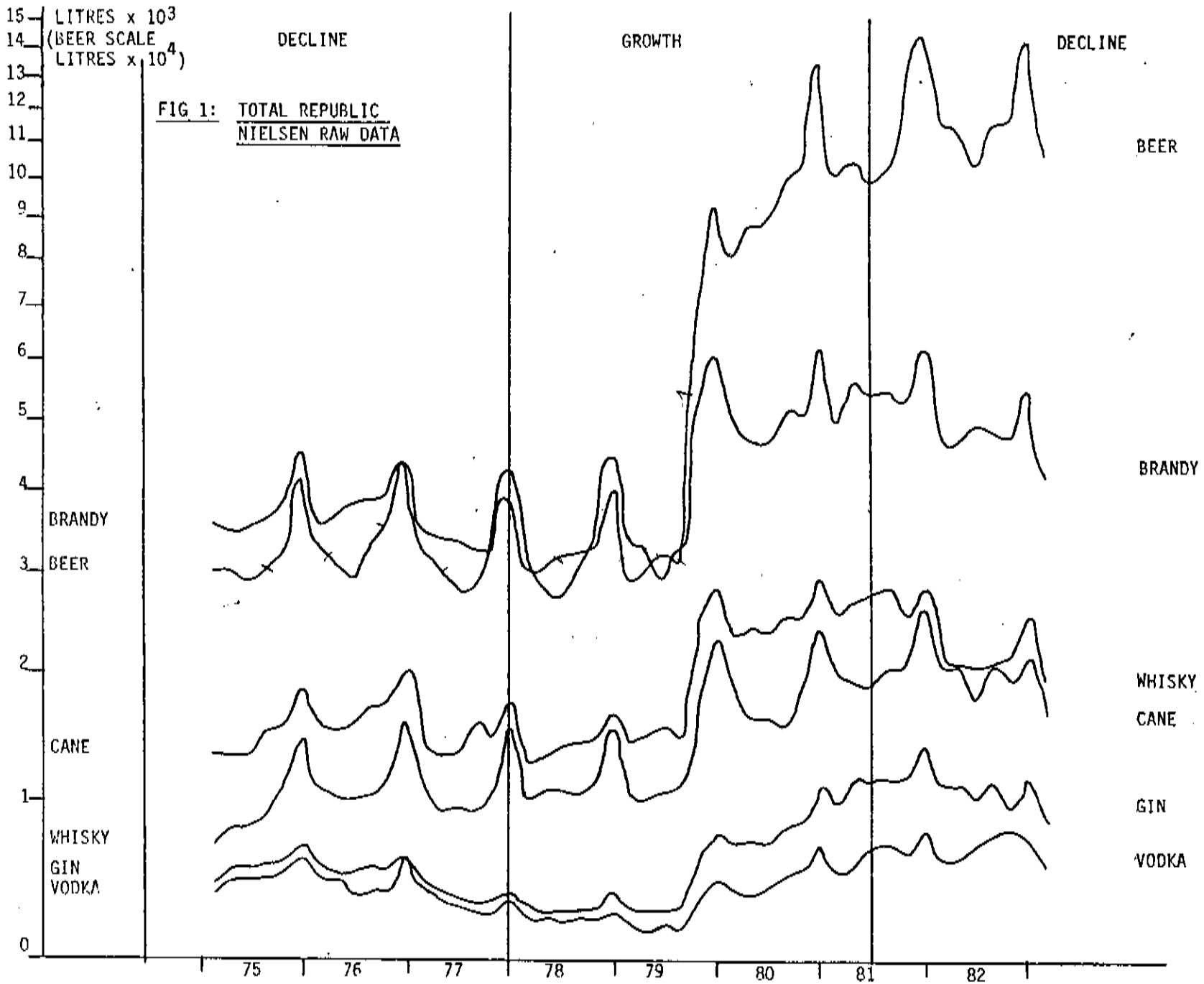

FIG 1: TOTAL REPUBLIC
NIELSEN RAW DATA

4.4 PRICE COMPARISON

A direct "like-with-like" comparison of prices between Spirits and Beer is not simple. The former is consumed by the tot (25ml) usually with a mixer such as water, soda water, tonic. Beer on the other hand is consumed unadulterated, and usually by the glassful. In most cases this can be considered as a pint or half a bottle i.e. 375ml. Thus it would seem reasonable when comparing prices to compare a "drink" of Spirits i.e. a tot with a "drink" of Beer i.e. a pint. This basis for comparison is done on an average Retail Selling Price per Drink Equivalent.

TABLE 5

CALCULATION OF AVERAGE RETAIL SELLING PRICE PER DRINK EQUIVALENT - TOTAL REPUBLIC

PRODUCT	SALES R (mil)	SALES lt (mil)	PRICE R/lt	DRINK EQUIV (lt)	NO. OF DRINK EQUIV (lt)	PRICE PER DRINK Equiv (Cents)
Beer	144,89	117,23	1,23	0,375	312,6	46
Whisky	28,17	2,13	13,22	0,025	85,2	33
Vodka	6,98	0.65	10,74	0,025	26,0	27
Brandy	47,31	4,75	9,96	0,025	190,0	25
Gin	10,23	1,15	8,89	0,025	46,0	22
Cane	18,78	2,13	8,81	0,025	85,2	22

TABLE 6

BREAKDOWN OF MARKET SHARE BY PRODUCT - TOTAL REPUBLIC

PRODUCT	SALES R1 000 000	PERCENTAGE TOTAL MARKET	SALES 1 000 000lt	PERCENTAGE TOTAL MARKET
Beer	144,89	43,6	117,23	71,50
Brandy	47,31	14,2	4,75	2,90
Whisky	28,17	8,5	2,13	1,30
Cane	18,78	5,6	2,13	1,30
Gin	10,23	3,1	1,15	0,70
Vodka	6,98	2,1	0,65	0,40
	256,00	77,1	128,04	78,10
TOTAL MARKET	332,46	100,00%	163,81	100,00%

NOTES:

1. The above figures are calculated on 12 month moving averages as at February/March 1983. These results are based on data supplied by the A.C. Nielsen Company.

2. The Total Market includes the market for Spirits, Unfortified Wines, Fortified Wines and Beer.

3. The selling price per Drink Equivalent can be influenced by the pack size. The smaller

packs i.e. 375ml and 200ml will cost more per equivalent litre than the 750ml size. Thus a product that has a high percentage of sales in the smaller pack size will have a Retail-Selling Price per Drink Equivalent that is higher than anticipated.

It should be noted that the Drink Equivalent Prices are based on the retail sale of Off-Consumption Liquor. (3) These prices should not be confused with prices that would be paid for Drinks Equivalent purchased as On-Consumption Liquor. On-Consumption Liquor is far more expensive than the equivalent cost of Off-Consumption. This is due to the fact that On-Consumption must include all the accompanying costs of serving a drink. These include the cost of labour, (barman, waiters, washup staff) the cost of ancillaries (ice, doily, cocktail stick and snacks) and the cost of the environment (decor and general furniture fixtures and fittings). The actual selling price of On-Consumption will very enormously, according to the standard of the establishment being considered. As a guide, the price for On-Consumption Drink Equivalent is anything from two to five times the price of Off-Consumption Drink Equivalent.

