AN ABSTRACT OF THE THESIS OF

CONNIE SCHROCK WYRICK FOR THE MASTER OF ARTS IN MATHEMATICS PRESENTED ON DECEMBER 1981

TITLE: MULTIPLE REGRESSION AS AN INTERNATIONAL MARKET FORECASTING TOOL

ABSTRACT APPROVED:

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THE PURPOSE OF THIS THESIS IS TO DEVELOP A STRONGER TOOL FOR FORECASTING THE INTERNATIONAL MARKET FOR A SPECIFIC COMPANY. THE PAPER IS DIVIDED INTO FOUR PARTS. THE FIRST PART DESCRIBES VARIOUS METHODS OF FORECASTING. COLLECTION OF DATA AND SELECTION OF VARIABLES ARE IN THE SECOND. EXPLANATION OF THE TOOLS USED IN DEVELOPING THE MULTIPLE REGRESSION EQUATIONS FOLLOW. THE FOURTH YIELDS THE EQUATIONS AND CONCLUSIONS.

MULTIPLE REGRESSION AS AN INTERNATIONAL MARKET FORECASTING TOOL

A THESIS

PRESENTED TO

THE DEPARTMENT OF MATHEMATICS

EMPORIA STATE UNIVERSITY

IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF ARTS

BY

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NOVEMBER 1981

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ACKNOWLEDGEMENT

IN THIS PAPER, MANY PEOPLE HAVE AIDED ME. I EXPRESS MY THANKS TO THE COMPANY WHO CONTRIBUTED FREELY THE INFORMATION PRESENTED IN THIS THESIS. MY GRATITUDE IS ESPECIALLY EXTENDED TO DAVE RINDOM FOR HIS SUGGESTIONS AND GUIDANCE.

THE GUIDANCE AND PATIENCE OF DR. ROCKY HARTZLER HAVE BEEN IMPORTANT IN THE FOUNDATION OF THIS PROJECT, AS HAS BEEN THE DIRECTION AND HELP OF DR. JOHN BURGER. I WOULD ALSO LIKE TO THANK THE ENTIRE MATHEMATICS FACULTY AT EMPORIA STATE UNIVERSITY FOR MY EDUCATION. I HAVE GREATLY APPRECIATED LEARNING FROM THEM. SPECIAL THANKS TO PROFESSOR JOHN GERRIETS AND PROFESSOR LESTER LAIRD FOR ALLOWING EXTRA TIME TO WORK WITH ME ON INDEPENDENT STUDY CLASSES.

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CHAPTER 1. INTRODUCTION

THIS PAPER IS A REPORT ON HOW A MULTIPLE LINEAR REGRESSION PROCEDURE MAY BE USED TO OBTAIN PREDICTIONS TO FORECAST A COMPANY'S SALES ON THE INTERNATIONAL MARKET.

SIMPLE REGRESSION HAS AS THE OBJECTIVE OF THE ANALYSIS TO DETERMINE THE DEGREE OF RELATIONSHIP BETWEEN TWO VARIABLES. FROM THAT RELATIONSHIP THE DEPENDENT VARIABLE CAN BE PREDICTED. MULTIPLE REGRESSION IS THE EXTENSION OF SIMPLE REGRESSION TO INCLUDE THE INFLUENCE OF MANY INDEPENDENT VARIABLES ON THE ONE DEPENDENT VARIABLE.

THE DATA USED IN THE DEVELOPMENT COMES FROM ACTUAL RECORDS OF A COMPANY. THIS COMPANY HAS REQUESTED THE OMISSION OF ITS NAME AND WILL BE REFERRED TO THROUGHOUT THIS PAPER AS THE COMPANY.

THE EMPORIA STATE UNIVERSITY COMPUTER AND A FORTRAN MULTIPLE REGRESSION PROGRAM WAS USED REPEATEDLY WITH VARYING INDPENDENT VARIABLE SELECTION UNTIL SATISFACTORY EQUATIONS WERE PRODUCED. FROM THE MULTIPLE REGRESSION EQUATIONS AN INTERNATIONAL FORECAST WAS EXTRAPOLATED. ONE MUST REMEMBER THERE SHOULD BE A CERTAIN AMOUNT OF CAUTION INVOLVED IN EXTRAPOLATION. AS ONES VALUE GET FURTHER AND FURTHER FROM ITS CENTRAL VALUE, THERE IS A DANGER OF MISINTERPRETATION. THEREFORE LONG RANGE PREDICTIONS WOULD BE OF LITTLE VALUE. FORECASTING

EQUATIONS WERE DEVELOPED FIRST ON A YEARLY BASIS AND NEXT ON A QUARTERLY BASIS.

A RADIO SHACK MODEL I TRS-80 COMPUTER WAS ALSO USED IN THE COURSE OF THIS WORK. IT SERVED ITS PURPOSE BY COMPUTING VARIOUS TRENDS AS NEEDED TO EXTEND SOME OF THE INDEPENDENT VARIBLES. THE PROGRAM WAS WRITTEN IN THE BASIC LANGUAGE AND A FURTHER DISCUSSION OF TRENDING IS INCLUDED IN CHAPTER V.

CHAPTER II METHODS OF FORECASTING

SALES FORECASTING IS DIFFICULT AT BEST YET NECESSARY FOR THE FUTURE OF ANY COMPANY. FORECASTING ATTEMPTS TO PREDICT THE LEVEL OF SALES DURING SPECIFIC PERIODS IN THE FUTURE. THE RANGE AND FREQUENCY OF THE FORECAST DEPEND UPON THE COMPANY'S PRODUCT AND INTERESTS.

FORECASTING FALLS INTO TWO BASIC CATEGORIES. THERE ARE OPINION METHODS AND STATISTICAL METHODS. <5,443> THREE OF THE OPINION METHODS THAT STAND OUT ARE JURY OF EXECUTIVE OPINION, THE GRASS ROOTS APPROACH, AND SURVEY METHODS.

THE JURY OF EXECUTIVE OPINION USES THE OPINIONS OF THE EXECUTIVES OF THE COMPANY. IT PROVIDES A FORECAST EASILY AND QUICKLY. ONE OF THE BIGGEST DRAWBACKS IS THAT IT IS SUBJECTIVE AND AFFECTED BY MOODS OF OPTIMISM AND PESSIMISM. <5,443> PROVIDING EXECUTIVES WITH ECONOMIC FACTS AND CONDITIONS IMPROVES THIS METHOD. ANOTHER IMPROVEMENT IS TO ALLOW DISCUSSION AFTER THEIR INDIVIDUAL FORECASTS HAVE BEEN MADE.

THE SECOND OPINION METHOD IS THE GRASS ROOTS APPROACH. IT IS ONE OF THE OLDEST AND POSSIBLY WIDEST USED. <10,167> IT STARTS AT THE SALESPERSON LEVEL. EACH SALESPERSON TURNS IN A FORECAST FOR HIS ANTICIPATED SALES. MOVING UP TO THE DISTRICT MANAGERS WHO TABULATE THEIR DISTRICTS. THIS CONTINUES UNTIL A TOTAL FORECAST IS MADE ON THE CORPORATE LEVEL. DRAWBACKS TO THIS

INCLUDE THE TREND TO UNDERESTIMATE IF THE SALES QUOTAS ARE BASED ON THE FIRST PREDICTIONS. <5,443> ANOTHER PROBLEM IS THE SALESPERSONS USUALLY DO NOT HAVE THE TRAINING NECESSARY FOR OBJECTIVE FORECASTS.

A THIRD OPINION METHOD IS THE SURVEY APPROACH. IT BASES THE FORECAST ON WHAT PURCHASERS SAY THEY EXPECT DURING THE NEXT YEAR. THE SURVEY MAY BE HANDLED AND DISTRIBUTED IN AN NUMBER OF WAYS. BUT ONE WILL GET THE BEST RESULTS IF REPETITIVE SURVEYS ARE UNIFORM AND THEREBY YIELD THE DIRECTION AND SOMETIMES THE DEGREE OF CHANGE FROM YEAR TO YEAR.

STATISTICAL METHODS ARE THE SECOND AREA OF FORECASTING. THERE ARE MANY METHODS: TREND ANALYSIS, CYCLE ANALYSIS, SEASONAL PATTERNS, SIMPLE CORRELATION, REGRESSION ANALYSIS, INPUT-OUTPUT ANALYSIS AND FORECASTING MODELS. NEW METHODS ARE DEVELOPED BY COMBINING PROCEDURES AND OF COURSE MANY METHODS MENTIONED ABOVE OVERLAP.

TREND ANALYSIS PROJECTS DATA FROM PAST PATTERNS.

CYCLE ANALYSIS RECOGNIZES THAT HISTORY TENDS TO REPEAT ITSELF.

SEASONAL PATTERNS ALSO CREATE FLUCTUATIONS IN SALES AND ALLOWANCES SHOULD BE MADE FOR THEM WHEN FORECASTING.

MANY DIFFERENT TYPES OF CORRELATION METHODS ARE USED. IN THIS CATEGORY WOULD FALL SIMPLE CORRELATION. THE FORECASTER MUST FIND FACTORS THAT ARE SENSITIVE TO COMING CHANGES. TO DO THIS ONE MAY SEARCH FOR A LEADING

INDICATOR. A LEADING INDICATOR SERIES IS ONE THAT IS EXPECTED TO TURN OR MOVE IN THE SAME PATTERN AS THE SALES BEING FORECAST. <3,140> SIMPLE CORRELATION CAN BE A USEFUL TOOL, BUT SALES TEND TO BE CORRELATED WITH A NUMBER OF FACTORS. THIS LEADS TO THE USE OF REGRESSION ANALYSIS WHICH IS USED AND DISCUSSED LATER IN THIS PAPER.

ANOTHER POPULAR METHOD IS INPUT-OUTPUT ANALYSIS. IN THIS TYPE THE ANALYST SHOULD TAKE INTO CONSIDERATION A LARGE NUMBER OF FACTORS. EACH FACTOR AFFECTS THE OUTCOME. INPUT-OUTPUT IS A METHOD OF DETERMINING THE COMPONENTS THAT ENTER INTO AN INDUSTRY AND THE EFFECTS OF CHANGING MARKETS. <2,117>

THE FINAL METHOD TO BE MENTIONED HERE IS FORECASTING MODELS. THEY CONSIST OF MATHEMATICAL EQUATIONS THAT DESCRIBE THE INTERRELATIONSHIP BETWEEN FACTORS WHICH DETERMINE SALES. <10,243> THE MODELS FALL INTO TWO TYPES. INTRINSIC WHICH PREDICT FROM FORMER PATTERNS AND EXTRINSIC WHICH USE REGRESSION AND CORRELATION.

CHAPTER III FORECASTING BY MULTIPLE REGRESSION

THIS METHOD OF USING MULTIPLE REGRESSION AS A FORECASTING TOOL IS NOT A NEW PROCESS ALTHOUGH IT IS BECOMING MORE USEFUL WITH THE AVAILIBILITY OF COMPUTERS AND MULTIPLE REGRESSION PROGRAMS. NO ONE HAS YET DEVELOPED A METHOD OF CHOICE OF VARIABLES TO BE INTRODUCED PRIOR TO A RUN OF THE DATA. EACH EQUATION MUST BE BUILT ONE STEP AT A TIME WITH MUCH OF THE VARIABLE SELECTION ON A "TRIAL AND ERROR" BASIS. EACH VARIABLE MUST NOT ONLY SCORE WELL IN TESTS BUT EACH OUGHT TO MAKE SENSE. THEREFORE THERE MUST BE A RATIONALE BEHIND THE CHOICE OF EACH INDEPENDENT VARIABLE. ONE OF THE STRONGEST METHODS FOR CHOOSING VARIABLES IS KNOWLEDGE OF THE COMPANY.

SOME OF THE USES OF MULTIPLE REGRESSION ARE NOT IN THE AREA OF SALES. THE OLIN LIBRARY OF WASHINGTON UNIVERSITY STUDIED 16 VARIABLES IN AN EFFORT TO PREDICT LIBRARY EXPENDITURES. <8,797> THE CONSUMER FINANCE INDUSTRY HAS USED MULTIPLE REGRESSION FOR DERIVING A RELIABLE SET OF VARIABLES TO EVALUATE OPERATING COSTS. <3,383> IN ADDITION TO THESE USES MULTIPLE REGRESSION AND CORRELATION TECHNIQUES HAVE BEEN USED TO PROJECT COLLEGE ENROLLMENT AND OF COURSE FORECASTING SALES. ONE MUST REMEMBER EACH CASE IS DIFFERENT AND MUST BE DEVELOPED INDIVIDUALLY.

CHAPTER IV COLLECTION AND SELECTION OF DATA

THE FIRST ACTION WAS TO REVIEW PAST RECORDS AND ACCUMULATE ALL DATA AVAILABLE ON THE COMPANY'S INTERNATIONAL MARKET. IT WAS NOTED THAT 85% OF THE TOTAL INTERNATIONAL SALES WAS MADE UP OF SALES TO TWELVE COUNTRIES. FOR THIS REASON THESE COUNTRIES WERE SELECTED TO BE STUDIED. THE COMPANY HAS INTERNATIONAL SALES BROKEN DOWN INTO TWO AREAS. FROM AREA I, FRANCE, ITALY, SOUTH AFRICA, SPAIN, SWEDEN, UNITED KINGDOM AND WEST GERMANY WERE SELECTED. FROM AREA II, ARGENTINA, AUSTRALIA, BRAZIL, JAPAN AND MEXICO WERE USED.

THE NEXT PROCESS WAS TO COLLECT SALES FIGURES ON EACH COUNTRY BY QUARTER AND YEAR. RECORDS OF THIS FORM WERE ONLY AVAILABLE FOR THE YEARS FROM 1976 THROUGH 1980. SALES WERE THEN CHARTED SO OVERALL PATTERNS COULD BE NOTICED. IT WAS NOTED THAT WHILE YEARLY SALES FLUCTUATED BY COUNTRY, THE QUARTERLY SALES WERE VERY ERRATIC. THESE ARE INCLUDED IN APPENDIX A.

THE VARIABLES WERE THEN SELECTED. THE COMPANY'S TOTAL INTERNATIONAL SALES WAS INCLUDED AS A VARIABLE AND LATER EXCLUDED FROM THE MULTIPLE REGRESSION EQUATIONS. THIS WAS DONE BECAUSE IT COULD NOT BE USED TO FORECAST FINAL RESULTS. SALES ARE INFLUENCED BY EXCHANGE RATES IN EACH COUNTRY THUS THE EXCHANGE RATE WAS CHOSEN AS A VARIABLE. AN EXCHANGE RATE IS THE AMOUNT OF A NATION'S CURRENCY ALLOWED PER U.S. DOLLAR. THE EXCHANGE RATE FOR THE LAST DAY OF EACH MONTH WAS FOUND. THE RATE FOR EACH

MONTH WAS THEN AVERAGED TO PRODUCE THE QUARTERLY AND YEARLY EXCHANGE RATES.

IN AN ATTEMPT TO DISTINGUISH THE DIFFERENT ECONOMIES OF THE COUNTRIES, THE DEVELOPMENT NUMBER GIVEN TO EACH COUNTRY BY THE 'WORLD DEVELOPMENT REPORT' WAS PLACED IN EACH COUNTRY'S FILE. THIS NUMBER INDICATES THE COUNTRY'S INDUSTRIAL LEVEL.

PERCENT OF PRICE INCREASES WAS INCLUDED AS A VARIABLE ON THE FIRST COMPUTER RUNS, BUT IT WAS LATER IMPROVED AND REPLACED BY A PRICE AND PRODUCT MIX VARIABLE. AN INDEX NUMBER IS A STANDARDIZED NUMBER THAT DEMONSTRATES THE PERCENT OF CHANGE FROM A STARTING YEAR, CALLED THE BASE YEAR. IT CAN BE COMPUTED TO ALLOW FOR A NUMBER OF FACTORS. MORE DISCUSSION OF THIS INDEX IS INCLUDED IN THE NEXT CHAPTER.

THERE WERE VERY DEFINITE DROPS IN SALES IN A FEW COUNTRIES DURING THE SECOND YEAR OF THIS STUDY. UPON RESEARCHING THIS EVENT, A VERY UNUSUAL PROBLEM WAS FOUND IN THE SALES MANAGEMENT OF SOME OF THESE COUNTRIES. MANY CHANGES AND NEW MANAGEMENT CAUSED A PERIOD OF GROWTH. THEREFORE IT WAS NECESSARY TO INCLUDE A MANAGEMENT RATING FOR EACH COUNTRY. THE RATINGS OF EACH COUNTRY WERE BASED ON A SCALE FROM ONE TO FIVE. ONE MEANT POOR MANAGEMENT, WITH VERY LITTLE HAPPENING. FIVE MEANT ALL PROMOTIONS WERE RUNNING SMOOTHLY. THIS WAS A SUBJECTIVE RATING.