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An examination of Table 5 reveals that Beer has the highest Retail Selling Price per Drink Equivalent of all products being considered. It is 1,4 times the price of Whisky, 1,7 times the price of Vodka, 1,8 times the price of Brandy and more than double the price of Cane and Gin. Yet despite this high price, Beer represents 43,6 per cent of the total market in Rand terms and 71,5 per cent in volume terms. Whisky is the next most expensive at 33 cents with Vodka following at 27 cents.

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(1) This data is collected from various sources supplied by A.C. Nielsen &Company

(2) Total Research Corporation Op. Cit

(3) "Off-Consumption" and "On-Consumption" are terms particular to the Liquor Industry, and referred to the licensed premises on which the Liquor is sold. Thus "Off-Consumption" refers to liquor sold for consumption off the licensed premises. In particular this would relate to a hotel Off-Sales or a bottle store. "On-Consumption" refers to liquor sold for consumption on the licensed premises such as an hotel, public bar or restaurant.

CHAPTER 5

METHOD

5.1 INTRODUCTION

The evaluation of the behaviour of the Spirit Liquor and Beer Markets and Retail Purchasing Patterns during Economic Cycles hinges on two basic sets of data;

- indicators of the national economic performance
- meaningful data of national liquor consumption

Once these two base sets of data have been established they can then be tested to establish whether or not there is any correlation. A high correlation will indicate that retail purchasing patterns mirror the national economic behaviour, whereas a low (or zero) correlation will show this not to be the case.

5.2 THE BUSINESS CYCLE

The existence of Business Cycles in economic activity is, as noted by G. de Kock (1) a well

established fact. Zamowitz (2) in his introduction to The Business Cycle Today is quoted as follows:-

> "A widely accepted conception of business cycles of historic experiences includes recurrent (but non periodic) cumulative expansions and contractions, which are diffused over a multitude of economic processes and involve such major aggregates as national income and product."

J.E.M. Von Coller (3) makes the following observations regarding business cycles.

> "Economic activity has an established tendency to move in cycles which are really recurring wavelike sequences of economic expansion and contraction diffused throughout all business sectors. Such cyclical behaviour is reflected in nearly all economic time series to a greater or lesser extent and is evident in the flow of funds movement of interest rates, consumer spending of income, savings habits, business investment patterns,

employment and manufacturing output. The cycles are not periodic, that is, neither the duration of complete cycles, nor the amplitudes between peaks and troughs are of consistent magnitude. The turning points in these various cycles both at peaks and troughs are of particular interest to the business sector, because they signify changes in trading conditions which have a direct effect on the fortunes of firms concerned."

The above gives weight to the concept of the experience of periods of both growth and decline with peaks and troughs separating these two states. These peaks and troughs or Basic Turning Points for the economy as a whole are determined by the Reserve Bank (4) as follows:-

PEAKS	TROUGHS
April 1960	August 1961
April 1965	December 1965
May 1967	December 1967
December 1971	August 1972
July 1974	December 1977
August 1981	

Using these peak and trough points, the boundaries between periods of economic growth and decline can be established. This represents a basis for a very crude test of the basic hypothesis. If the volume of retail liquor sales coincides with these identified economic cycle boundaries, this may indicate that liquor consumption patterns mirror the national economic behaviour. However these few change points are not sufficient to give a statistically acceptable correlation. Nor do they provide any indication of the consumption behaviour patterns during the cycles.

In order to test the behaviour during the different business cycles, use was made of the Composite Index of Leading Indicators and the Composite Index of Coinciding Indicators as published in Trends (5).

5.3 DEVELOPMENT OF COMPOSITE INDICIES

Economic time series can usually be classified in one of three groups.

(I) Series whose peaks and troughs occur ahead of (lead) the Basic Reference Turning Points (Reference Points).

(II) Series whose peaks and troughs coincide (roughly) with the Reference Points.

(III) Series whose peaks and troughs occur after (lag) the Reference Points.

Naturally, some series will be so erratic that their behaviour will fluctuate amongst all three groups. However, by identifying series whose behaviour and timing is consistant within a group, a composite index can be calculated. This composite index has the advantage of smoothing out the variations of the individual series and reinforcing the characteristic of the particular group (Leading, Coinciding or Lagging as the case may be). Based on the assumption that the timing of the composite index will also be consistant through the Economic Cycle, the composite index forms a useful base for monitoring business cycles throughout the stages. This is particularly the case of Leading Indicators, which can be expected to predict the Economic Cycle and so give advanced notice of changes.

Another reason for using a composite indicator in preference to a single indicator such as GDP or Monthly Retail Sales is that the chances of producing a misleading indicator (as the result

of an unusual situation relating to one particular indicator) is much reduced. Such situations may arise in the case of a simple index where data is provisional and must be revised or a change is introduced which has a major bearing on the data e.g. the introduction of G.S.T. on Retail Sales. A composite index is less likely to be affected by one such factor and so more closely reflect the true situation of the Economic Cycles which fall into that time series group.

5.4 CRITERIA AND PROCEDURES FOR SELECTION OF INDICATORS (6)

In order to select those time series which would be most applicable to the determination of a composite index, certain selection criteria were employed. Zamowitz and Boschan (7) indentified six criteria and attached a weighting to each according to its importance. These were modified by Von Coller (8) to suit South African conditions. A comparison of the two systems is given below.

Criterion for Selection	Weights (per cent) Zamowitz and Boschan	Von Collier
1. Economic Significance	16,7	23,0
2. Statistical Adequacy	16,7	-
3. Consistance of Timing	26,7)	
4. Conformity to Historical Cycles	) 16,7)	5,0
5. Smoothness	13,3	12,0
6. Currency of Timeliness	10,0	15,0
	100,0%	100,0%

These weights are as noted by Van Collier subject to "..... a measure of subjectiveness....." .

Initially fifty time series relating to the South African economy were identified. These series were modified where necessary particularly to remove the effects of seasonality and randomness. Other modifications included inverting series (e.g. insolvencies tend to behave inversely to the General Economy) and the summation of series of similar origin. These modified series were then examined for timing of their turning points. It should be noted that the selection of a time series as being Leading, Lagging Coinciding or none of these is purely a function of the series behaviour relative to the Reference Points. Thus although a particu-

lar series may appear by its nature to fall into a particular category, it is necessary to test it extensively both on the basis of the scoring system set out above, as well as in terms of its turning points relative to the Reference Points. Only once the classification of the time series has been determined in this manner can an attempt be made to establish the reasons for the classification.

The process outlined above resulted in a selection of Nine Leading and Five Coinciding Indicators. These are detailed below:

Leading Indicators.

1. Mining Production
2. Gold and Foreign Exchange Reserves.
3. 12 month change in Money (M1)
4. Industrial share Index
5. Car Sales
6. Building Plans - Dwelling
7. Unfilled Orders - Durables
8. New Companies Registered
9. Insolvencies (Inverted)

Coinciding Indicators

1. Imports (Deflated)
2. Unemployment (Wh.Coll Asian) (Inverted)

3. Index of Manufactured Production (1963/4=100).

4. Wholesale Sales (Deflated)

5. Retail Sales (Deflated)

No Lagging Indicators were identified. In discussion with Mr. Von Coller it was revealed that this method did not produce Lagging Indicators which were sufficiently accurate. There is the further point that since Lagging Indicators reflect the historic changes, they are not of much use in analysing or predicting Economic Cycle behaviour. B.E. Van der Walt (9) produces graphs of all three indicators. He does however note that "The advantage of this (composite lagging business cycle) indicator is that it confirms observed business cycle changes, for example those shown by the coincident business cycle indicator".

The Composite Indicators are published in the BER publication "Trends" (10) and are presented in both graphical and tabular form. In order for the indicies to be useful for comparison with other time series, they are expressed as a per cent ratio, with 1970 as the base year.

It should be noted that the graphical presentation is expressed as both the original data, as well as the smoothed form, whereas the tabulated indicies are presented in their original form. Although termed "original data" this is not quite correct as the data has in fact been seasonaly adjusted. Because it is a composite indicator the random components will have been absorbed in the combining process. An inspection of the graph will indicate that the original data varies very little from the smoothed derandomized graph. In addition the individual component series were smoothed by a 3 x 3 moving average.

The trend component has not been removed. In discussion with Mr. Von Coller it was noted that detrending the indicies has the effect of moving the Coincident Indicator peaks off the corresponding Basic Reference Points. As this would in fact make the Indicies less useful, this process has not been incorporated.

These Composite Leading and Coincident Indicators form the basis as a measure of the economic performance of the Spirit Liquor and Beer Markets.

5.5 SOURCE OF DATA

The primary source of data for this research was the A.C. Nielsen Company.

The A.C. Nielsen (11) data is based on sample of 10 per cent of the total number of retail outlets in South Africa, with the store selection being weighted to account for the different types of stores being chain stores (or groups) independent stores and non-white stores. These are defined as follows:

CHAIN STORES

This includes all stores belonging to the following groups: Western Province Cellars, Liquor Town, Solly Kramers, Winelands, Gilbeys Retail (Rebel, Fine Fair, Happinness is and Liquorama) Picardi Cellars, Holiday Inn, Drop Inn, Marcous and Pieterse Kaapse Kelders.

INDEPENDENT STORES

These are stores not mentioned above, but with less than 90 per cent of their turnover being generated by sales to Non White customers.

NON-WHITE-STORES

This sector includes all stores mentioned under chains who are reliant for more than 90 per cent of their turnover on non white customers (this naturally includes all Administration Board outlets).

The data is presented in a time series of two monthly intervals. Each interval represents the aggregate retail sales for the period covered by that interval.

The data available from Nielsens goes back as far as February 1975. This gives a base spanning just over eight years. Although it would have been preferable to employ data which would have covered two full economic cycles, this data is not available.

The fact that the data is produced in bi-monthly aggregates presents a problem of incompatability with the Composite Indicies, which are presented on a monthly basis. The effect of this is that for every element of data on Retail Liquor Sales there were two indicators. To illustrate this

consider the data for Whisky and the Composite Coinciding Indicator for December/January 1976/1977.

Whisky: December/January 1976/1977 1 601 000 lt

Composite Coinciding Indicator December 1976 101,5

Composite Coinciding Indicator January 1977 100,8.

(Note that for the purpose of this illustration the raw data of Whisky is used).

This incompatability can be handled in one of two ways:

(I) Modification of Liquor Data (in this case Whisky) to suit the Composite Index.

(II) Modification of the Composite Index to suit the Liquor Data.

(1) MODIFICATION OF LIQUOR DATA

General observation of the Retail Liquor Industry clearly indicate that December trading is in excess of that of January. Thus to simply allocate the figure for December/January as to half to December and half to January would clearly be an incorrect statement of the true position.

A similar situation is true (albeit to differing degrees) for the other ten trading months. No alternate weightings for method of realistically allocating the raw bi-monthly data to a monthly basis could be determined.

(II) MODIFICATION OF COMPOSITE

Three alternative methods were considered:

1. Use the first or even month of the bi-monthly pair i.e. in the example above, select the December Composite Coinciding Index (101,5) for testing against the December/January Liquor Data.

2. Use the second or odd month of the bi-monthly pair i.e. in the example above select the January Composite Coinciding Index (100,8) for testing against the December/January Liquor Data.

3. Use an average index bassied on the mean of the Composite Indicies corresponding to the bi-monthly pair. In the above example this would be calculated as follows:-

Average Composite Coinciding Index for December/January = (101,5 + 100,8)/2 = 101,15

In order to assess the effect of each of the three different modifications of the Composite Indicies each of the three modified forms will be tested against the Liquor Data.

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(1) De Kock, G. "The Business Cycle in South Africa - Recent Tendencies" - South African Journal of Economics 43.1.1975

(2) Zamowitz, V. The Business Cycles Today: An Introduction The Business Cycles Today. NBER Fiftieth Anniversary Colloquium I.

(3) Von Coller, J.E.M. "A System of Composite Leading and Coinciding Indicies of the South African Business Cycle" S.E.E. No. 8 1980.

(4) Smit D.J. and Van der Walt, B.E. - "Business Cycles in South Africa during the post war period 1946-1968." South African Reserve Bank Quarterly Bulletin No.97 September 1970.

(5) Op Cit

(6) A more detailed discussion of this topic is to be found in the paper by J.E.M. von Coller Op Cit.

(7) Zamowitz V. and Boschan C. "Cyclica Indicators, an Evaluation and New Leading Indicies" Business Conditions Digest May 1975

(8) Von Coller J.E.M. Op Cit.

(9) B.E. Van der Walt: "Indicatorsof Business Cycle Changes in South Africa" South African Reserve Bank Quarterly Bulletin March 1983.

(10) Op Cit

(11) Report on the S.A. Retail Liquor Market 1981. A.C. Nielsen publication.

CHAPTER 6

ANALYSIS AND RESULTS

6.1 INTRODUCTION

This chapter is concerned primarily with the testing of the Basic Hypothesis as stated in Chapter 1.

> "The Retail Spirit Liquor and Beer Market Sales are largely independant of Economic Cycles".

This will be done by testing the correlation of the data presented in Appendix I with the Composite Index of Leading and Coinciding Indicators as published on page 39 of the September 1983 issue of Trends (Vol.6 No.3 published by the Bureau of Economic Research, University of Stellenbosch).

In order to be able to utilise the same basis for comparison, it will be necessary to modify both sets of data as follows:

LIQUOR DATA

This must be statistically adjusted to accommodate the Trend, Cyclical, Seasonal and Irregular

movements of these time series, in order to be comparable with the Composite Indicies.

COMPOSITE INDICIES DATA

This data must be presented in a form which takes into account the fact that the Liquor Data is presented in bi-monthly aggregates.

Once both sets of data have been modified, linear correlations can be employed to assess the degree of interrelationship between the two sets of data.

6.2 ADJUSTMENT OF LIQUOR DATA TREND MOVEMENT

As mentioned previously, it was noted in discussions with J.E.M. Von Coller that the removal of the trend component from the Composite Coinciding Index had the effect of moving the turning points off the corresponding reference points. As this reduced the usefulness of the index, this component has not been removed from both the Composite Leading and Coinciding Indicies. Accordingly this trend component has been allowed to remain in the Liquor Data.

CYCLICAL MOVEMENT

No attempt is made to remove any of the Cyclical Movement from either the Liquor Data or the Composite Indicators. This is because it is this very cyclical movement which represent the business cycles which are to be tested for correlation.