THE LAST VARIABLE THAT WAS ADDED AFTER PRELIMINARY RUNS, WAS THE INDEX NUMBER FOR INDUSTRIAL PRODUCTION OF VOLUME OR IMPORTS DEPENDING ON WHAT INFORMATION WAS AVALIABLE FOR EACH COUNTRY. VOLUME OF IMPORTS IS AN INDEX NUMBER WITH 1975 AS IT'S BASE YEAR. IT INDICATES THE AMOUNT OF COMMODITIES ALLOWED INTO THE COUNTRY WITH RESPECT TO THE BASE YEAR. ON THE QUARTERLY RUNS THIS VARIABLE WAS TRANSFORMED INTO A RATE OF CHANGE INDEX IN ORDER TO AVERAGE FLUCTUATION.

ON THE QUARTERLY RUNS THERE WAS AN EXTRA VARIABLE WHICH WAS THE WEIGHT OF EACH QUARTER'S SALES. THIS WAS NECESSARY IN ORDER TO FORECAST SUCH ERRATIC SEASONAL CHANGES. IT WAS COMPUTED BY TOTALING EACH RESPECTIVE QUARTER'S SALES AND THEN CALCULATING THE PERCENT.

IN SUMMARIZING THE VARIABLES FOR THE YEARLY MULTIPLE REGRESSION EQUATIONS, THE (1)FIRST VARIABLE IS THE COUNTRY'S CRITERION VARIABLE WHICH IS TOTAL YEARLY SALES.

THE INDEPENDENT VARIABLES WERE:

2) THE COMPANY'S TOTAL INTERNATIONAL SALES

3) A MANAGEMENT RATING FOR EACH COUNTRY

4) THE AVERAGE EXCHANGE RATE

5) THE DEVELOPMENT NUMBER GIVEN TO EACH COUNTRY

6) PRICE AND PRODUCT MIX INDEX WITH 1974 AS BASE YEAR

7) THE INDEX NUMBER FOR INDUSTRIAL PRODUCTION OR VOLUME OF IMPORTS

IN SUMMARIZING THE VARIABLES OF THE QUARTERLY MULTIPLE REGRESSION EQUATIONS, 1-5 ARE THE SAME AS ON THE YEARLY RUNS.

6) PRICE PERCENT INCREASES

7) WEIGHT OF EACH QUARTER

8) RATE OF CHANGE INDEX FOR INDUSTRIAL PRODUCTION OR VOLUME OF IMPORTS

THERE WAS SUCH A WIDE VARIETY OF CONDITIONS IN THE TWELVE COUNTRIES STUDIED THAT A MODEL USING THE YEARLY DATA OF ALL COUNTRIES PRODUCED ONLY A MODERATE DEGREE OF CORRELATION. THEREFORE WORKING WITH THE ENTIRE GROUP WAS DISCONTINUED.

CHAPTER V TOOLS USED

A. DEVELOPMENT OF PRICE AND PRODUCT MIX INDEX

PRICE INDEXES ARE USUALLY EXPRESSED ON A 100 BASIS FROM THE YEAR WHICH THE CHANGES ARE MEASURED CALLED THE BASE YEAR. THE BASE YEAR FOR THE COMPANY WAS 1969. IT WAS SELECTED BECAUSE IT WAS A VERY STABLE YEAR FOR PRICES WITHIN THE COMPANY AND THE ECONOMY. THE INDEX IS A WEIGHTED ONE BECAUSE IT CANNOT BE ASSUMED THAT EACH PRODUCT IS OF EQUAL VALUE AND IMPORTANCE. EACH PRODUCT CHANGE AFFECTS THE ORIGINAL INDEX CHAIN AS IT IS INTRODUCED OR REMOVED FROM THE MARKET.

IN APPENDIX B THE READER MAY REVIEW THE NUMBERS AND ARITHMETIC USED IN DEVELOPING THE INDEX. THE FIRST YEAR THAT WAS COMPUTED AFTER THE BASE YEAR(1969) WAS 1975.

THE FOLLOWING IS THE SUMMARY OF THE RESULTS OF THE PRICE AND PRODUCT MIX INDEX. THE NEW FIGURES WERE LINKED TO THE ORIGINAL BASE OF 1969 BY USING PROPORTIONS.

YEARLY INDEX FOR PRICE AND PRODUCT MIX

BASE YEARS	1969	1975	1976	1977	1978
1969	100				
1975	163.9	100			
1976	176.0	107.4	100		
1977	197.1	120.2	112.0	100	
1978	240.0	146.4	136.4	121.8	100
1979	274.0	167.2	155.7	139.1	114.2
1980	330.7	201.8	188.0	167.9	137.9

THIS INDEX WAS NOT COMPUTED ON A QUARTERLY BASIS DUE TO THE EXTENT OF CALCULATIONS NECESSARY, BUT IT WAS RECOMMENDED TO THE COMPANY THAT IT DEVELOP A COMPUTER PROGRAM TO ACHIEVE THE INDEX.

B. RATE OF CHANGE INDEX

THE RATE OF CHANGE INDEX IS COMPUTED BY TAKING THE SUM OF THE CURRENT PERIOD VALUES DIVIDED BY THE PREVIOUS PERIOD SUM. THIS YIELDS VALUES VERY CLOSE TO ONE AND ACCURATLY SHOWS THE PERCENTAGE CHANGE. BY COMPUTING THIS FOR QUARTERLY DATA IT PROVIDES A LESS DRAMATIC YEARLY CHANGE. THIS IS NECESSARY BECAUSE IT IS KNOWN THAT SALES ARE INFLUENCED OVER A PERIOD OF TIME. THIS INDEX ALSO YIELDS ITSELF EASILY TO TRENDING WHICH IS NECESSARY FOR FUTURE PREDICTIONS.

C. FORTRAN MULTIPLE REGRESSION PROGRAM

INCLUDED ARE TWO FINAL COMPUTER PRINTOUTS ON EACH COUNTRY. ONE WITH YEARLY DATA RESULTS AND ONE FOR QUARTERLY DATA. SEE APPENDIX C FOR YEARLY RESULTS AND APPENDIX D FOR QUARTERLY RESULTS. THE FIRST PART OF THE RESULTS SECTION IS A CORRELATION COEFFICIENT MATRIX. CORRELATION COEFFICIENTS VARY FROM -1.00 TO +1.00. COEFFICIENTS RANGING FROM ZERO TO APPROXIMATELY .20 MAY BE REGARDED AS INDICATING NO CORRELATION, .20 TO .40 INDICATES A LOW DEGREE OF CORRELATION, .60 TO .80 INDICATES A MARKED DEGREE OF CORRELATION, AND .80 TO 1.00 MAY BE REGARDED AS INDICATING A HIGH CORRELATION. A NEGATIVE VALUE INDICATES AN INVERSE RELATIONSHIP. BY LOOKING AT THE MATRIX, THE RELATIONSHIP BETWEEN ANY TWO VARIABLES CAN BE QUICKLY DETERMINED. THE COLUMN THAT IS OF MAJOR IMPORTANCE TO THIS STUDY IS THE FIRST WHICH SHOWS THE VARIABLE RELATIONSHIP TO THE CRITERION VARIABLE. IT IS OBVIOUS THAT VARIABLES SELECTED ARE GOOD INDICATORS DUE TO THE LARGE AMOUNT OF HIGH CORRELATION COEFFICIENTS INDICATING RELATIONSHIP BETWEEN THE VARIABLES USED.

THE NEXT INFORMATION GIVEN IS THE VARIABLES' MEAN AND STANDARD DEVIATION. THESE CAN BE USED TO STANDARDIZE THE VARIABLES. TO STANDARDIZE A VARIABLE, ONE MUST SUBTRACT THE MEAN AND THEN DIVIDE BY THE STANDARD DEVIATION. BY CHANGING THE VARIABLES IN THIS WAY THEY CAN BE PUT ON A COMPARABLE LEVEL.

THE THIRD, AND FOR THIS PAPER'S PURPOSES, MOST IMPORTANT PART IS THE REGRESSION EQUATIONS. THESE EQUATIONS ARE SET UP TO USE ANY COMBINATION OF VARIABLES ENTERED. IN THE TABLE, THE VARIABLE'S NUMBERS ARE GIVEN FOLLOWED BY A B-WEIGHT AND A Z-WEIGHT. THE B-WEIGHTS ARE THE COEFFICIENTS OF THE MULTIPLE REGRESSION EQUATIONS USED TO FORECAST SALES. THE Z-WEIGHTS ARE THE COEFFICIENTS OF THE EQUATIONS IF THEY WERE ALL STANDARDIZED VARIABLES. THE MULTIPLE-R IS GIVEN NEXT. IT IS THE MULTIPLE REGRESSION CORRELATION COEFFICIENT AND IS INTERPRETED IN THE SAME WAY AS THE CORRELATION MATRIX. INTERPRETATION OF THIS FIGURE TELLS IF THE EQUATION IS A VALUABLE CHOICE FOR A PREDICTION EQUATION. FOLLOWING THIS SECTION IS A CHART FORM SUMMARY OF THIS INFORMATION. THE R-SQUARE IS THE MULTIPLE REGRESSION CORRELATION COEFFICIENT, SQUARED. ONE MINUS THE R-SQUARE YIELDS THE AMOUNT OF UNEXPLAINED VARIATION FROM THE REGRESSION EQUATION.

THE FINAL PART OF THIS PROGRAM PRINTOUT IS THE F-TESTS WHICH DO NOT YIELD ANY TANGIBLE RESULTS FOR THE YEARLY DATA. THIS IS TRUE BECAUSE THERE EXIST AS MANY VARIABLES AS YEARS OF STUDY. THIS FACT PRODUCES ZERO DEGREES OF FREEDOM AND THUS THE TEST CANNOT BE COMPUTED. A COPY OF THE FORTRAN PROGRAM IS INCLUDED IN APPENDIX F.

D. USE OF MULTIPLE REGRESSION PROGRAM

TO USE THE MULTIPLE REGRESSION PROGRAM OUT OF THE FUNSTAT PACKAGE THE DATA AND CONTROL CARDS MUST BE IN THE PROPER FORMAT AND ORDER. THE PROGRAM HAS BEEN ALTERED TO ALLOW THE FORMAT LINE FOR THE DATA CARDS TO BE READ IN WITH THE CONTROL CARDS. IT HAS ALSO BEEN CHANGED TO ALLOW THE INPUT OF LARGER NUMBERS.

1) THE FIRST CARD IS THE TITLE CARD SO THAT THE PRINT OUT MAY BE NAMED. START AT THE NUMBER 1 SPACE AND JUST TYPE THE TITLE THAT IS NEEDED.

```
1 2 3 4 5 6 7 8 9101112131415161718192O    (CARD COLUMNS)
A R G E N T I N A                          (TITLE)
```

2) THE SECOND CARD IS THE CONTROL CARD AND IS RIGHT JUSTIFIED BY FIVE'S. THIS MEANS THE ONES DIGIT OF THE NUMBERS MUST END IN THE 5, 10, 15, 20, AND 25 COLUMNS. THE FIRST NUMBER IN COLUMNS 1-5 IS THE NUMBER OF DATA CARDS. THE SECOND NUMBER IN COLUMNS 6-10 IS THE NUMBER OF VARIABLES. NEXT IN COLUMNS 11-15 IS THE NUMBER OF REGRESSION EQUATIONS. IN COLUMNS 16-20 IS THE NUMBER OF F-STATISTIC TESTS TO BE MADE AND IN COLUMNS 21-25 THE NUMBER OF VARIABLES TO BE GENERATED BY THE PROGRAM. THIS PROGRAM WILL CREATE NEW VARIABLES FROM THOSE ALREADY READY IN BY CARDS. FOR INSTANCE IT COULD CREATE FROM THE SIX VARIABLES A SEVENTH WHICH IS THE SQUARE OF THE THIRD PLUS THE FOURTH. X(7) = X(3)**2 + X(4) THIS LINE MUST BE PLACED IN THE PROGRAM. (THE PROGRAM COMMENT CARDS SHOW WHERE TO PUT THE VARIABLE GENERATING CARDS.)

MAKE SURE EACH LINE STARTS IN THE SEVENTH COLUMN.

3) THE THIRD CARD IS THE FORMAT CARD. THIS CARD TELLS THE COMPUTER THE SIZE AND TYPE OF VARIABLES USED. IN THE FIRST SPACE TYPE A FIRST PARENTHESIS AND FN.X WHERE N IS REPLACED BY THE NUMBER OF TOTAL SPACES A NUMBER TAKES AND X IS REPLACED BY THE NUMBER OF DECIMAL PLACES THAT ARE NEEDED. F IS THE FIELD DESCRIPTER AND WILL BE SUFFICIENT FOR ALL VARIABLES USED IN THIS PAPER. THE NUMBERS ARE RIGHT JUSTIFIED. AS LONG AS THE PROPER NUMBER OF DECIMAL PLACES ARE TYPED IN, THE DECIMAL CAN BE OMITTED. BETWEEN EACH NEW VARIABLE, SPACES CAN BE PLACED BY USING A NX. FOR EXAMPLE IF TWO SPACES ARE NEEDED YOU WOULD TYPE 2X. FOR THREE, 3X. REMEMBER TO PLACE A COMMA BETWEEN EACH ENTRY AND TO CLOSE WITH A PARENTHESIS.

FOR EXAMPLE: 3.71 256.5 921 3597.28 IN F8.2

```
 1 2 3 4 5 6 7 8 9101112        (CARD COLUMNS)
         3 7 1
       2 5 6 5 0                (THE FOUR NUMBERS)
       9 2 1 0 0
     3 5 9 7 2 8
```

```
(F6.0,2X,F5.2,2X,F4.3)                          (FORMAT CARD)
 1 2 3 4 5 6 7 8 9101112131415161718192O  (CARD COLUMNS)
 6 6 6 6 6 6     5 5 5 2 2     4 3 3 3     (THE PLACINGS)
```

4) THE FOURTH TYPE OF CARDS ARE ALL THE DATA CARDS THAT ARE PUNCHED ACCORDING TO THE FORMAT ON THE THIRD

CARD. WHEN ENTERING YOUR FIRST VARIABLE DO NOT USE A ZERO. IF NO SALES WERE PLACED IN THAT TIME PERIOD ENTER A 1. ALSO REMEMBER NEGATIVES ARE ENTERED RIGHT IN FRONT OF THE NUMBER AND ENOUGH SPACES MUST BE ALLOWED FOR THEM IN THE FORMAT STATEMENT.

5) THE MULTIPLE REGRESSION EQUATION CARDS ARE NEXT. THEY ARE RIGHT JUSTIFIED BY THREE'S. THE FIRST NUMBER IN COLUMNS 1-3 IS THE NUMBER OF VARIABLES IN THAT EQUATION. THE LAST NUMBER IS THE DEPENDENT VARIABLE OR THE ONE THAT WE ARE TRYING TO FORECAST. INCLUDED BETWEEN ARE THE NUMBERS OF THE OTHER VARIABLES THAT ARE USED FOR THAT EQUATION. FOR THIS EXAMPLE THERE ARE 9 VARIABLES THAT CAN BE USED. NUMBER 1 IS THE DEPENDENT VARIABLE.

```
 1 2 3 4 5 6 7 8 9101112131415161718192 0  (CARD COLUMNS)
     4     8     6     3     1
     5     9     8     7     5     1
     2     6     1
     5     7     4     3     2     1
```

6) THE F-STATISTIC TEST CARD, WHICH ARE RIGHT JUSTIFIED BY FIVE'S ARE THE LAST SET. THE FIRST NUMBER IN COLUMNS 1-5, IS THE NUMBER OF THE FULL MODEL REGRESSION EQUATION. THE SECOND NUMBER, IN COLUMNS 6-10, IS THE NUMBER OF THE EQUATION TO BE TESTED.

```
 1 2 3 4 5 6 7 8 9101112131415161718  (CARD COLUMNS)
         9          2                 (F-STATISTIC TESTS)
         9          4
```

THE FOLLOWING IS AN EXAMPLE OF WHAT A TOTAL SET OF DATA WOULD LOOK LIKE.

```
          1 2 3 4 5 6 7 8 9101112131415161718192021222324 25
TITLE     A R G E N T I N A
CONTROL             5         3         3         2         0
FORMAT    ( F 8 . 2 , 2 X , F 3 . 0 , 2 X , F 4 . 3 )
DATA                3 7 1       1 2 3     4 4 4 4
                  2 5 6 5 0     2 2 2     3 5 5 5
                  3 4 1 0 0     4 1 1     8 1 2 3
                  5 5 5 1 1     3 3 3     2 3 3 3
                1 2 3 4 0 0     1 1 2       6 7 8
EQUATION        2     3     1
                3     3     2     1
                2     2     1
F-TEST                2         1
                      2         3
```

6) COPIES OF THE FORMS TO HELP USE THIS PROGRAM ARE INCLUDED IN APPENDIX E.