SEASONAL MOVEMENT

Because time series by the very definition are based on regular time periods they are exposed to various seasonal influences. In order to reduce the data to a comparable base, it is necessary to remove the effects of seasonality. The method used in the deseasonalization of the data in Trends is described by Spiegel (1) as the Percentage Moving Average or Ratio to Moving Average Method. This method was applied to the Liquor Data and is briefly described as follows:

A twelve month moving average is computed. Since results thus obtained fall between successive months instead of in the middle of the month as for the original data a two month moving average of this twelve month moving

average is computed. This is referred to as the "centered twelve month moving average".

The original data is then expressed as a percentage of the centered twelve month moving average corresponding to it.

Percentages for corresponding months are then totalled and averaged, giving the required index. These are adjusted to ensure that they average 100 per cent. The original monthly data is then deseasonalized or adjusted for seasonal variation by dividing it by the calculated average monthly index.

RANDOM OR IRREGULAR MOVEMENTS

The random movements for the Composite Indicies were achieved by a 3 x 3 moving average. The same method was applied to the Liquor Data.

The above adjustments resulted in the elements of the Liquor Data being in the same format as the Composite Indicators. What remained was for the Composite Indicators to be adjusted to accommodate the bi-onthly presentation of the Liquor Data.

6.3 ADJUSTMENT OF THE COMPOSITE INDICIES DATA

As was discussed to Chapter 5 Section 5.5 "Source of Data", the composite indicies will be adjusted and checked for correlation in three different forms.

1. Use of the Composite Index of the month corresponding to the first (or even month) of the bi-monthly pair of the Liquor Data.

2. Use of the Composite Index of the month corresponding to the second (or odd month) of the bi-monthly pair of the Liquor Data.

3. Use of an Average Index based on the mean of the Composite Indicies corresponding to the bi-monthly pair.

The data was processed on a Sharp MZ-80K Micro Computer.

The adjusted Liquor Data and Composite Indicies are given in Appendix II

CORRELATION

Correlation was carried out using linear correlation. The formula used is that for the coefficient of correlation as defined by Spiegel (2)

$$r = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{(N\Sigma X^2 - (\Sigma X)^2)(N\Sigma Y^2 - (\Sigma Y)^2)}}$$

where

r = coefficient of correlation

N = Number of variables being considered

X, Y = Variables under consideration, in this case Liquor Data and Composite Indicies

The results of this correlation are given in tables 7 to 10 below.

TABLE 7

CORRELATION OF DESEASONALIZED LIQUOR DATA AND COMPOSITE INDICIES FOR EVEN MONTHS

PRODUCT	COINCIDENT INDEX	LEADING INDEX
Whisky	0,4839	0,8071
Gin	0,7048	0,8135
Brandy	0,6055	0,6653
Cane	0,5127	0,6859
Beer	0,5472	0,9005
Vodka	0,7925	0,5733

TABLE 8

CORRELATION OF DESEASONALIZED LIQUOR DATA AND COMPOSITE INDICIES FOR ODD MONTHS

PRODUCT	COINCIDENT INDEX	LEADING INDEX
Whisky	0,5001	0,7981
Gin	0,7124	0,7948
Brandy	0,6363	0,6614
Cane	0,5619	0,6865
Beer	0,5565	0,8898
Vodka	0,7760	0,5497

TABLE 9

CORRELATION OF DESEASONALIZED LIQUOR DATA AND MEAN COMPOSITE INDICIES FOR BOTH MONTHS

PRODUCT	COINCIDENT INDEX	LEADING INDEX
Whisky	0,4937	0,8032
Gin	0,7110	0,8048
Brandy	0,6230	0,6639
Cane	0,5393	0,6868
Beer	0,5537	0,8959
Vodka	0,7868	0,5619

TABLE 10

SUMMARY OF CORRELATION OF TABLES 7, 8 AND 9

PRODUCT	COINCIDENT INDEX Table No.			LEADING INDEX Table No.		
	7	8	9	7	8	9
Whisky	0,48	0,50	0,49	0,80	0,79	0,80
Gin	0,70	0,71	0,71	0,81	0,79	0,80
Brandy	0,60	0,63	0,62	0,66	0,66	0,66
Cane	0,51	0,56	0,54	0,68	0,68	0,68
Beer	0,54	0,55	0,55	0,90	0,88	0,89
Vodka	0,79	0,77	0,78	0,57	0,54	0,56

6.4 USE OF EVEN AND ODD MONTHS AND MEAN OF COMPOSITE INDICIES

The first point to emerge from an examination of the results is that there is very little difference between the correlation using the Composite Indicies for Even and Odd Months. This is not entirely unexpected since a visual inspection of the Composite Indicies will show that the data is smooth and continuous with no extreme points. In addition, the Even months do not show a pattern any different from the Odd Months.

The conclusion that can be drawn from this is that it makes no difference whether the Index used is that of the Even Month, the Odd Month or the Mean of the Even and Odd Months. In terms of future analysis, this implies that the Coinciding and Leading Composite Indicies as published in Trends may be used without further modification.

6.5 CORRELATION WITH LEADING AND COINCIDING INDICATORS

Generally speaking, retail sales of Spirit Liquor and Beer were more closely correlated with the Leading Indicators than with the

Coinciding Indicators. The exception to this was Vodka which showed a much higher correlation with the Coincident Index (0,7925) (3) than with the Leading Index (0,5733). All the remainder showed a positive correlation with the Leading Index. In ascending order these are Brandy (0,6653), Cane (0,6859), Whisky (0,8071), Gin (0,8135) and Beer (0,9005).

The sales of Spirit Liquor and Beer can thus be regarded as leading the behaviour of the National Economy.

6.6 GRAPHICAL PRESENTATION OF DATA AND RESULTS

Figure 1 shows the raw Spirit Liquor and Beer Data and Figure 2 shows the deseasonalized Spirit Liquor and Beer Data.

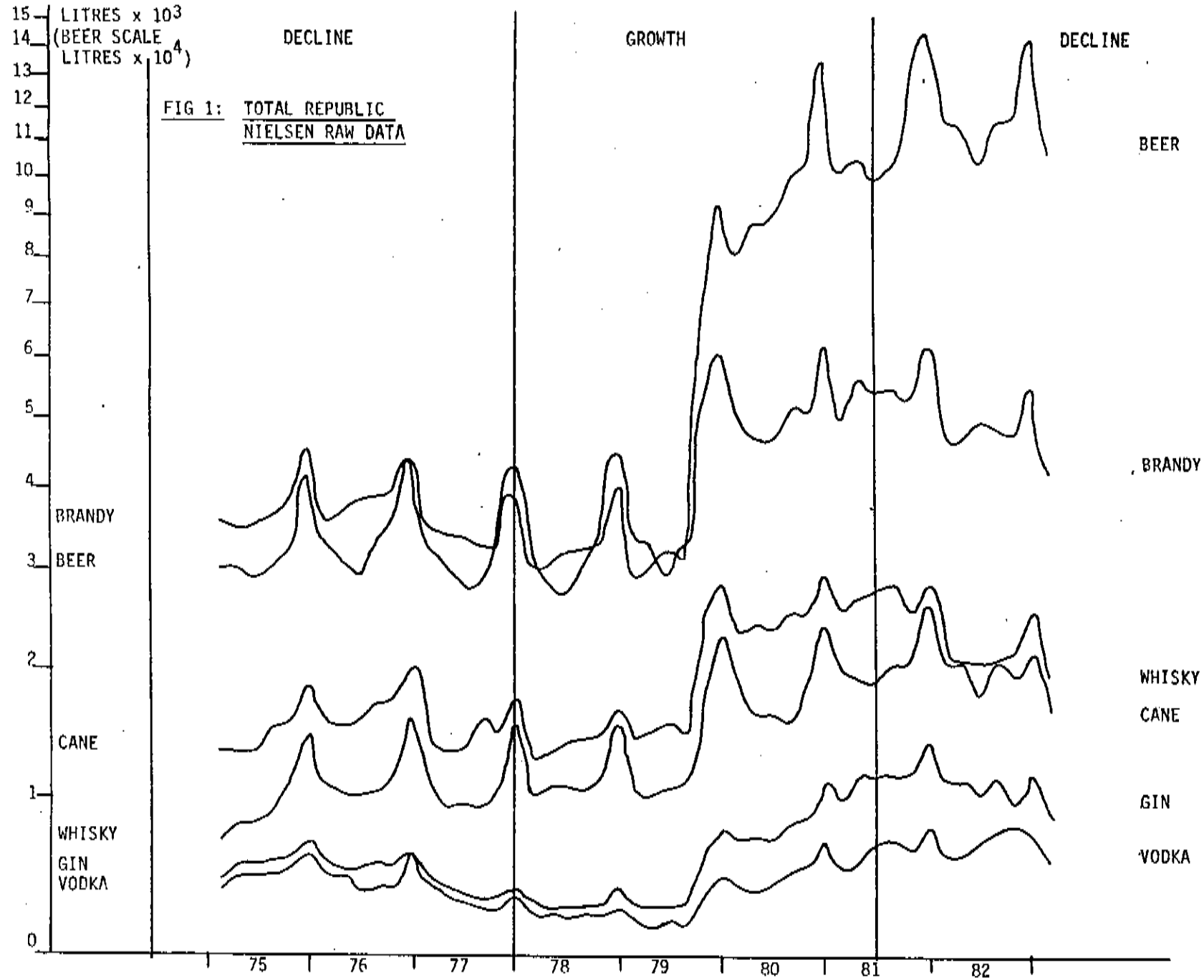

FIG 1: TOTAL REPUBLIC
NIELSEN RAW DATA

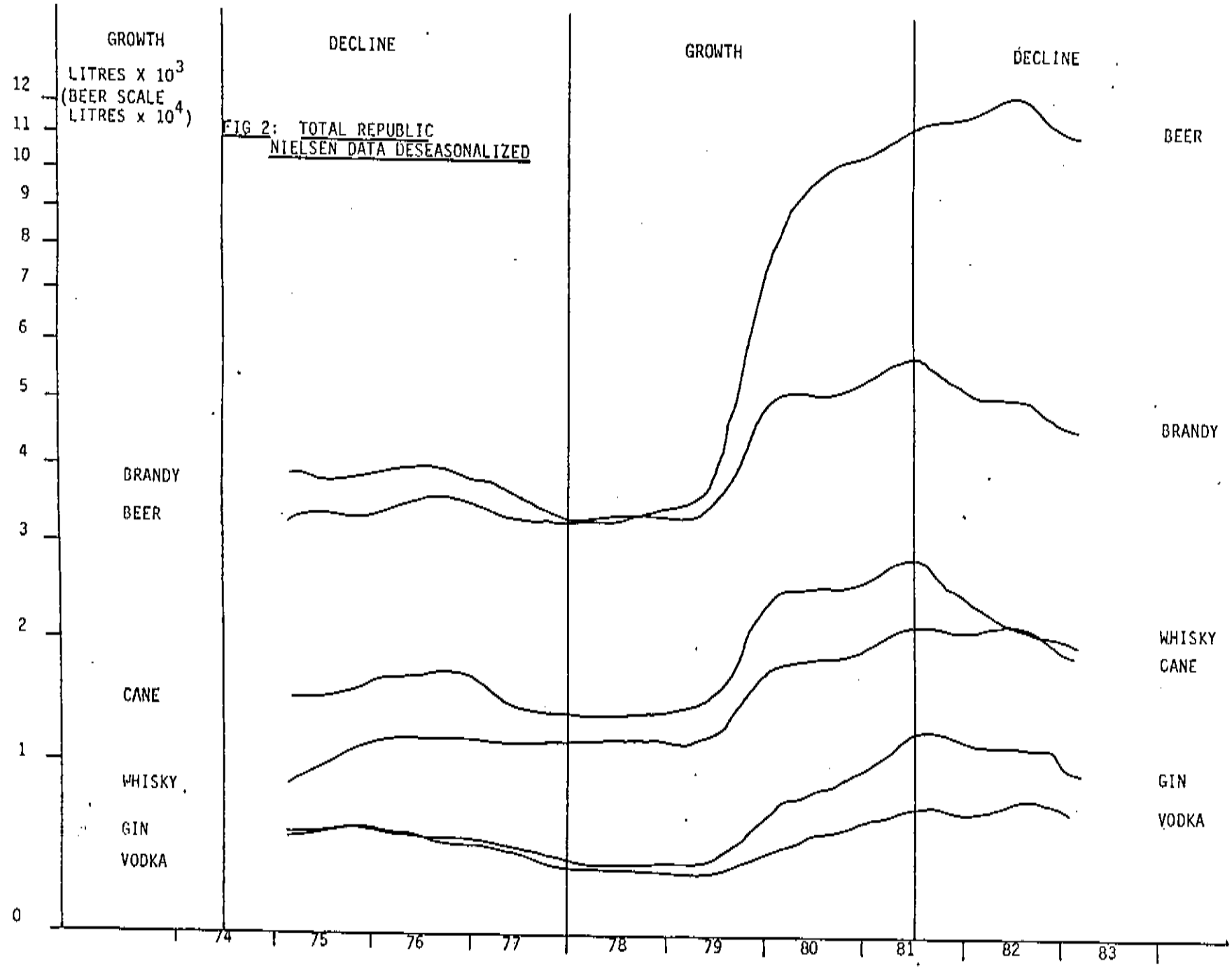

FIG 2: TOTAL REPUBLIC
NIELSEN DATA DESEASONALIZED

(1) Spiegel N.R. Theory and Problems of Statistics Schaums Outline Series - McGraw Hill Company Page 287

(2) Spiegel M.R. Op Cit

(3) For convenience all correlation indicies refer to correlation with Composite Indicies for Even Months (Table 9)

CHAPTER 7

CONCLUSIONS AND IMPLICATION

7.1 INTRODUCTION

Three basic conclusions can be drawn from the results presented in Chapter 6.

1. All Spirit Liquor and Beer Sales have a positive correlation with Leading and Coinciding Composite Indicators.

2. With the exception of Vodka, all products are more closely correlated with Leading than Lagging Indicators.

3. Beer and Whisky have correlations of the same order of magnitude.

These conclusions will be discussed and the implications of them on the liquor market examined.

7.2 DISCUSSION OF CONCLUSIONS

1. All Spirit Liquor and Beer Sales have a positive correlation with both Composite Indicators

There are two points of major significance which emerge from this statement.

- Spirit Liquor and Beer Sales do not behave independently of the National Economy.

- Spirit Liquor and Beer Sales experience periods of growth and decline which move in the same direction as those experienced by the economy as a whole.

The first fact, that Spirit Liquor and Beer Sales do not behave independently of the National Economy is in direct contrast of the Basic Hypothesis which states that,

> "The Retail Spirit Liquor and Beer Market Sales are largely independent of Economic Cycles".