E. TRENDING

IN ORDER TO FORECAST FROM THE MULTIPLE REGRESSION EQUATIONS, THE VARIABLES THAT ARE USED MUST BE EXTENDED. ONE WAY OF DOING THIS IS FINDING THE BEST FITTING CURVE AND EXTRAPOLATING ALONG THAT LINE. TREND ANALYSIS IS BASED ON THE ASSUMPTION THAT A CURRENT TREND WILL CONTINUE. AN OBVIOUS PROBLEM IS THE LACK OF ANY REAL UNDERLYING THEORY. ONE HOPES THAT WHATEVER MECHANISM THAT GENERATED THE TREND IN THE PAST WILL CONTINUE TO WORK. HISTORICAL SERIES OF DATA ARE LAID OUT AND CHECKED AGAINST VARIOUS TRENDING CURVES. THE THREE TYPES OF CURVES THAT THE DATA WERE FITTED TO WERE LINEAR, GEOMETRIC AND PARABOLIC. THE DEFINITIONS FOLLOW:

1) A LINEAR TREND HAS A CONSTANT AMOUNT OF CHANGE. C(T)=A+BT

2) A GEOMETRIC TREND HAS A CONSTANT RATE OF CHANGE AS IN AN EXPONENTIAL CURVE. C(T)=EXP(A+BT)

3) A PARABOLIC CURVE HAS A CHANGING RATE OF CHANGE. C(T)=A+BT+CTT

IN ALMOST EVERY CASE THE PARABOLIC CURVE WAS THE BEST FIT. BEST FIT WAS EVALUATED BY THE STANDARD ERROR OF MEASUREMENT. A COPY OF THE BASIC PROGRAM USED IS INCLUDED IN APPENDIX G. FOLLOWING THE PROGRAM ARE COPIES OF THE TRENDING RESULTS.

CHAPTER VI MULTIPLE REGRESSION EQUATIONS

MULTIPLE REGRESSION IS THE EXTENSION OF SIMPLE REGRESSION, IT TAKES INTO ACCOUNT MORE THAN ONE INDEPENDENT VARIABLE. STOCHASTIC ERROR OCCURS BECAUSE OF THE INABLILITY TO INCLUDE ALL VARIABLES THAT INFLUENCE SALES. BY USING MULTIPLE REGRESSION, ONE IS ABLE TO MINIMIZE THIS ERROR BY INCLUDING MORE VARIABLES.

AS THIS PROGRAM WAS USED, NEW VARIABLES WERE INTRODUCED AND THE MULTIPLE-R CORRELATION COEFFICIENT WAS CHECKED TO SELECT A SET OF VARIABLES YIELDING HIGH RESULTS. A DEMONSTRATION OF THIS IS INCLUDED IN THE FOLLOWING TABLE. THE NEXT TWO FOLLOWING TABLES GIVE THE MULTIPLE REGRESSION EQUATIONS FOR YEARLY AND QUARTERLY DATA.

IN ALL COUNTRIES WITH CONSTANT MANAGEMENT (AUSTRALIA, JAPAN, MEXICO, SOUTH AFRICA, SWEDEN, AND UNITED KINGDOM) IT IS RECOMMENDED TO USE THE REGRESSION EQUATION INVOLVING VARIABLES 7,6,4, AND 1. ALSO THAT SAME EQUATION IS RECOMMENDED FOR ARGENTINA AND BRAZIL. THE MANAGEMENT VARIABLE IS NOT USED IN THESE COUNTRIES BECAUSE IT CONTRIBUTES A NEGATIVE RELATIONSHIP IN THE EQUATION. THEREFORE, BECAUSE THE GOAL IS TO IMPROVE SALES, ONE DOES NOT WANT AN EQUATION THAT WOULD PRODUCE A LOWER DOLLAR FIGURE WHEN THE MANAGEMENT HAS IMPROVED. FOR THE REMAINING COUNTRIES (FRANCE, ITALY, SPAIN, AND WEST GERMANY) THE MANAGEMENT VARIABLE IS USED. THE DATA AND INFORMATION FOR ALL REGRESSION EQUATIONS EXISTS.

SHOULD INFORMATION CHANGE AT ANY POINT, ANOTHER EQUATION COULD BE SELECTED.

FOLLOWING IS A DEMONSTRATION OF HOW THE MULTIPLE REGRESSION PREDICTION COEFFICIENT BECOMES MORE ACCURATE AS EACH VARIABLE IS ADDED TO THE EQUATION. THIS SAME PROCESS COULD BE REPEATED WITH ANY STARTING VARIBLE.

QUARTERLY RESULTS

MULTIPLE-R	VARIABLE NUMBERS				
	4 1	/ 4 6 1	/4 6 7	1/4 6 7 8	1/2 4 6 7 8 1
ARGENTINA	.2894	.3613	.6982	.7677	.8732
AUSTRALIA	.3515	.4767	.6008	.6576	.7346
BRAZIL	.4725	.4728	.6337	.6786	.8225
FRANCE	.2560	.2794	.4404	.6962	.8086
JAPAN	.1670	.1670	.5555	.5945	.5946
ITALY	.4763	.5327	.7037	.7906	.9013
MEXICO	.1915	.6368	.6556	.7584	.8416
SOUTH AFRICA	.6614	.8257	.8301	.8315	.8442
SPAIN	.0099	.4321	.4820	.5313	.5330
SWEDEN	.1903	.4242	.5482	.7050	.7199
UNITED KINGDOM	.3038	.3728	.4637	.5696	.6053
WEST GERMANY	.3417	.3417	.4418	.5717	.6533

IN THE FOLLOWING REGRESSION EQUATIONS THESE VARIABLE ABBREVIATIONS WERE USED.

MP - MANUFACTURING PRODUCTION INDEX

IP - INDUSTRIAL PRODUCTION INDEX

VI - VOLUME OF IMPORTS INDEX

PMI - PRODUCT MIX AND PRICE INDEX

ER - EXCHANGE RATES

M - MANAGEMENT RATING

F - FORECASTED SALES

YEARLY MULTIPLE REGRESSION EQUATIONS

ARGENTINA 28022.1(MP) + 8745.5(PMI) + 46666448.0(ER) + -4541277.0 = F

AUSTRALIA 146225.9(MP) + -68.518(PMI) +-4928452.0(ER) + -8856333.0 = F

BRAZIL 10138.3(VI) + 14685.5(PMI) + 11865529.0(ER) + -4675013.0 = F

FRANCE 270554.8(IP) + -25.247(PMI) + -88793680.0(ER) + 486937.6(M) + -11261846.0 = F

ITALY 472074.3(IP) + -29648.8(PMI) + 8183930880(ER) + -37407.6(M) + -56952000.0 = F

JAPAN 2175.5(VI) + -3657.3(PMI) + 639875840(ER) + -1519581.0 = F

MEXICO -543553.4(IP) + 184941.5(PMI) + 141047312.0(ER) + 14646533.0 = F

SOUTH AFRICA 36199.9(IP) + 7821.9(PMI) + -4538702.0(ER) + 396551.0 = F

SPAIN 4889.0(IP) + 2974.5(PMI) + 283686144.0(ER) + 47568.3(M) + -5005001 = F

SWEDEN 207048.2(IP) + 3933.2(PMI) + -73443920.0(ER) + -3433830.0 = F

WEST GERMANY -3680.9(IP) + 8869.2(PMI) + -980716.0(ER) + 373761.8(M) + 6948064.0 = F

UNITED KINGDOM -14236.6(IP) + 15888.4(PMI) + -2644360(ER) + 3897612.0 = F

FOR THE QUARTERLY EQUATIONS A FEW OTHER ABBREVIATIONS ARE NEEDED.

RMP - RATE OF CHANGE OF MANUFACTURING PRODUCTION INDEX

RIP - RATE OF CHANGE OF INDUSTRIAL PRODUCTION INDEX

RVI - RATE OF CHANGE OF VOLUME OF IMPORTS INDEX

PPI - PRICE PERCENT INCREASES

QW - QUARTERLY WEIGHTS

QUARTERLY MULTIPLE REGRESSION EQUATIONS

ARGENTINA 1212437.0(RMP) + 462528.7(QW) + 1960.14(PPI) + 5445607.0(ER) + 93191.7(M) + -1576973 = F

AUSTRALIA 4545903.0(RMP) + 1481158.0(QW) + 3583.2(PPI) + -1638492(ER) + -3202927 = F

BRAZIL 440848.3(RVI) + 564271.9(QW) + -3709.97(PPI) +-1178760(ER) + 235226.4(M) +-367794 = F

FRANCE 3448385(RIP) + 1096589(QW) + 1177.5(PPI) + 1868848(ER) + 35832.5(M) + -4249457 =F

JAPAN 464498(RVI) + 516983.1(QW) + 898.79(PPI) + 1834349 (ER) + -584523 = F

ITALY 6214866(RIP) + 2029214(QW) + 11634.2(PPI) + 8557363200(ER) + -63557.6(M) + -17792352 = F

MEXICO -14657544(RIP)9 + 1452935(QW) + 42214.2(PPI) + 7185337(ER) + 10855766 = F

SOUTH AFRICA 119648.3(RIP) + 1803006(QW) + 4648.6(PPI) + 162166(ER) + -1102097 = F

SPAIN -436457(RIP) + 453807(QW) + -1328.3(PPI) + 85879.8(M) + -57987568(ER) + 1159402 = F

SWEDEN -3107543(RIP) + 480082.8(QW) + 4035.7(PPI) + 7704080(ER) + 940789 = F

UNITED KINGDOM 1987375(RIP) + 1475401(QW) + -5415.9(PPI) + 87142(ER) + -3289494 = F

WEST GERMANY 2739832(RIP) + 558010.9(QW) + -3662.3(PPI) + 939264(ER) + 157643(M) + -3171898 = F

TO GIVE AN INDICATION OF VALUES THE MULTIPLE REGRESSION EQUATIONS PRODUCE, THE FOLLOWING IS A COMPARISON OF THE ACTUAL SALES AND THE FORECAST THE EQUATIONS WOULD HAVE PRODUCED HAD ONE KNOWN (OR ESTIMATED) THE INDEPENDENT VARIABLES CORRECTLY. THESE ARE THE TOTALS OF SALES ORDERS FOR THE 1980 CALENDAR YEAR.

	FORECAST	ACTUAL SALES	% ERROR
ARGENTINA	$1,066,829	$1,071,077	.4%
AUSTRALIA	2,451,556	2,474,414	.9%
BRAZIL	1,507,651	1,530,471	1.4%
FRANCE	1,167,854	1,167,850	0.0%
JAPAN	380,831	393,205	3.1%
ITALY	3,852,515	3,852,956	0.0%
MEXICO	6,348,533	7,145,474	11.1%
SOUTH AFRICA	1,272,959	1,288,669	1.2%
SPAIN	677,392	677,390	0.0%
SWEDEN	1,429,944	1,450,630	1.4%
UNITED KINGDOM	1,419,019	1,492,220	4.9%
WEST GERMANY	904,039	904,036	0.0%

THESE FIGURES DO NOT IN ANY WAY PROVE THAT THE EQUATION WILL FOECAST THIS ACCURATELY BUT IT DOES DEMONSTRATE IN DOLLARS WHAT THE MULTIPLE-R CORRELATION COEFFICIENT MEANS IN AMOUNT OF ERROR. THE FINAL PROOF WILL COME IN ONE YEAR WHEN RESULTS AND FORECAST CAN BE COMPARED. HOWEVER, ALL INDICATIONS POINT TO THE FACT THAT THE YEARLY FORECAST WILL BE RELIABLE.

QUARTERLY SALES FLUCTUATE AT ERRATIC RATES THEREFORE THE REGRESSION EQUATIONS DID NOT YIELD AS ACCURATE REGRESSION EQUATONS AS WERE PRODUCED FOR THE YEARLY BASIS.

	FORECAST	ACTUAL SALES	% ERROR	VARIABLES USED
ARGENTINA	$ 87,565	$ 8,000	OVER 100%	3,4,6,7,8
AUSTRALIA	695,739	446,501	55.8%	4,6,7,8
BRAZIL	114,968	160,503	28.4%	3,4,6,7,8
FRANCE	208,733	388,560	46.3%	3,4,6,7,8
JAPAN	173,496	110,870	56.0%	4,6,7,8
ITALY	-1,103,239	-1,247,022	11.5%	3,4,6,7,8
MEXICO	1,688,036	989,281	68.6%	4,6,7,8
SOUTH AFRICA	368,353	377,777	2.5%	4,6,7,8
SPAIN	216,241	320,640	48.3%	3,4,6,7,8
SWEDEN	361,686	713,763	49.3%	4,6,7,8
UNITED KINGDOM	33,135	9,645	OVER 100%	4,6,7,8
WEST GERMANY	49,336	63,065	21.8%	3,4,6,7,8
TOTALS	2,894,812	2,341,585	23.6%	

THE QUARTER USED WAS JANUARY - MARCH 1981.

VII YEARLY FORECAST FROM MULTIPLE REGRESSION EQUATIONS

HERE IS THE FORECAST FOR THE 1982 CALENDAR YEAR. THIS FORECAST IS BASED ON THE RECENTLY DEVELOPED MULTIPLE REGRESSION EQUATIONS AND THE VARIABLES ARE EXTENDED BY USING THE TRENDING PROGRAM.

	M	ER	PI	PMI	F
ARGENTINA	X	.000122	100.4	330.69	$ 1,169,883
AUSTRALIA	X	1.198	125.4	330.69	3,553,447
BRAZIL	X	.0094	105	330.69	1,357,425
FRANCE	4	.2462	118.8	330.69	958,455
JAPAN	X	.004341	132.8	330.69	1,705,231
ITALY	3	.001177	126.4	330.69	2,433,901
MEXICO	X	.05102	146.7	330.69	3,261,791
SOUTH AFRICA	X	1.28	115.3	330.69	1,347,499
SPAIN	4	.01528	110.2	330.69	1,042,394
SWEDEN	X	.2511	111.2	330.69	2,448,841
UNITED KINGDOM	X	2.3841	110.8	330.69	1,269,906
WEST GERMANY	2	.5558	121.6	330.69	1,547,285
TOTAL					$21,996,058

IF THESE COUNTRIES ACCOUNT FOR 85% OF THE TOTAL INTERNATIONAL MARKET THE OVERALL SALES WOULD BE $25,877,715. IF IT WERE 80% TOTAL SALES WOULD BE $27,495,072.

CHAPTER VIII CONCLUSIONS AND RECOMMENDATIONS

THIS PROJECT IS A NEVER ENDING PROCESS. THE FORECASTING SYSTEM SHOULD BE CONSISTENTLY BETTER THAN ANY SUBSTITUTE METHOD OR IT SHOULD BE MODIFIED. STILL, ONE MUST REMEMBER THE BEST SYSTEM CANNOT GUARANTEE THE ACCURACY MANAGEMENT MAY WANT. A BENEFIT OF THIS TOOL IS THAT AT ANY POINT THERE CAN BE IMPROVEMENTS AND CHANGES THAT WILL INCREASE THE RELIABILITY OF THE MULTIPLE REGRESSION EQUATION.

FUTURE IMPROVEMENTS WOULD INCLUDE ADDING QUARTERLY AND YEARLY DATA AS IT BECOMES AVAILABLE TO UPDATE THE REGRESSION EQUATIONS. QUARTERLY WEIGHTS (VARIABLE SEVEN) SHOULD ALSO BE RECOMPUTED WITH EACH NEW YEAR. THE PRELIMINARY WORK IS FINISHED FOR THE PRICE AND PRODUCT MIX INDEX VARIABLE BUT THE COMPANY SHOULD DEVELOP THIS FURTHER THUS HAVING IT AVAILABLE FOR EACH QUARTER. ACCURACY WILL ALSO INCREASE IF THE INDEX WERE COMPUTED SEPARATELY FOR INTERNATIONAL AND NATIONAL MARKETS.

ANOTHER POSSIBLE USE OF THE YEARLY MULTIPLE REGRESSION EQUATIONS WOULD BE TO USE A MOVING YEAR AVERAGE. BY ACCUMULATING DATA A QUARTER AT A TIME AND THEN MOVING THE FOUR QUARTERS. THEREBY USING THE PROGRAM ON A QUARTERLY BASIS.

THERE ARE OTHER POSSIBLE CHANGES THAT WILL DEVELOP AS THESE EQUATIONS ARE PUT INTO PRACTICE. THESE SHOULD NOT BE USED BLINDLY BUT AS A QUIDELINE WHICH HAS NOT BEEN AVALIABLE TO THE COMPANY BEFORE THIS PROJECT. THEY WILL BECOME INCREASINGLY MORE ACCURATE EACH YEAR AS THERE IS MORE INFORMATION ON WHICH TO BASE THE EQUATIONS.