This hypothesis anticipated a low correlation between Spirit Liquor and Beer Sales and

Indicators of the National Economy. Since this has been proved to be not the case and since the behaviour of the National Economy represents the behaviour of Economic Cycles, the basic hypothesis can be rejected.

The second point, that Spirit Liquor and Beer Sales experience periods of growth and decline in the same direction as the economy as a whole, reinforces the rejection of the basic hypothesis, in that not only are Spirit Liquor and Beer Sales not independent of Economic Cycles, they are in fact a function of the National Economy and the Leading Composite Indicators in particular.

The combination of both sets of arguments leave no doubt as to the invalidity of the Basic Hypothesis and its consequent rejection.

2. WITH THE EXCEPTION OF VODKA ALL PRODUCTS ARE MORE CLOSELY ASSOCIATED WITH LEADING THAN LAGGING INDICATORS

The reason for Vodka's different behaviour is not clear. An examination of both figure 1 and figure 2 indicate that Vodka and Gin experience similar sales until approximately the middle of

1979. After this point Gin sales experienced a much steeper growth rate and have maintained this increased gap over Vodka. It is possibly this slower growth rate of Vodka that tends to make it more related to the Coincident Indicator which also exhibits this reduced growth rate.

The fact that the remaining products are related to the leading Indicators is of importance when considering the forecasting aspect. Since Leading Indicators can be used as an indication of impending changes in the Economic Cycles, they can also be used as indicators for changes in projected Spirit Liquor and Beer Sales.

3. BEER AND WHISKY HAVE CORRELATIONS OF MUCH OF THE SAME MAGNITUDE

This is of significance when considering the secondary hypothesis which states that,

> "High Status Liquor will be less affected by Economic Cycles than Low Status Liquor"

It has been shown in Chapter 3 that Whisky (and in varying degrees the other Spirits) are high status Liquors, whereas Beer is regarded as an

alcoholic beverage of low status. Thus if the secondary hypothesis were true one would expect Beer to have the highest correlation with the economic indicators, Whisky to have the lowest and the remaining Spirits to fall in between. Whilst it is true that Beer does exhibit the highest correlation, Whisky as the highest status drink does not prove to be immune to the effects of economic cycles. The correlation of 0,8071 of Whisky with the Leading Composite Index is only 10,4 per cent less than that of Beer (0,9005), Gin is even higher at 0,8135 with Brandy and Cane of the same magnitude (0,6653 and 0,6859 respectively) and Vodka at 0,5733.

The fact that high Status Spirits such as Whisky and Gin show themselves to be effected by Economic Cycles by the same order of magnitude as the Low Status Beer indicates that the premise of the secondary hypothesis is not correct and must be rejected.

The conclusion that can be drawn from the fact that the secondary hyphothesis is invalid is that no reliance can be placed on projections of the behaviour of Spirit Liquor or Beer during Economic Cycles based on the perceived status of the product.

7.3 IMPLICATION OF THE CONCLUSIONS ON THE LIQUOR MARKET

The rejection of the Basic Hypothesis gives rise to the question of why the Spirit and Beer Markets exhibit cyclical tendencies and in particular why these two markets tend on the whole to lead the general economy.

Clearly, an in depth study in to the reason for this cyclical behaviour is outside the scope of this research. What will be presented is a brief examination of some possible reasons in the hopes that others may pursue this more deeply.

In his article entitled "Indicators of business cycle changes in South Africa (1), B.E. Van der Walt makes reference to three groups of leading business cycle indicators as follows:-

- indicators related to the foreign demand for South African goods and services.
- indicators related to future production and expenditure.
- indicators related to the future course of the economy and general business cycle.

None of these groups include retail sales in general or Liquor sales in particular. The results of this research indicate that Liquor sales in general should be examined more closely for possible inclusion as a leading business cycle indicator. The most probable group is that related to the future course of the economy and general business cycle.

In considering Retail Liquor Sales as a leading indicator the nature of the South African Business Cycle must be examined. Generally speaking the South African Cycle lags that of the United States and Europe. A growth in those overseas economies will precipitate a growth in the South African economy with a growth in exports as noted by G. de Kok. (2)

> "The rising exports generates additional income and this in turn stimulates consumption. With economic activity rising, slowly at first but then with increasing momentum, both private and public enterprises have a clear inducement to expand their investment expenditure on new construction plant and also to invest more in inventories. This process is

encouraged by the favourable financial climate prevailing in the early stages of the upswing. In due course then we have a strong upswing with increases in all the major components of gross domestic expenditure. Naturally this is accompanied by a substantial increase in the rate of growth of real gross domestic product to a figure well in excess of the long term average."

It is in the early stages, when additional income is generated but before the economy as a whole has moved into a period of real growth that expenditure on non-essential consumables can take place.

This implies that Liquor Sales are in reality non-essential purchases which pre-empt the behaviour of the economy as a whole. As the general economy moves towards a growth period Liquor Sales will begin to take off as a result of expectations of excess income available for expenditure on non essential purchases. The converse applies as the economy approaches a decline.

This examination of the behaviour of disposable income during economic cycles would appear to support the concept of Retail Liquor Sales following a cyclical pattern, closely related to Leading Economic Indicators.

7.4 CONCLUSIONS

The primary hypothesis is based on the widespread belief that the Liquor Market is unaffected by economic cycles. The research detailed in this paper has clearly shown that this is not the case.

A secondary hypothesis based on the premise that high status Liquor is less affected by economic cycles than low status Liquor has also been shown to be invalid.

The research has shown that the Spirit Liquor and Beer Markets are positively related to the behaviour of the economy as a whole with a significant correlation to the Leading Composite Indicator.

It is hoped that these findings will prove a useful tool to those in the Liquor Industry who are involved in forecasting and predicting Retail Liquor Sales.

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APPENDIX I

The Retail Market for Spirit Liquor and Beer in South Africa

NO	YR	MN	WHISKY	VODKA	GIN	BRANDY	CANE	BEER
73	75	FE	759	470	502	3511	1304	30023
75	75	AP	847	515	507	3539	1374	30772
77	75	JU	857	512	707	3500	1373	29031
79	75	AU	873	550	521	3675	1510	32273
81	75	OC	1192	595	550	3275	1591	32931
83	75	DE	1492	671	665	4052	1820	41723
85	76	FE	1131	536	508	3600	1392	33681
87	76	AP	1069	541	490	3650	1540	31740
89	76	JU	1025	456	498	3670	1572	29972
91	76	AU	1051	432	501	3981	1774	[illegible]
93	76	OC	1179	477	494	3985	1727	32871
95	76	DE	1601	588	589	4476	1965	44052
97	77	FE	1183	503	515	3590	1403	[illegible]
99	77	AP	972	426	449	3138	1370	32040
101	77	JU	967	339	434	3100	1300	30254
103	77	AU	924	370	395	3331	1302	30271
105	77	OC	1201	345	402	3240	1401	[illegible]
107	77	DE	1579	409	463	3985	1703	42021
109	78	FE	1172	383	351	3287	1226	31677
111	78	AP	1017	311	330	3047	1293	30033
113	78	JU	1390	304	358	3246	1412	37142
115	78	AU	1654	310	360	3292	1469	38842
117	78	OC	1151	314	380	3316	1467	34553
119	78	DE	1564	367	476	4099	1661	45294
121	79	FE	1067	278	365	2924	1402	33047
123	79	AP	1024	276	351	3085	1171	32675
125	79	JU	1370	292	376	3253	1567	33324
127	79	AU	1105	289	381	3197	1402	33319
129	79	OC	1737	455	544	5137	2474	70050
131	79	DE	2340	517	831	6171	2885	92665
133	80	FE	1800	465	774	4943	2231	71002
135	80	AP	1087	439	761	4076	2420	83494
137	80	JU	1620	490	740	4740	2370	84002
139	80	AU	1570	572	850	5280	2570	95731
141	80	OC	1330	590	950	5190	2522	104899
143	80	DE	2470	740	1120	6360	2900	133157
145	81	FE	2000	570	1300	5010	2580	121384
147	81	AP	1940	590	1130	5580	2590	124556
149	81	JU	1350	720	1150	5490	2740	98254
151	81	AU	2080	740	1130	5560	2920	100270
153	81	OC	2250	680	1190	5300	2500	104011
155	81	DE	2630	810	1420	6290	2340	147030
157	82	FE	2370	630	1110	4630	2970	113034
159	82	AP	2090	540	1120	4070	2800	115011
161	82	JU	1730	740	1040	4910	2830	142007
163	82	AU	2100	900	1130	4840	2100	112007
165	82	OC	1130	820	550	4760	1950	116247
167	82	DE	2750	720	1130	5510	2160	142065
169	83	FE	1960	600	900	4220	1600	107491