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APPENDIX A
SALES FIGURES AND CHARTS

SALES TOTAL INTERNATIONAL

1976	MONTHLY	QUARTERLY
JANUARY	629214	
FEBRUARY	417266	
MARCH	1.00729E+06	2.05377E+06
APRIL	237817	
MAY	41194	
JUNE	2.86785E+06	3.14686E+06
JULY	572882	
AUGUST	477679	
SEPTEMBER	553390	1.60395E+06
OCTOBER	302638	
NOVEMBER	1.18199E+06	
DECEMBER	2.8868E+06	4.37142E+06
YEARLY TOTAL		1.1176E+07

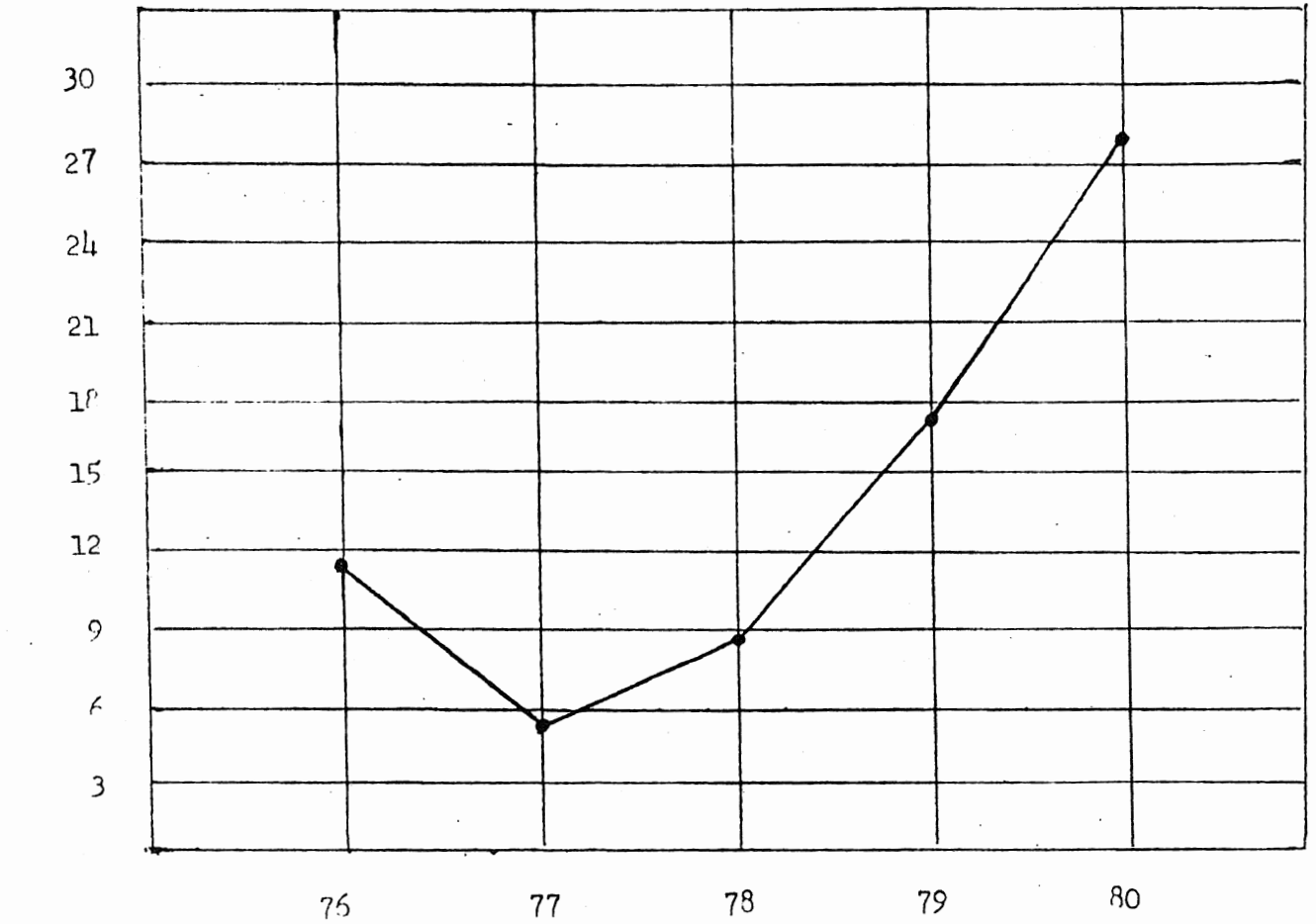
1977	MONTHLY	QUARTERLY
JANUARY	747133	
FEBRUARY	426513	
MARCH	1.18449E+06	2.35814E+06
APRIL	48506	
MAY	461940	
JUNE	44528	554974
JULY	721278	
AUGUST	572374	
SEPTEMBER	163759	1.45741E+06
OCTOBER	265320	
NOVEMBER	654248	
DECEMBER	377367	1.29694E+06
YEARLY TOTAL		5.66746E+06

1978	MONTHLY	QUARTERLY
JANUARY	977822	
FEBRUARY	332606	
MARCH	-44848	1.26558E+06
APRIL	1.0222E+06	
MAY	155160	
JUNE	422827	1.60019E+06
JULY	564196	
AUGUST	1.14541E+06	
SEPTEMBER	1.35598E+06	3.06559E+06
OCTOBER	832350	
NOVEMBER	843305	
DECEMBER	1.30328E+06	2.97893E+06
YEARLY TOTAL		8.91028E+06

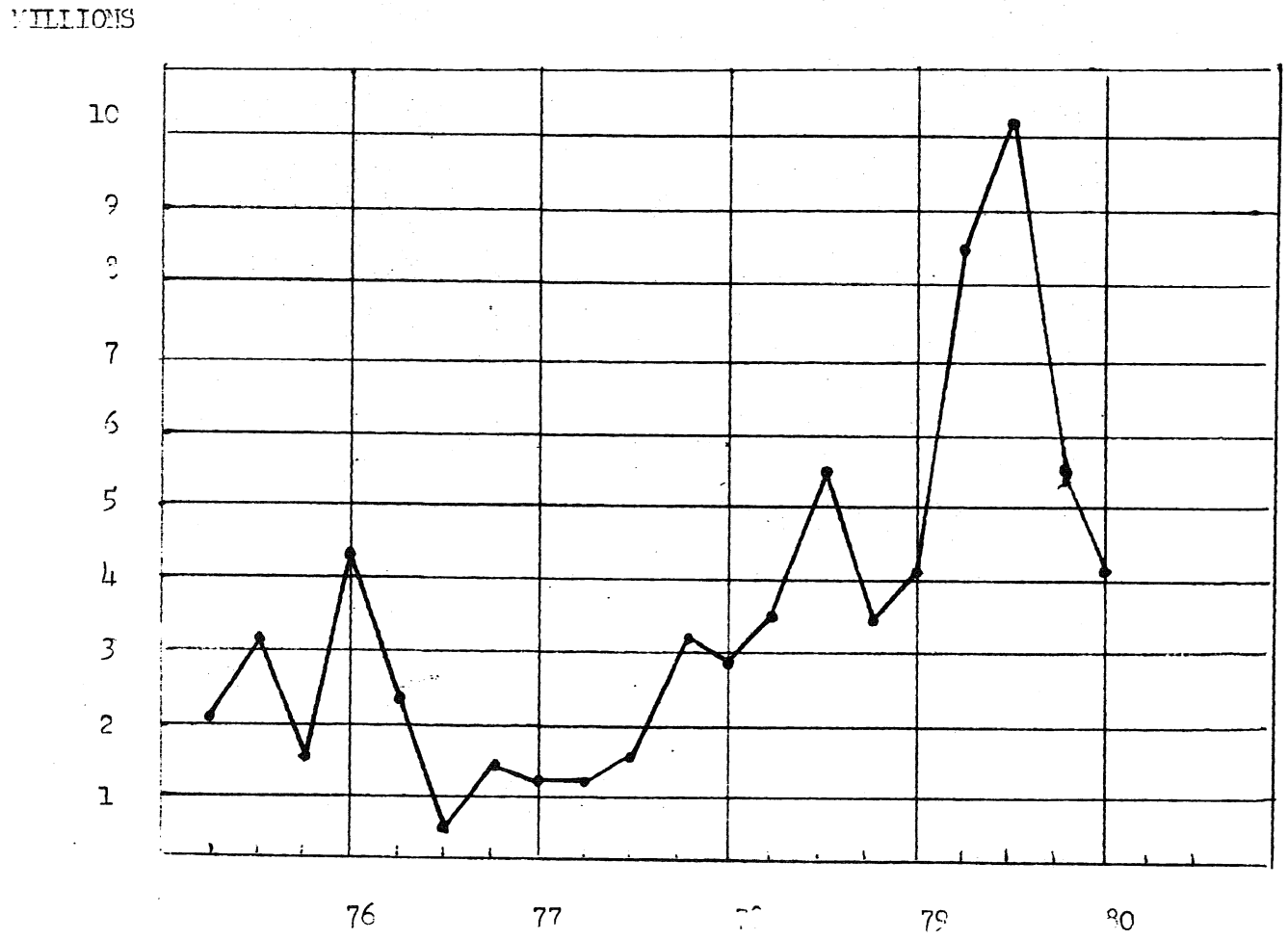
1979	MONTHLY	QUARTERLY
JANUARY	841071	
FEBRUARY	1.25798E+06	
MARCH	1.43777E+06	3.53682E+06
APRIL	750156	
MAY	2.59192E+06	
JUNE	2.16119E+06	5.50327E+06
JULY	1.31554E+06	
AUGUST	1.3624E+06	
SEPTEMBER	818575	3.49652E+06
OCTOBER	1.41027E+06	
NOVEMBER	2.15588E+06	
DECEMBER	1.31027E+06	4.87643E+06
YEARLY TOTAL		1.7413E+07

1980	MONTHLY	QUARTERLY
JANUARY	1.28868E+06	
FEBRUARY	2.38076E+06	
MARCH	4.79363E+06	8.46307E+06
APRIL	4.22469E+06	
MAY	3.18998E+06	
JUNE	2.70901E+06	1.01237E+07
JULY	2.10657E+06	
AUGUST	1.13714E+06	
SEPTEMBER	2.41575E+06	5.65946E+06
OCTOBER	2.53303E+06	
NOVEMBER	303788	
DECEMBER	1.32056E+06	4.15738E+06
YEARLY TOTAL		2.84036E+07

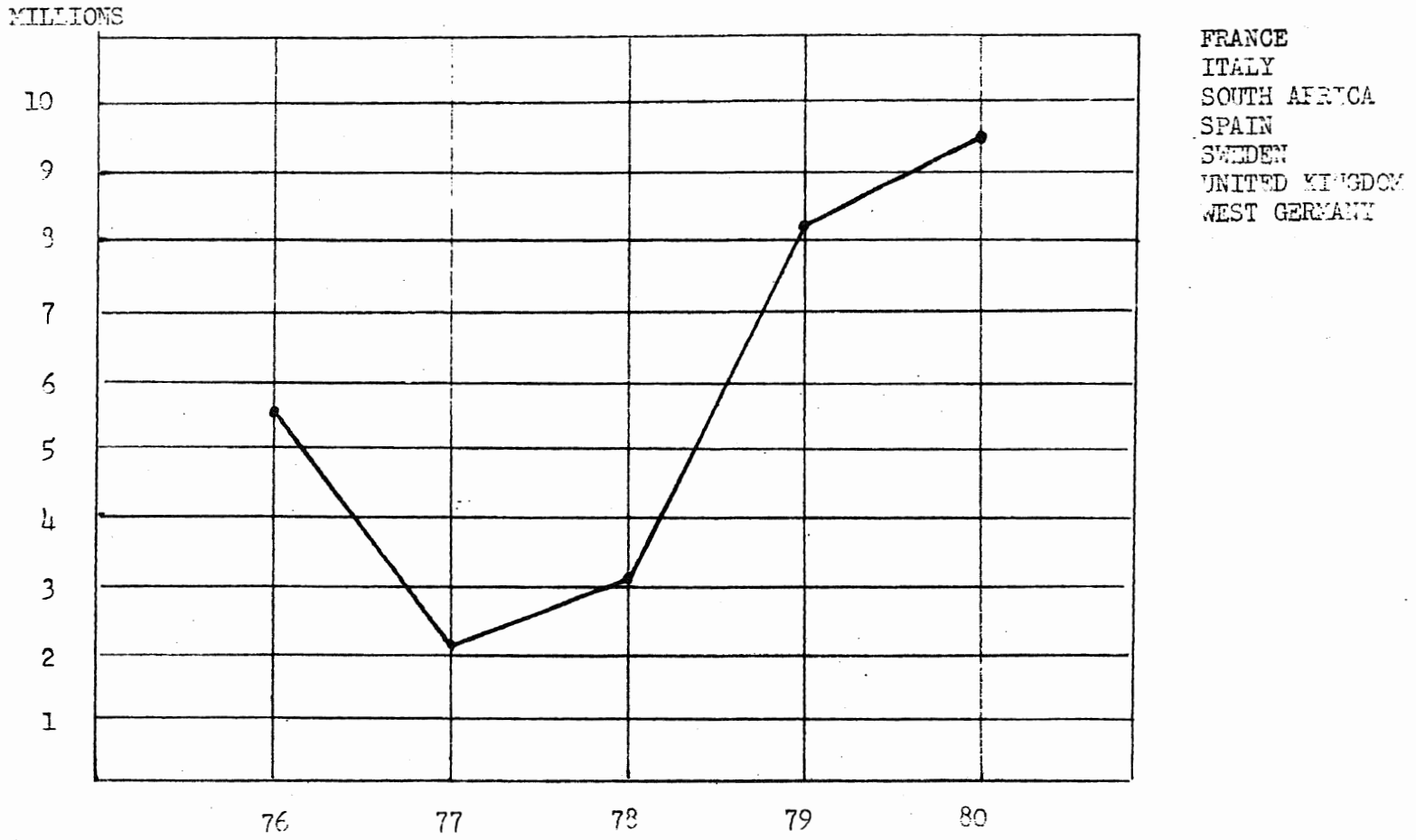
TOTAL INTERNATIONAL - ANNUAL



TOTAL INTERNATIONAL - QUARTERLY



SELECTED COUNTRIES OF AREA I - ANNUAL



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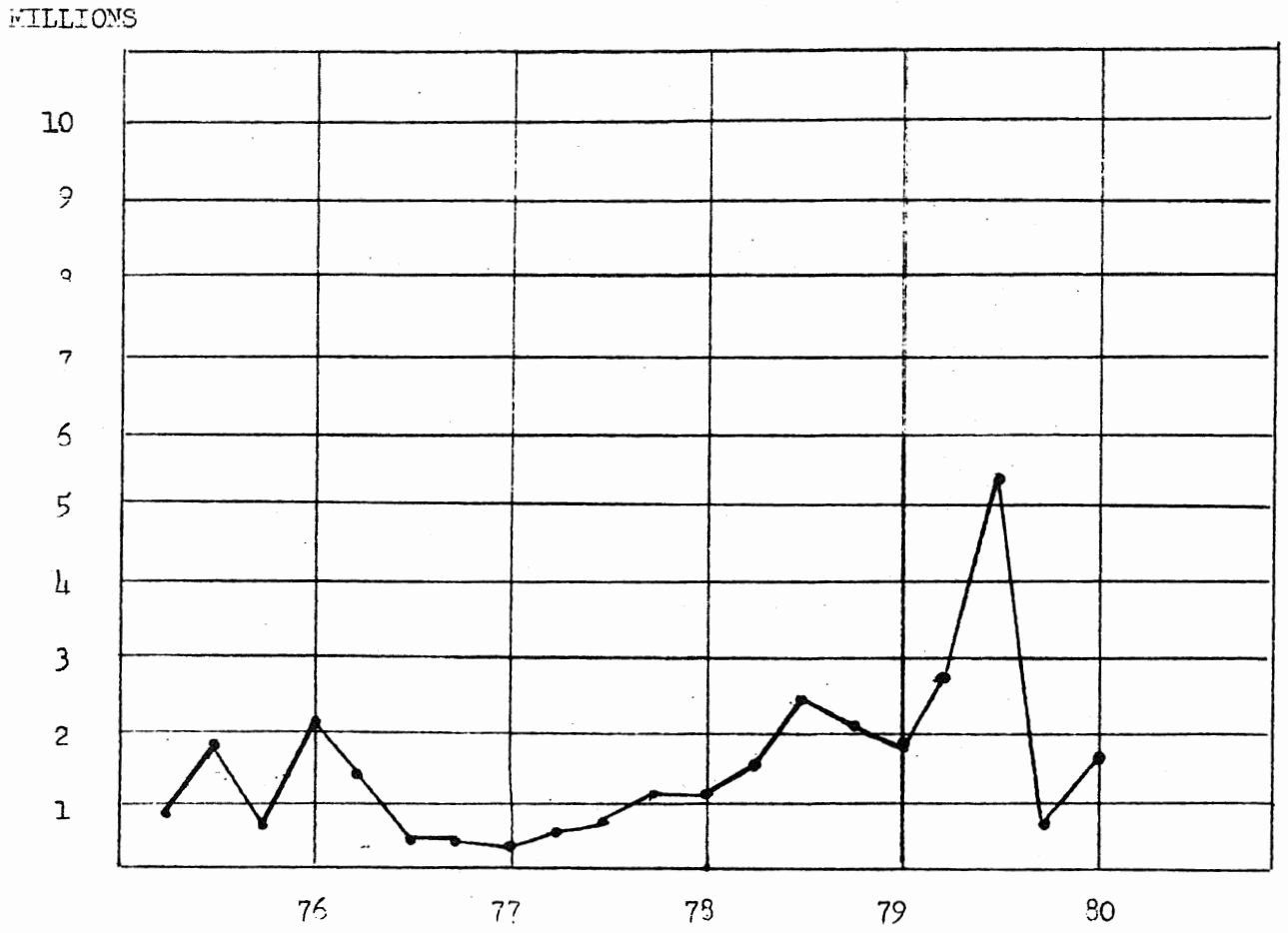

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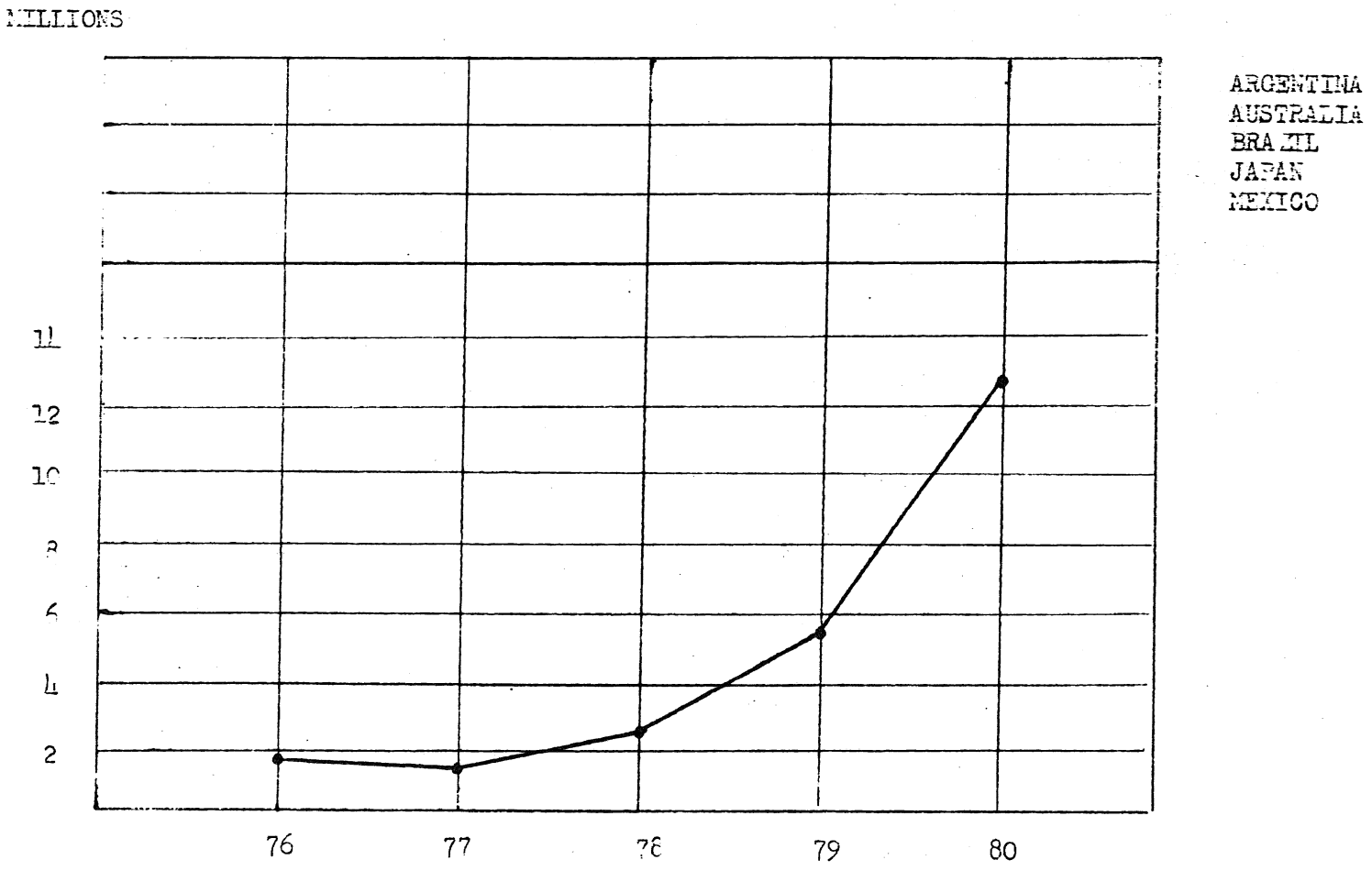

SELECTED COUNTRIES OF AREA II - QUARTERLY

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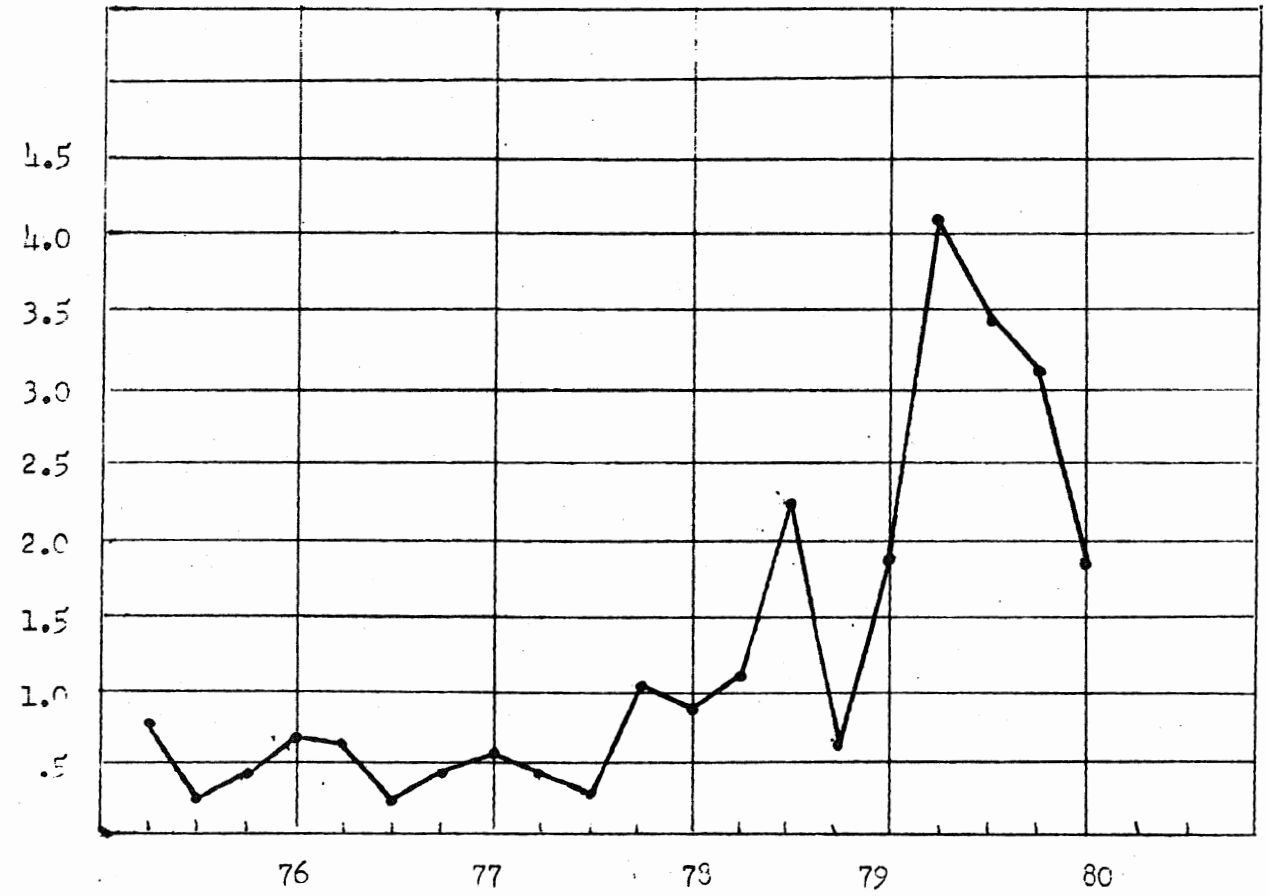


SALES ARGENTINA

1976	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	0	0
APRIL	0	
MAY	0	
JUNE	0	0
JULY	0	
AUGUST	0	
SEPTEMBER	0	0
OCTOBER	0	
NOVEMBER	0	
DECEMBER	0	0
YEARLY TOTAL		0

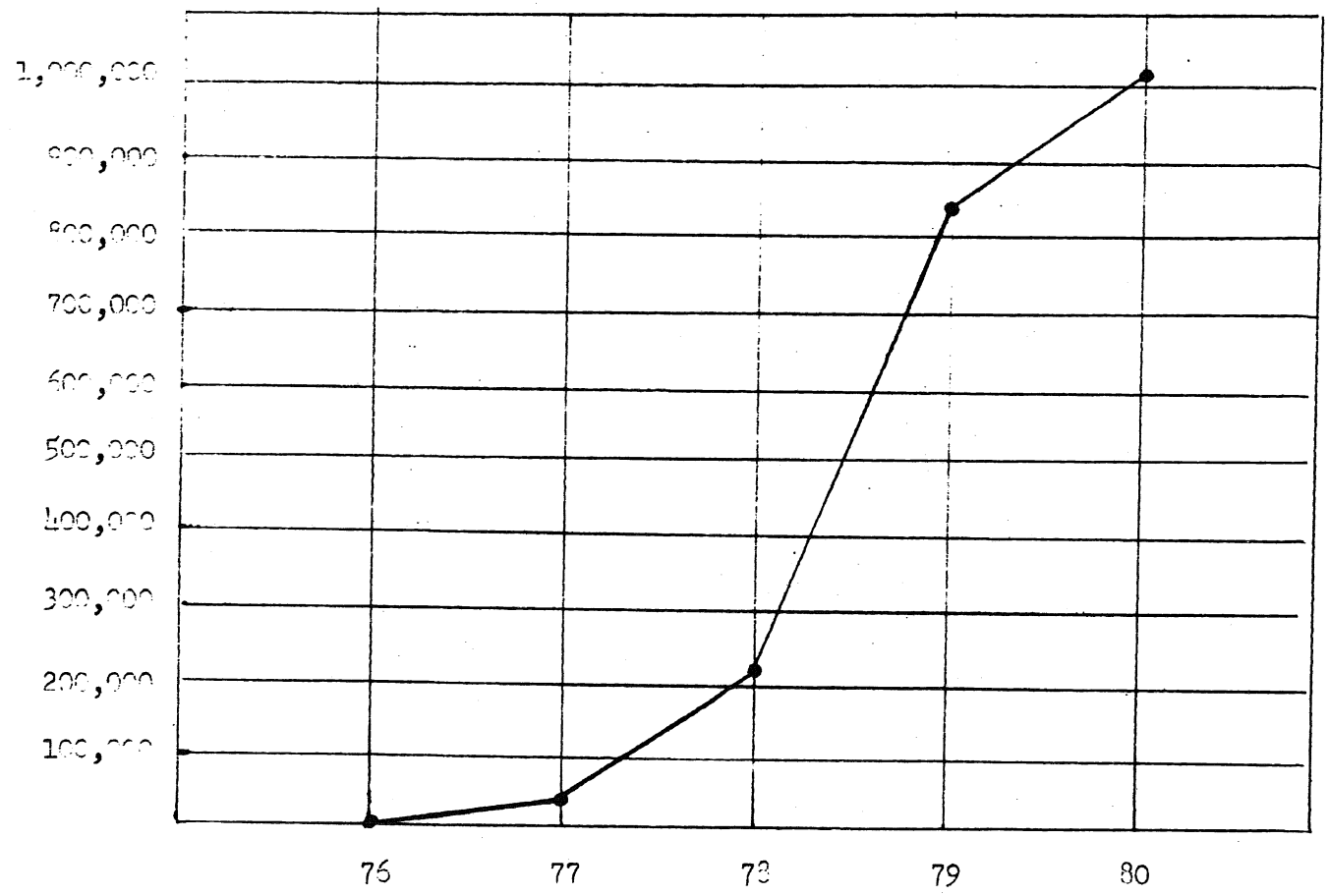
1977	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	0	0
APRIL	0	
MAY	0	
JUNE	0	0
JULY	32160	
AUGUST	3075	
SEPTEMBER	0	35235
OCTOBER	8500	
NOVEMBER	0	
DECEMBER	0	8500
YEARLY TOTAL		43735

1978	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	0	0
APRIL	154200	
MAY	-175	
JUNE	25170	179195
JULY	0	
AUGUST	350	
SEPTEMBER	37750	38100
OCTOBER	0	
NOVEMBER	0	
DECEMBER	0	0
YEARLY TOTAL		217295

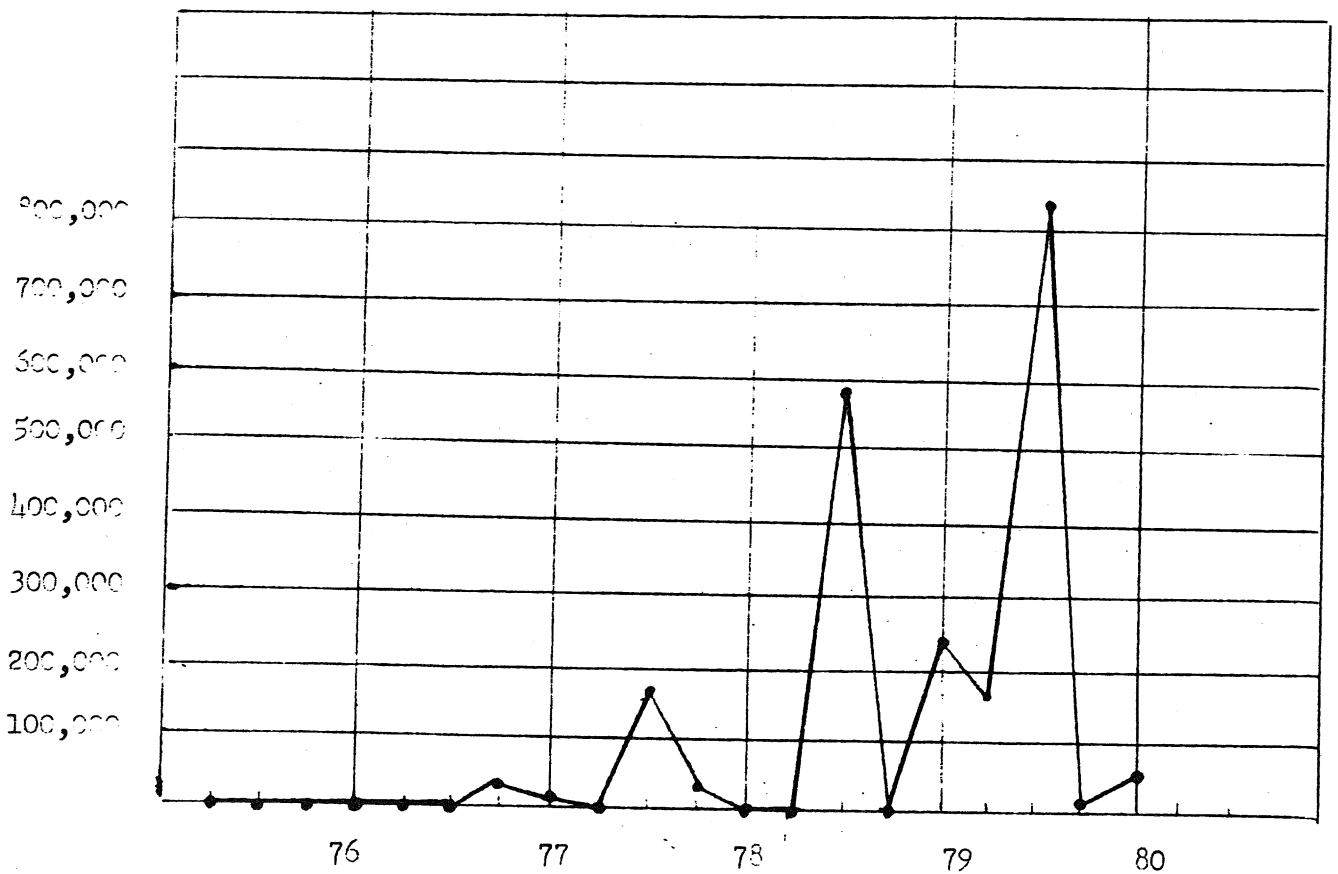
1979	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	0	0
APRIL	0	
MAY	596725	
JUNE	-2040	594685
JULY	0	
AUGUST	0	
SEPTEMBER	0	0
OCTOBER	68813	
NOVEMBER	170622	
DECEMBER	0	239435
YEARLY TOTAL		834120

1980	MONTHLY	QUARTERLY
JANUARY	186353	
FEBRUARY	-21740	
MARCH	21675	186288
APRIL	0	
MAY	621705	
JUNE	209550	831255
JULY	0	
AUGUST	0	
SEPTEMBER	1350	1350
OCTOBER	48974	
NOVEMBER	3210	
DECEMBER	0	52184
YEARLY TOTAL		1.07108E+06

ARGENTINA - ANNUAL



ARGENTINA - QUARTERLY



SALES AUSTRALIA

1976	MONTHLY	QUARTERLY
JANUARY	16860	
FEBRUARY	10694	
MARCH	7216	34770
APRIL	0	
MAY	3100	
JUNE	123650	126750
JULY	128580	
AUGUST	3670	
SEPTEMBER	58345	190595
OCTOBER	24919	
NOVEMBER	0	
DECEMBER	128465	153384
YEARLY TOTAL		505499