APPENDIX II

Adjusted Liquor Data

NO	YR	MN	WHISKY	VODKA	GIN	BRANDY	CANE	BEER
73	75	FE	491.3723	295.13232	301.03586	2131.5733	826.4362	18233.601
75	75	AP	825.30987	479.91226	492.90429	3393.4508	1322.8015	29529.368
77	75	JU	992.47984	550.0926	546.45795	3799.8034	1494.1096	33498.668
79	75	AU	1056.1772	562.84058	543.95498	3801.3297	1518.8891	33019.593
81	75	OC	1112.9327	587.84566	547.05451	3825.9979	1561.7594	32885.402
83	75	DE	1136.6434	571.11755	540.12129	3856.9747	1610.179	33039.55
85	76	FE	1150.9059	563.43867	530.62383	3901.7668	1653.3611	33792.95
87	76	AP	1162.4294	547.62907	526.12908	3949.8632	1677.9815	34770.495
89	76	JU	1168.2208	516.29266	522.14651	3987.6994	1691.3468	35453.735
91	76	AU	1171.1484	496.02764	515.74965	3954.2833	1704.9398	35599.451
93	76	OC	1167.4063	488.56809	507.71262	3902.2415	1688.9985	35034.794
95	76	DE	1158.9664	491.64232	499.8062	3796.7917	1646.3229	34276.94
97	77	FE	1139.4902	486.10935	490.95143	3734.1918	1661.2014	33637.115
99	77	AP	1118.175	480.77741	479.30156	3663.5762	1611.0632	33235.634
101	77	JU	1104.0497	422.37234	445.23251	3553.6798	1484.1649	32862.08
103	77	AU	1103.9552	384.65178	419.84707	3441.1358	1494.1326	32529.636
105	77	OC	1110.4192	356.14106	403.48457	3334.6733	1472.9125	32493.323
107	77	DE	1124.0824	341.24281	388.77928	3284.6509	1448.5927	32604.266
109	78	FE	1138.6273	331.69569	380.49057	3278.1384	1426.48	32648.632
111	78	AP	1158.827	328.71825	375.20395	3312.3477	1436.2395	32682.306
113	78	JU	1173.4149	322.64374	378.75558	3343.7531	1453.3763	32730.584
115	78	AU	1172.7951	317.20936	382.8396	3359.2177	1456.7797	33120.097
117	78	OC	1156.8417	309.9465	385.27048	3330.7507	1455.2695	33517.266
119	78	DE	1141.4463	304.94073	383.76133	3303.341	1468.839	34292.188
121	79	FE	1139.9712	301.7953	382.50754	3283.0601	1518.1612	34686.007
123	79	AP	1161.1651	301.04035	386.24291	3305.7658	1557.9825	35352.35
125	79	JU	1244.0432	317.47527	420.61693	3522.4948	1670.9032	40010.09
127	79	AU	1360.3089	347.4499	482.45244	3922.0877	1843.0779	48711.289
129	79	OC	1573.1455	399.33143	579.59816	4534.1076	2138.2039	62246.352
131	79	DE	1712.4138	438.52283	665.11752	4953.0425	2365.2908	73733.825
133	80	FE	1803.3275	473.54193	737.28537	5171.5465	2515.2808	84345.626
135	80	AP	1809.6869	496.43273	787.25248	5173.585	2552.4979	92919.936
137	80	JU	1818.7143	527.295	827.84493	5174.1873	2549.0449	99567.4
139	80	AU	1813.521	559.76805	867.30897	5219.1489	2537.1999	103422.87
141	80	OC	1857.5698	584.97541	904.19027	5247.609	2542.3141	103361.54
143	80	DE	1918.946	605.47884	973.67984	5378.9798	2615.497	104523.31
145	81	FE	2020.2374	630.70668	1064.3386	5535.8794	2730.6576	106839.56
147	81	AP	2113.2597	670.06981	1167.2545	5727.3883	2829.7363	111260.45
149	81	JU	2160.9711	705.72543	1229.2943	5720.836	2832.4996	114627.14
151	81	AU	2152.3366	716.05622	1230.3657	5594.9588	2735.497	115846.84
153	81	OC	2097.1105	700.10574	1200.8248	5363.2085	2565.4991	116062.26
155	81	DE	2092.5691	684.05917	1179.7909	5197.7009	2415.455	116496.52
157	82	FE	2114.9838	689.17002	1160.6636	5090.3646	2301.5057	118743.09
159	82	AP	2176.5041	720.2965	1161.6529	5058.5984	2241.0264	122662.41
161	82	JU	2191.5154	760.79576	1139.1624	5021.2092	2167.7876	123080.85
163	82	AU	2164.4638	774.98103	1105.8583	4921.7022	2072.5561	121217.22
165	82	OC	2091.1449	752.86318	1035.8471	4773.3059	1955.219	115848.66
167	82	DE	1912.1674	698.64596	880.51612	4135.8965	1664.9109	99933.487
169	83	FE	1332.9968	446.26314	632.6959	3060.0899	1215.0724	73448.439
171	83	AP	662.21316	213.40422	313.2157	1524.055	601.41148	36917.467