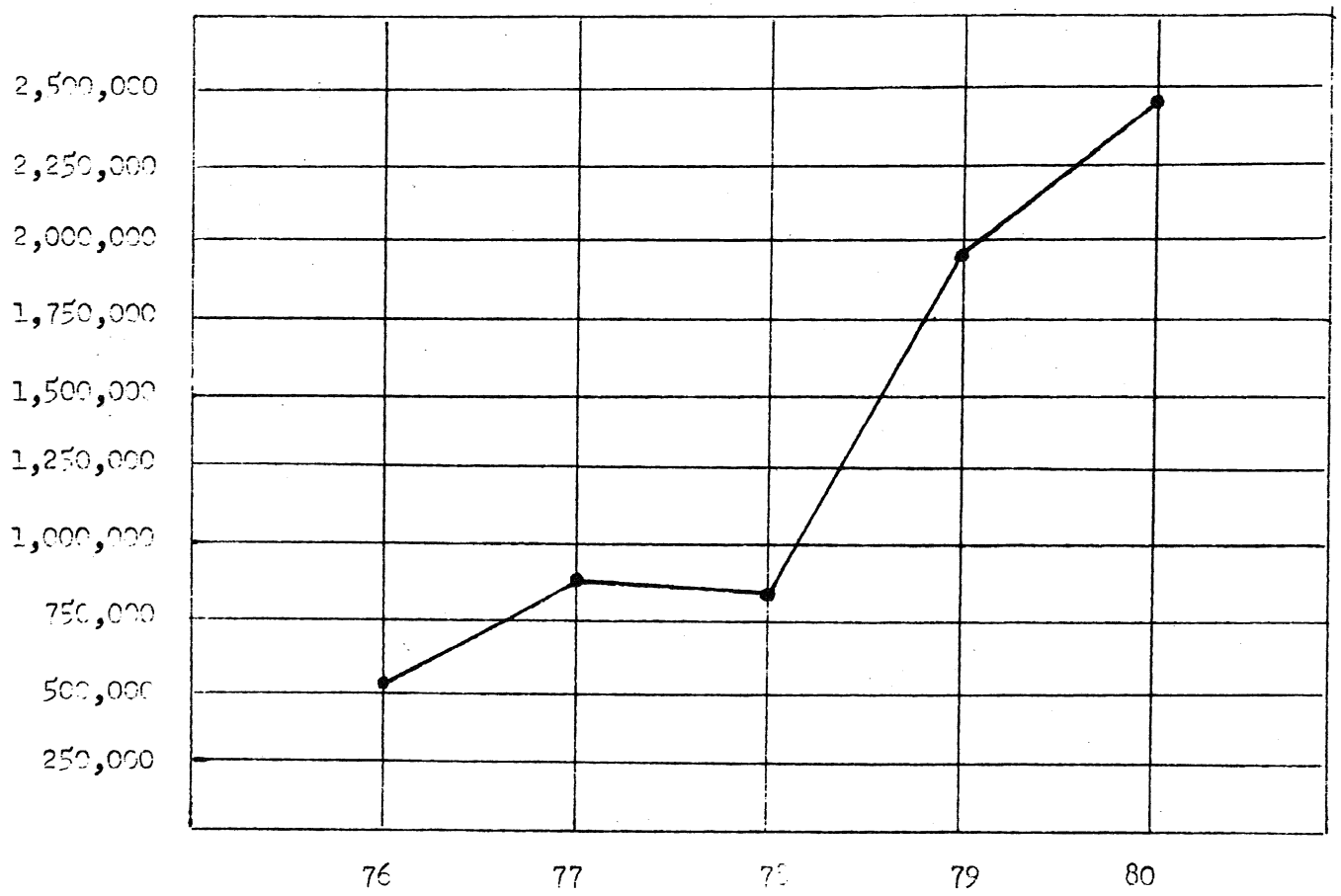
1977	MONTHLY	QUARTERLY
JANUARY	165085	
FEBRUARY	7740	
MARCH	186619	359444
APRIL	1377	
MAY	20030	
JUNE	58700	80107
JULY	0	
AUGUST	58747	
SEPTEMBER	292800	351547
OCTOBER	6175	
NOVEMBER	76010	
DECEMBER	-199	81986
YEARLY TOTAL		873084

1978	MONTHLY	QUARTERLY
JANUARY	-12010	
FEBRUARY	42790	
MARCH	-151900	-121120
APRIL	17670	
MAY	-185	
JUNE	37915	55400
JULY	90815	
AUGUST	201640	
SEPTEMBER	78545	371000
OCTOBER	444195	
NOVEMBER	45675	
DECEMBER	8485	498355
YEARLY TOTAL		803635

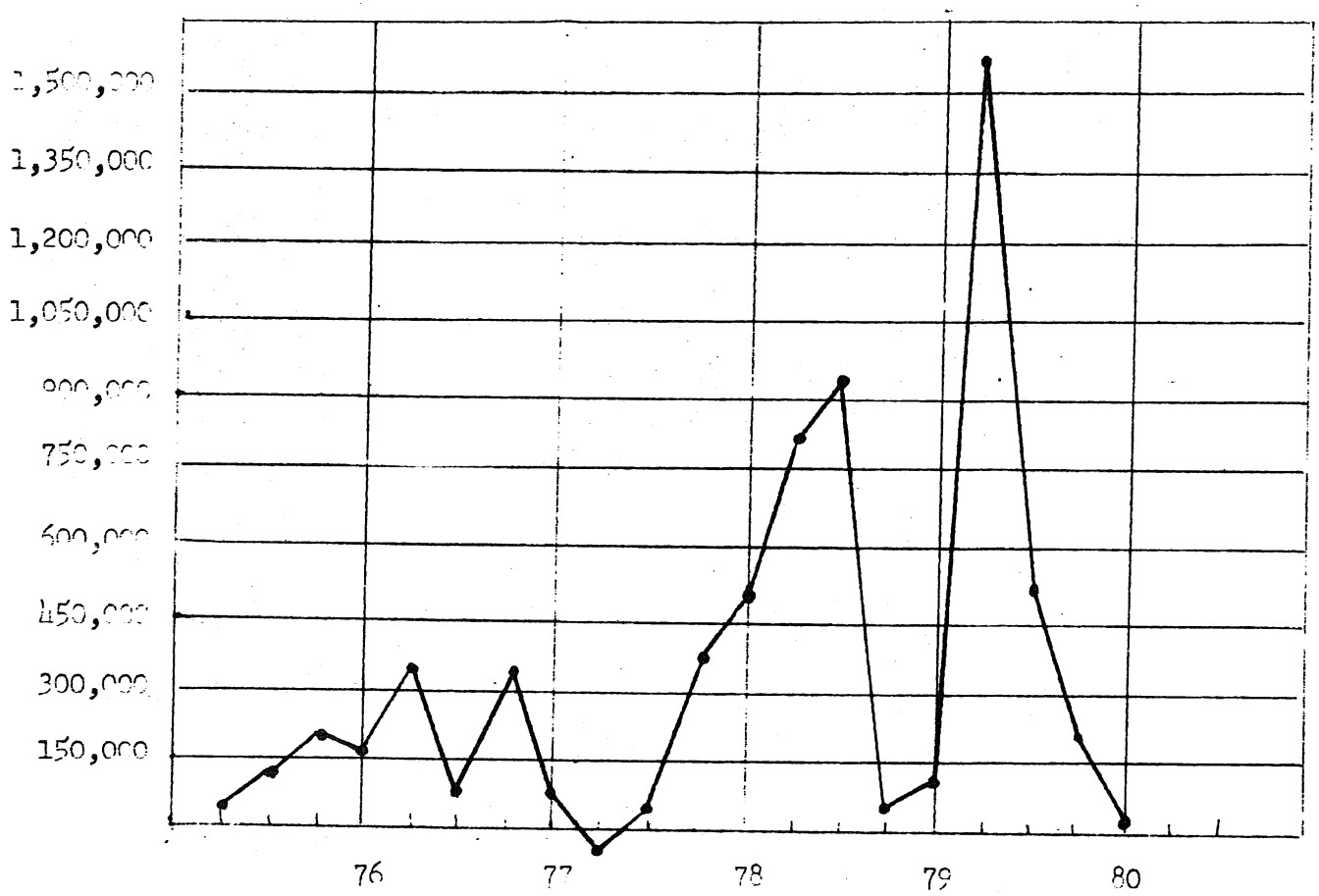
1979	MONTHLY	QUARTERLY
JANUARY	201520	
FEBRUARY	159750	
MARCH	505430	866700
APRIL	50340	
MAY	619917	
JUNE	256800	927057
JULY	30098	
AUGUST	1125	
SEPTEMBER	27025	58248
OCTOBER	-214500	
NOVEMBER	64050	
DECEMBER	254600	104150
YEARLY TOTAL		1.95616E+06

1980	MONTHLY	QUARTERLY
JANUARY	47375	
FEBRUARY	28900	
MARCH	1.61647E+06	1.69274E+06
APRIL	277332	
MAY	-2130	
JUNE	294675	569877
JULY	163280	
AUGUST	92525	
SEPTEMBER	-67133	188672
OCTOBER	19625	
NOVEMBER	3550	
DECEMBER	-50	23125
YEARLY TOTAL		2.47441E+06

AUSTRALIA - ANNUAL



AUSTRALIA - QUARTERLY



SALES BRAZIL

1976	MONTHLY	QUARTERLY
JANUARY	55131	
FEBRUARY	30037	
MARCH	0	85168
APRIL	0	
MAY	0	
JUNE	0	0
JULY	0	
AUGUST	0	
SEPTEMBER	0	0
OCTOBER	0	
NOVEMBER	0	
DECEMBER	0	0
YEARLY TOTAL		85168

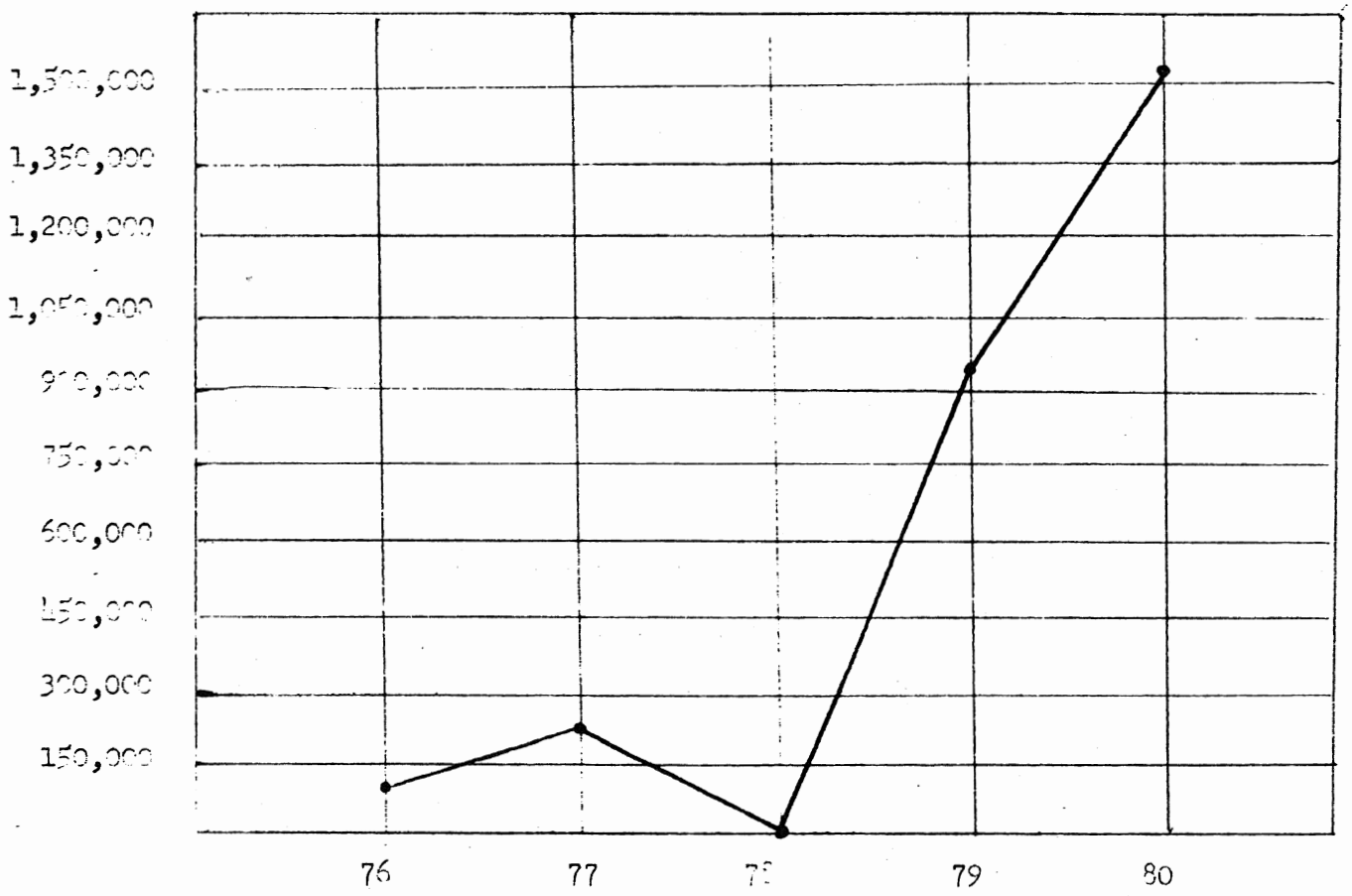
1977	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	0	0
APRIL	0	
MAY	0	
JUNE	111400	111400
JULY	0	
AUGUST	0	
SEPTEMBER	0	0
OCTOBER	17969	
NOVEMBER	114912	
DECEMBER	-5472	127409
YEARLY TOTAL		238809

1978	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	0	0
APRIL	0	
MAY	0	
JUNE	0	0
JULY	0	
AUGUST	0	
SEPTEMBER	0	0
OCTOBER	0	
NOVEMBER	0	
DECEMBER	0	0
YEARLY TOTAL		0

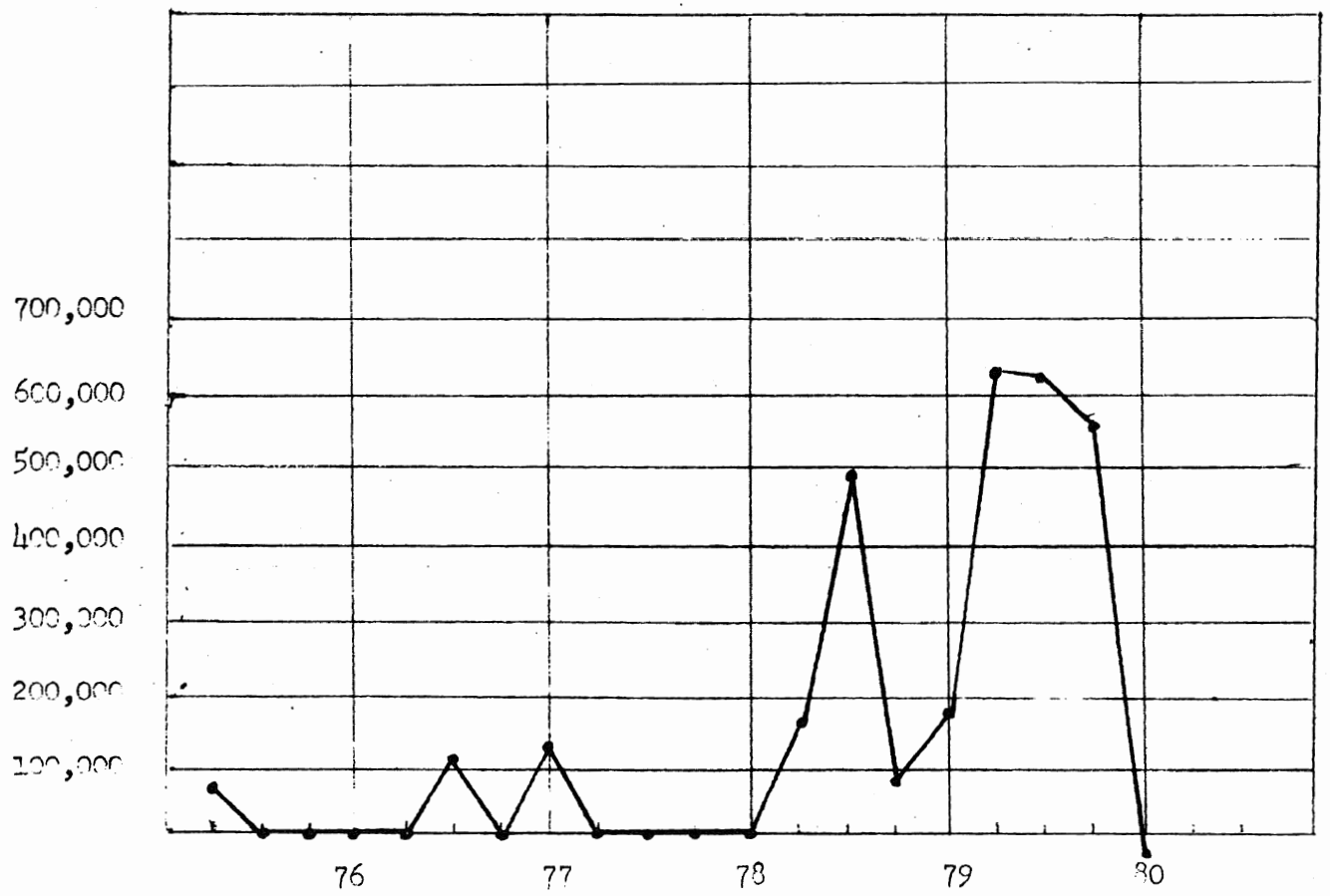
1979	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	179555	179555
APRIL	10150	
MAY	75560	
JUNE	414085	499795
JULY	15275	
AUGUST	11675	
SEPTEMBER	52950	79900
OCTOBER	65825	
NOVEMBER	112305	
DECEMBER	0	178130
YEARLY TOTAL		937380