Adjusted Composite Inddicies Data

			COINCIDENT				LEADING			
NO	YR	MN	DATA	ODD	EVEN	AVE	DATA	ODD	EVEN	AVE
73	75	FE	110.1	0	110.1	109.6	101.8	0	101.8	101.9
74	75	MA	109.1	109.1	0	0	101.8	101.8	0	0
75	75	AP	110.5	0	110.5	110	103.2	0	103.2	103.35
76	75	MA	109.5	109.5	0	0	103.5	103.5	0	0
77	75	JU	109.2	0	109.2	109.9	105.2	0	105.2	105.45
78	75	JU	110.6	110.6	0	0	105.7	105.7	0	0
79	75	AU	109.4	0	109.4	109.9	105.7	0	105.7	106.7
80	75	SE	110.4	110.4	0	0	107.7	107.7	0	0
81	75	OC	110.8	0	110.8	110.3	108.3	0	108.3	108.15
82	75	NO	109.8	109.8	0	0	108	108	0	0
83	75	DE	110.4	0	110.4	110.95	106.1	0	106.1	106.05
84	76	JA	111.5	111.5	0	0	106	106	0	0
85	76	FE	111	0	111	110.65	106.3	0	106.3	106.6
86	76	MA	110.7	110.7	0	0	106.9	106.9	0	0
87	76	AP	109.9	0	109.9	109.15	106.4	0	106.4	105.6
88	76	MA	108.4	108.4	0	0	104.8	104.8	0	0
89	76	JU	108.4	0	108.4	107.8	103.3	0	103.3	102.45
90	76	JU	107.2	107.2	0	0	101.6	101.6	0	0
91	76	AU	105.4	0	105.4	105.4	100.4	0	100.4	100.55
92	76	SE	105.4	105.4	0	0	100.7	100.7	0	0
93	76	OC	102.7	0	102.7	102.65	99.6	0	99.6	99.6
94	76	NO	102.6	102.6	0	0	99.6	99.6	0	0
95	76	DE	101.5	0	101.5	101.15	99.9	0	99.9	99.5
96	77	JA	100.8	100.8	0	0	99.1	99.1	0	0
97	77	FE	99.9	0	99.9	99.65	98.2	0	98.2	98.45
98	77	MA	99.4	99.4	0	0	98.7	98.7	0	0
99	77	AP	97.7	0	97.7	97.35	98.6	0	98.6	98.75
100	77	MA	97	97	0	0	98.9	98.9	0	0
101	77	JU	96.8	0	96.8	96.25	100.2	0	100.2	99.75
102	77	JU	95.7	95.7	0	0	99.3	99.3	0	0
103	77	AU	96.2	0	96.2	96.25	99.8	0	99.8	99.85
104	77	SE	96.3	96.3	0	0	99.9	99.9	0	0
105	77	OC	94.7	0	94.7	94.6	98.9	0	98.9	99.15
106	77	NO	94.5	94.5	0	0	99.4	99.4	0	0
107	77	DE	95.2	0	95.2	95.8	100.5	0	100.5	100.25
108	78	JA	96.4	96.4	0	0	100	100	0	0
109	78	FE	95.9	0	95.9	95.85	100.6	0	100.6	100.2
110	78	MA	95.8	95.8	0	0	99.8	99.8	0	0
111	78	AP	96.2	0	96.2	96.3	101	0	101	101.4
112	78	MA	96.4	96.4	0	0	101.8	101.8	0	0
113	78	JU	96.9	0	96.9	96.6	103.6	0	103.6	103.45
114	78	JU	96.3	96.3	0	0	103.7	103.7	0	0
115	78	AU	97.1	0	97.1	96.7	105.6	0	105.6	105.2
116	78	SE	96.3	96.3	0	0	104.8	104.8	0	0
117	78	OC	97.5	0	97.5	97.5	106.5	0	106.5	106.4
118	78	NO	97.5	97.5	0	0	106.3	106.3	0	0
119	78	DE	97	0	97	97.2	107	0	107	108.15
120	79	JA	97.4	97.4	0	0	109.3	109.3	0	0
121	79	FE	96.3	0	96.3	97.1	110.2	0	110.2	111.15
122	79	MA	97.9	97.9	0	0	112.1	112.1	0	0

			COINCIDENT				LEADING			
NO	YR	MN	DATA	ODD	EVEN	AVE	DATA	ODD	EVEN	AVE
123	79	AP	96.7	0	96.7	96.9	112.1	0	112.1	112.4
124	79	MA	97.1	97.1	0	0	112.7	112.7	0	0
125	79	JU	97.9	0	97.9	97.3	111.7	0	111.7	112.15
126	79	JU	96.7	96.7	0	0	112.6	112.6	0	0
127	79	AU	97.6	0	97.6	97.6	114.2	0	114.2	115.15
128	79	SE	97.6	97.6	0	0	116.1	116.1	0	0
129	79	OC	98.5	0	98.5	99.05	119.6	0	119.6	119.2
130	79	NO	99.6	99.6	0	0	119.8	119.8	0	0
131	79	DE	99.2	0	99.2	100	123	0	123	124.85
132	80	JA	100.8	100.8	0	0	126.7	126.7	0	0
133	80	FE	102.3	0	102.3	102	128.9	0	128.9	129.25
134	80	MA	101.7	101.7	0	0	129.6	129.6	0	0
135	80	AP	103.5	0	103.5	103.8	130.5	0	130.5	132.1
136	80	MA	104.1	104.1	0	0	133.7	133.7	0	0
137	80	JU	103.9	0	103.9	104.8	134.1	0	134.1	135.45
138	80	JU	105.7	105.7	0	0	136.8	136.8	0	0
139	80	AU	106.1	0	106.1	106.8	136.5	0	136.5	137.45
140	80	SE	107.5	107.5	0	0	138.4	138.4	0	0
141	80	OC	108.9	0	108.9	108.75	138.7	0	138.7	138
142	80	NO	108.6	108.6	0	0	137.3	137.3	0	0
143	80	DE	109.6	0	109.6	109.55	136.9	0	136.9	136.35
144	81	JA	109.5	109.5	0	0	135.8	135.8	0	0
145	81	FE	109.8	0	109.8	110.3	135.7	0	135.7	136.65
146	81	MA	110.8	110.8	0	0	137.6	137.6	0	0
147	81	AP	112.5	0	112.5	113.2	137	0	137	137.55
148	81	MA	113.9	113.9	0	0	138.1	138.1	0	0
149	81	JU	113.3	0	113.3	114.6	136	0	136	136.25
150	81	JU	115.9	115.9	0	0	136.5	136.5	0	0
151	81	AU	114.8	0	114.8	115.4	135.3	0	135.3	135.15
152	81	SE	116	116	0	0	135	135	0	0
153	81	OC	115	0	115	114.75	134.7	0	134.7	134.05
154	81	NO	114.5	114.5	0	0	133.4	133.4	0	0
155	81	DE	115.5	0	115.5	115.5	134.6	0	134.6	133.7
156	82	JA	115.5	115.5	0	0	132.8	132.8	0	0
157	82	FE	113.3	0	113.3	113.3	133.6	0	133.6	133
158	82	MA	113.3	113.3	0	0	132.4	132.4	0	0
159	82	AP	111.7	0	111.7	110.75	131.2	0	131.2	130.4
160	82	MA	109.8	109.8	0	0	129.6	129.6	0	0
161	82	JU	109.7	0	109.7	109.75	130.6	0	130.6	130.4
162	82	JU	109.8	109.8	0	0	130.2	130.2	0	0
163	82	AU	108.7	0	108.7	107.35	130.4	0	130.4	131.05
164	82	SE	106	106	0	0	131.7	131.7	0	0
165	82	OC	103.2	0	103.2	102.5	131.9	0	131.9	132.45
166	82	NO	101.8	101.8	0	0	133	133	0	0
167	82	DE	101	0	101	100.45	134.4	0	134.4	134.65
168	83	JA	99.9	99.9	0	0	134.9	134.9	0	0
169	83	FE	99.4	0	99.4	99.75	136.9	0	136.9	136.7
170	83	MA	100.1	100.1	0	0	136.5	136.5	0	0
171	83	AP	100.2	0	100.2	99.65	138.4	0	138.4	138.9