1980	MONTHLY	QUARTERLY
JANUARY	208319	
FEBRUARY	0	
MARCH	404711	613030
APRIL	413302	
MAY	198170	
JUNE	0	611472
JULY	241859	
AUGUST	-810	
SEPTEMBER	321170	562219
OCTOBER	-1950	
NOVEMBER	-254300	
DECEMBER	0	-256250
YEARLY TOTAL		1.53047E+06

BRAZIL - ANNUAL



BRAZIL - QUARTERLY



SALES FRANCE

1976	MONTHLY	QUARTERLY
JANUARY	83910	
FEBRUARY	-30295	
MARCH	76660	130275
APRIL	0	
MAY	-5350	
JUNE	148321	142971
JULY	113394	
AUGUST	-2760	
SEPTEMBER	0	110634
OCTOBER	1320	
NOVEMBER	10350	
DECEMBER	450335	462005
YEARLY TOTAL		845885

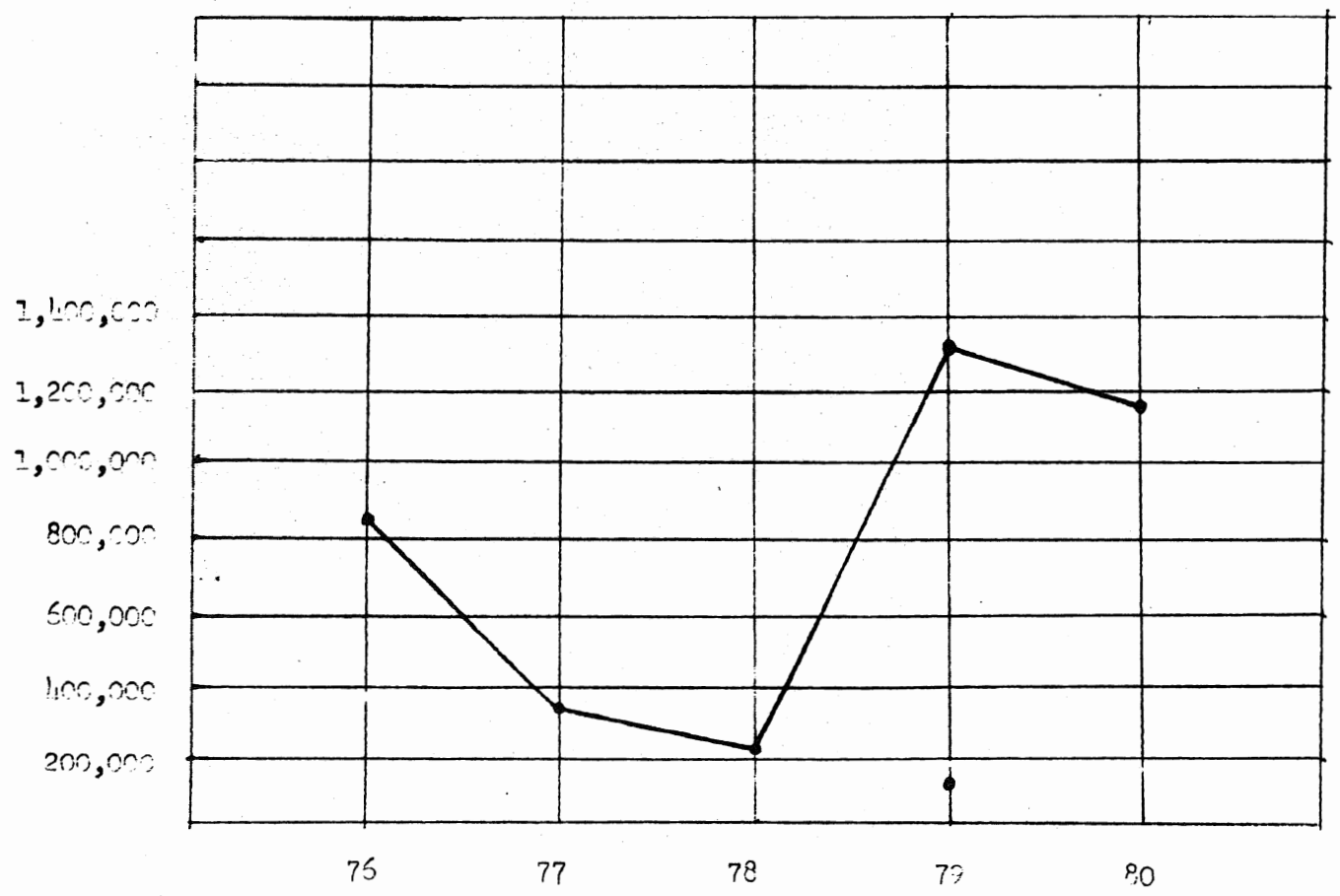
1977	MONTHLY	QUARTERLY
JANUARY	246655	
FEBRUARY	-2160	
MARCH	15400	259895
APRIL	0	
MAY	101725	
JUNE	-2650	99075
JULY	0	
AUGUST	0	
SEPTEMBER	0	0
OCTOBER	0	
NOVEMBER	0	
DECEMBER	0	0
YEARLY TOTAL		358970

1978	MONTHLY	QUARTERLY
JANUARY	42625	
FEBRUARY	0	
MARCH	76075	118700
APRIL	0	
MAY	0	
JUNE	0	0
JULY	63625	
AUGUST	12100	
SEPTEMBER	0	75725
OCTOBER	0	
NOVEMBER	26175	
DECEMBER	-1320	24855
YEARLY TOTAL		219280

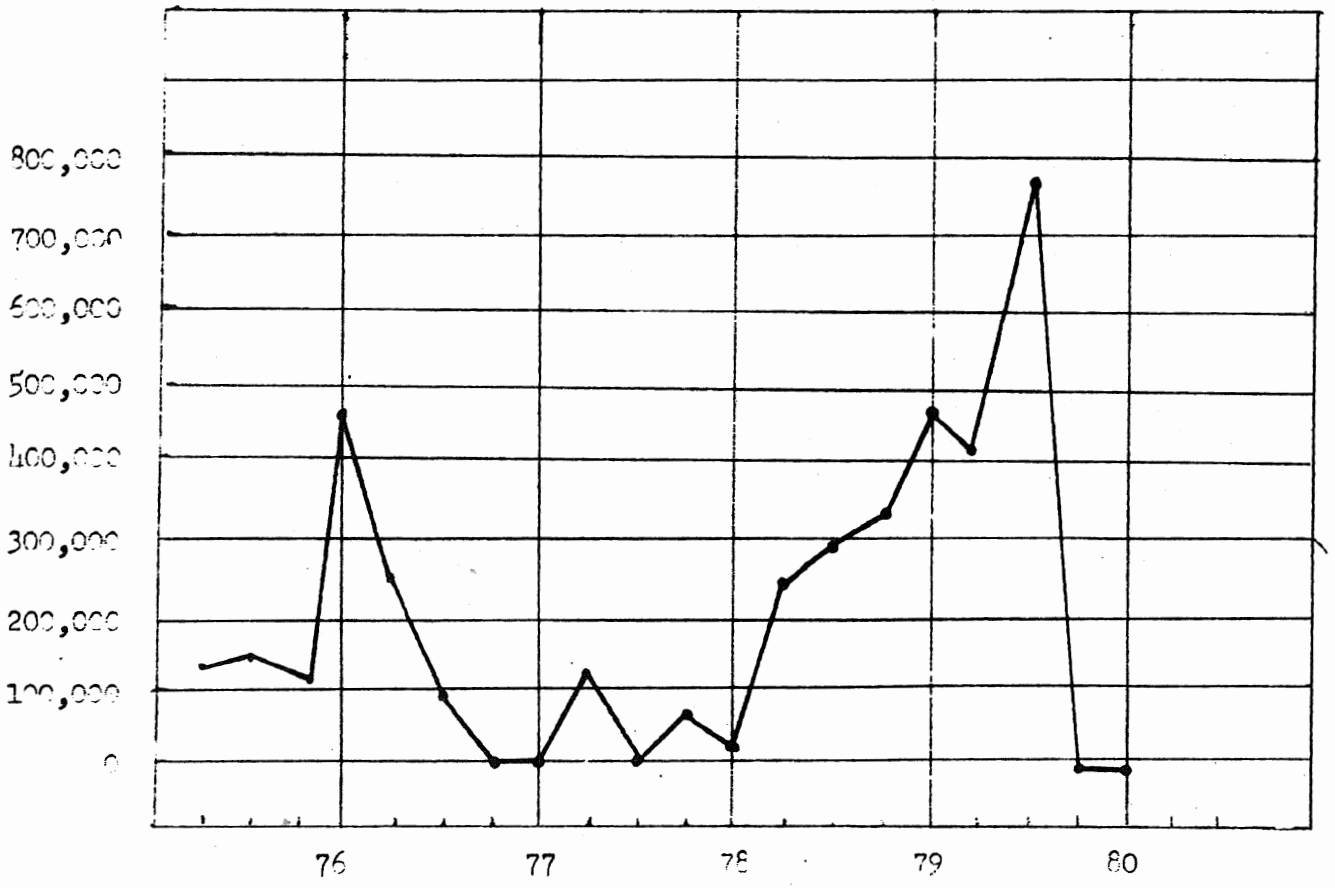
1979	MONTHLY	QUARTERLY
JANUARY	49160	
FEBRUARY	148410	
MARCH	47760	245330
APRIL	75740	
MAY	165088	
JUNE	50761	291589
JULY	0	
AUGUST	262370	
SEPTEMBER	62975	325345
OCTOBER	471528	
NOVEMBER	18	
DECEMBER	14575	486121
YEARLY TOTAL		1.34839E+06

1980	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	167393	
MARCH	244407	411800
APRIL	2750	
MAY	423325	
JUNE	349100	775175
JULY	-13555	
AUGUST	5425	
SEPTEMBER	-675	-8805
OCTOBER	73350	
NOVEMBER	-89975	
DECEMBER	6705	-9920
YEARLY TOTAL		1.16825E+06

FRANCE - ANNUAL



FRANCE - QUARTERLY



SALES ITALY

1976	MONTHLY	QUARTERLY
JANUARY	32349	
FEBRUARY	8100	
MARCH	65965	106414
APRIL	81700	
MAY	21899	
JUNE	74935	178534
JULY	12741	
AUGUST	149425	
SEPTEMBER	22775	184941
OCTOBER	-27117	
NOVEMBER	0	
DECEMBER	0	-27117
YEARLY TOTAL		442772

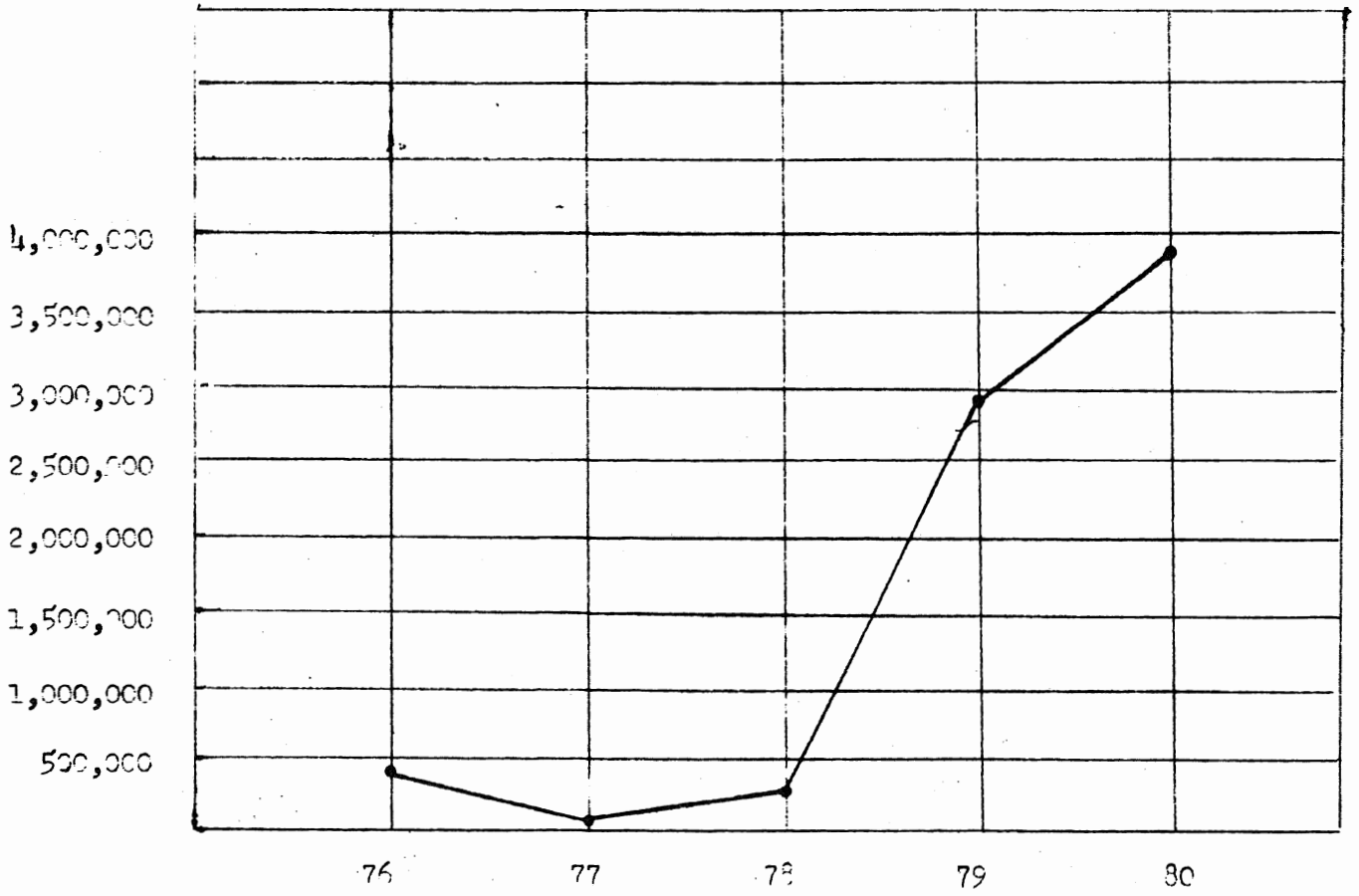
1977	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	0	0
APRIL	0	
MAY	38217	
JUNE	0	38217
JULY	0	
AUGUST	0	
SEPTEMBER	0	0
OCTOBER	13225	
NOVEMBER	28200	
DECEMBER	0	41425
YEARLY TOTAL		79642

1978	MONTHLY	QUARTERLY
JANUARY	4320	
FEBRUARY	7125	
MARCH	0	11445
APRIL	0	
MAY	-35325	
JUNE	0	-35325
JULY	0	
AUGUST	0	
SEPTEMBER	0	0
OCTOBER	0	
NOVEMBER	115726	
DECEMBER	173472	289198
YEARLY TOTAL		265318

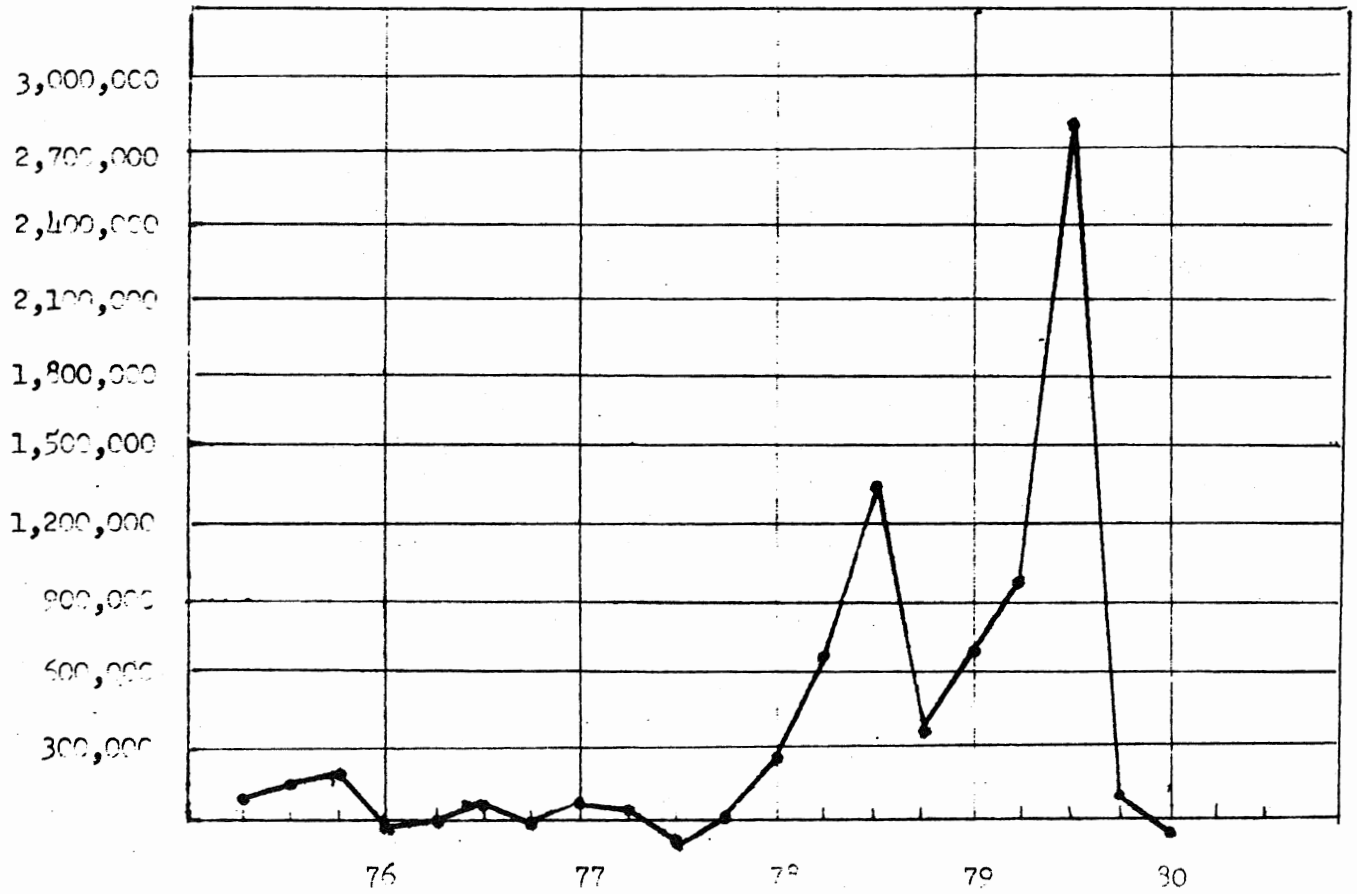
1979	MONTHLY	QUARTERLY
JANUARY	13447	
FEBRUARY	139665	
MARCH	458965	612077
APRIL	23000	
MAY	274501	
JUNE	1.04388E+06	1.34138E+06
JULY	337986	
AUGUST	0	
SEPTEMBER	1480	339466
OCTOBER	414956	
NOVEMBER	224987	
DECEMBER	45400	685343
YEARLY TOTAL		2.97827E+06

1980	MONTHLY	QUARTERLY
JANUARY	-613	
FEBRUARY	5125	
MARCH	956105	960617
APRIL	2.06175E+06	
MAY	11405	
JUNE	745040	2.81819E+06
JULY	-5718	
AUGUST	120970	
SEPTEMBER	-6350	108902
OCTOBER	-4655	
NOVEMBER	-27920	
DECEMBER	-2550	-35125
YEARLY TOTAL		3.85259E+06

ITALY - ANNUAL



ITALY - QUARTERLY



SALES JAPAN

1976	MONTHLY	QUARTERLY
JANUARY	-200	
FEBRUARY	2363	
MARCH	18590	20753
APRIL	0	
MAY	14800	
JUNE	0	14800
JULY	0	
AUGUST	0	
SEPTEMBER	173555	173555
OCTOBER	9025	
NOVEMBER	18400	
DECEMBER	81500	108925
YEARLY TOTAL		318033

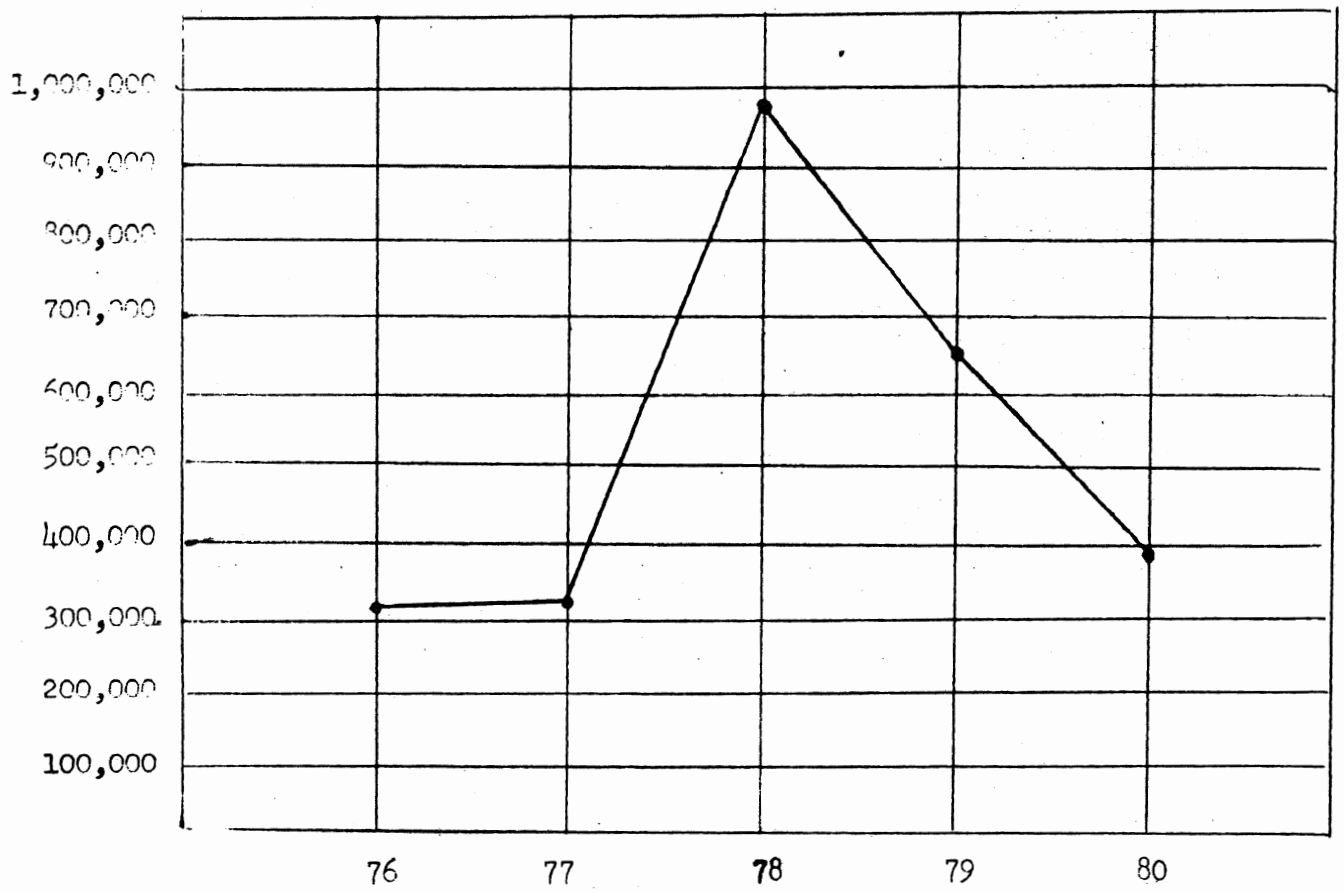
1977	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	104475	
MARCH	1300	105775
APRIL	13750	
MAY	0	
JUNE	0	13750
JULY	7627	
AUGUST	848	
SEPTEMBER	0	8475
OCTOBER	131400	
NOVEMBER	44993	
DECEMBER	8326	184719
YEARLY TOTAL		312719

1978	MONTHLY	QUARTERLY
JANUARY	426295	
FEBRUARY	-20	
MARCH	-1320	424955
APRIL	0	
MAY	0	
JUNE	0	0
JULY	0	
AUGUST	296405	
SEPTEMBER	0	296405
OCTOBER	0	
NOVEMBER	272734	
DECEMBER	-713	272021
YEARLY TOTAL		993381

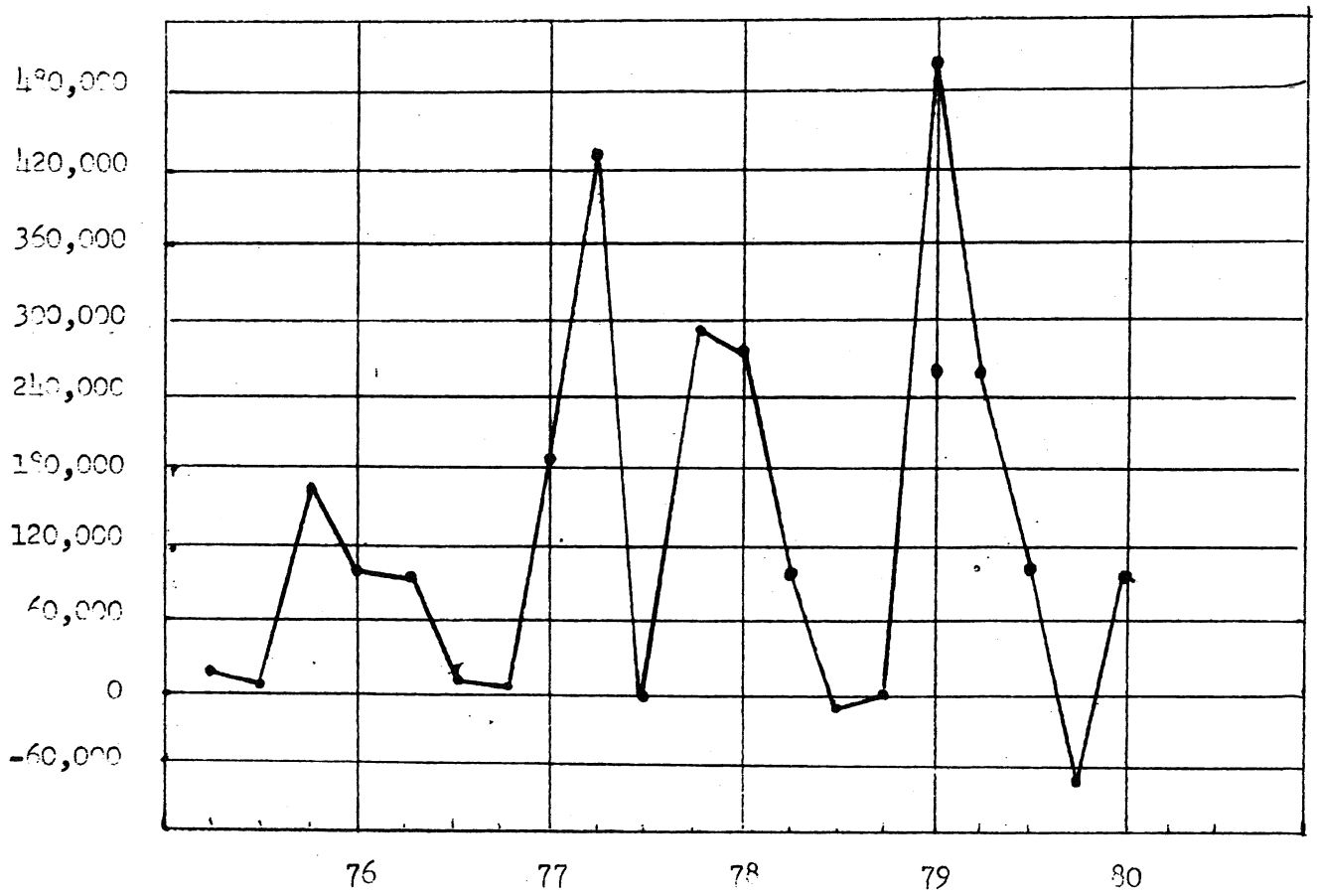
1979	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	775	
MARCH	90450	91225
APRIL	-2947	
MAY	-1550	
JUNE	0	-4497
JULY	0	
AUGUST	0	
SEPTEMBER	0	0
OCTOBER	0	
NOVEMBER	476115	
DECEMBER	91467	567582
YEARLY TOTAL		654310

1980	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	210	
MARCH	264778	264988
APRIL	104670	
MAY	-726	
JUNE	0	103944
JULY	2355	
AUGUST	-82400	
SEPTEMBER	4975	-75070
OCTOBER	99343	
NOVEMBER	0	
DECEMBER	0	99343
YEARLY TOTAL		393205

JAPAN - ANNUAL



JAPAN - QUARTERLY



SALES MEXICO

1976	MONTHLY	QUARTERLY
JANUARY	64750	
FEBRUARY	28737	
MARCH	471924	565411
APRIL	-50835	
MAY	-94712	
JUNE	247140	101593
JULY	0	
AUGUST	52942	
SEPTEMBER	60	53002
OCTOBER	-17640	
NOVEMBER	17640	
DECEMBER	352650	352650
YEARLY TOTAL		1.07266E+06

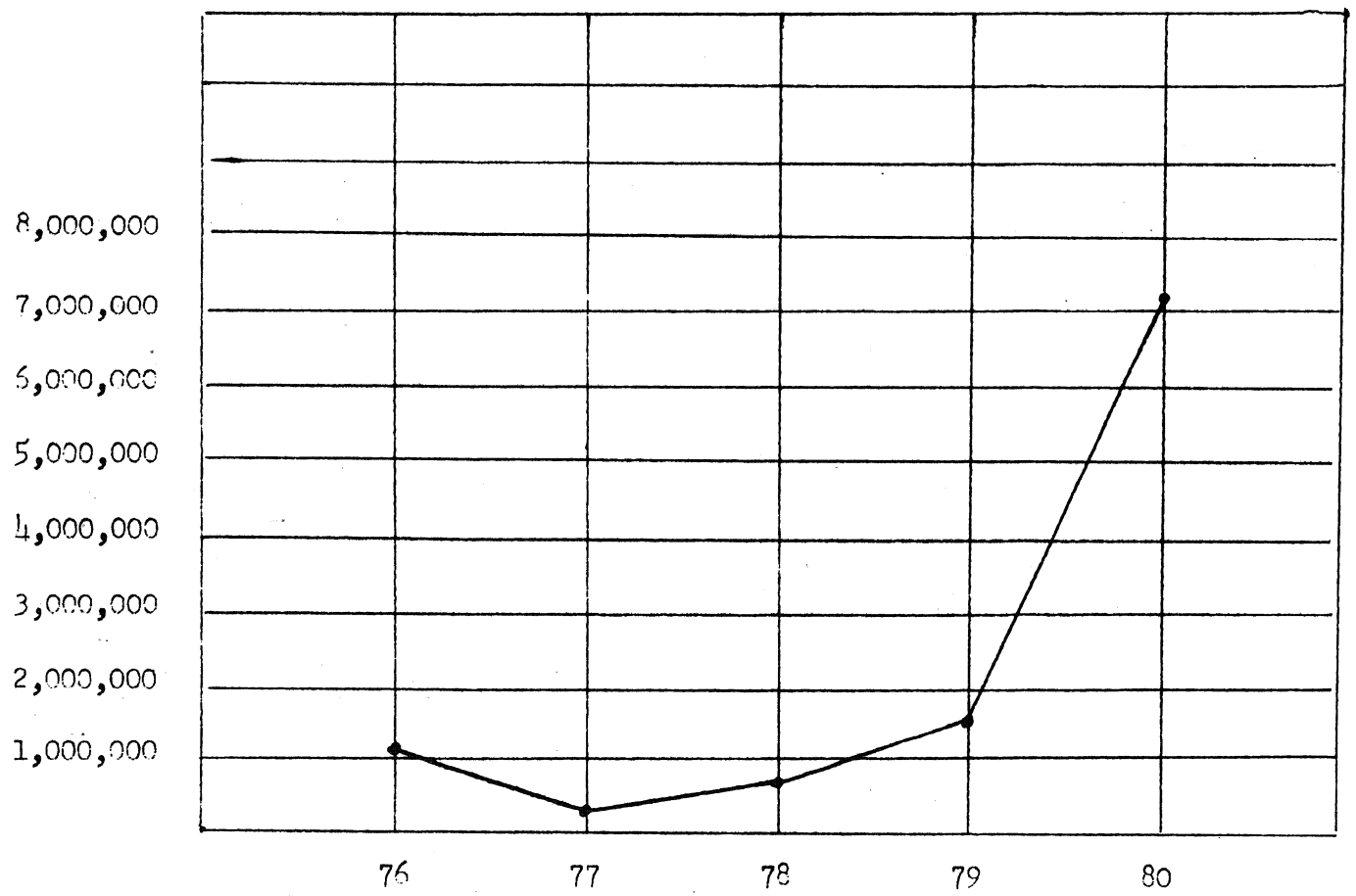
1977	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	142150	
MARCH	0	142150
APRIL	31850	
MAY	-2000	
JUNE	-16000	13850
JULY	0	
AUGUST	0	
SEPTEMBER	55910	55910
OCTOBER	24918	
NOVEMBER	13550	
DECEMBER	64416	102884
YEARLY TOTAL		314794

1978	MONTHLY	QUARTERLY
JANUARY	-225	
FEBRUARY	163885	
MARCH	-900	162760
APRIL	0	
MAY	30005	
JUNE	4869	34874
JULY	0	
AUGUST	75450	
SEPTEMBER	222440	297890
OCTOBER	30620	
NOVEMBER	0	
DECEMBER	42710	73330
YEARLY TOTAL		568854

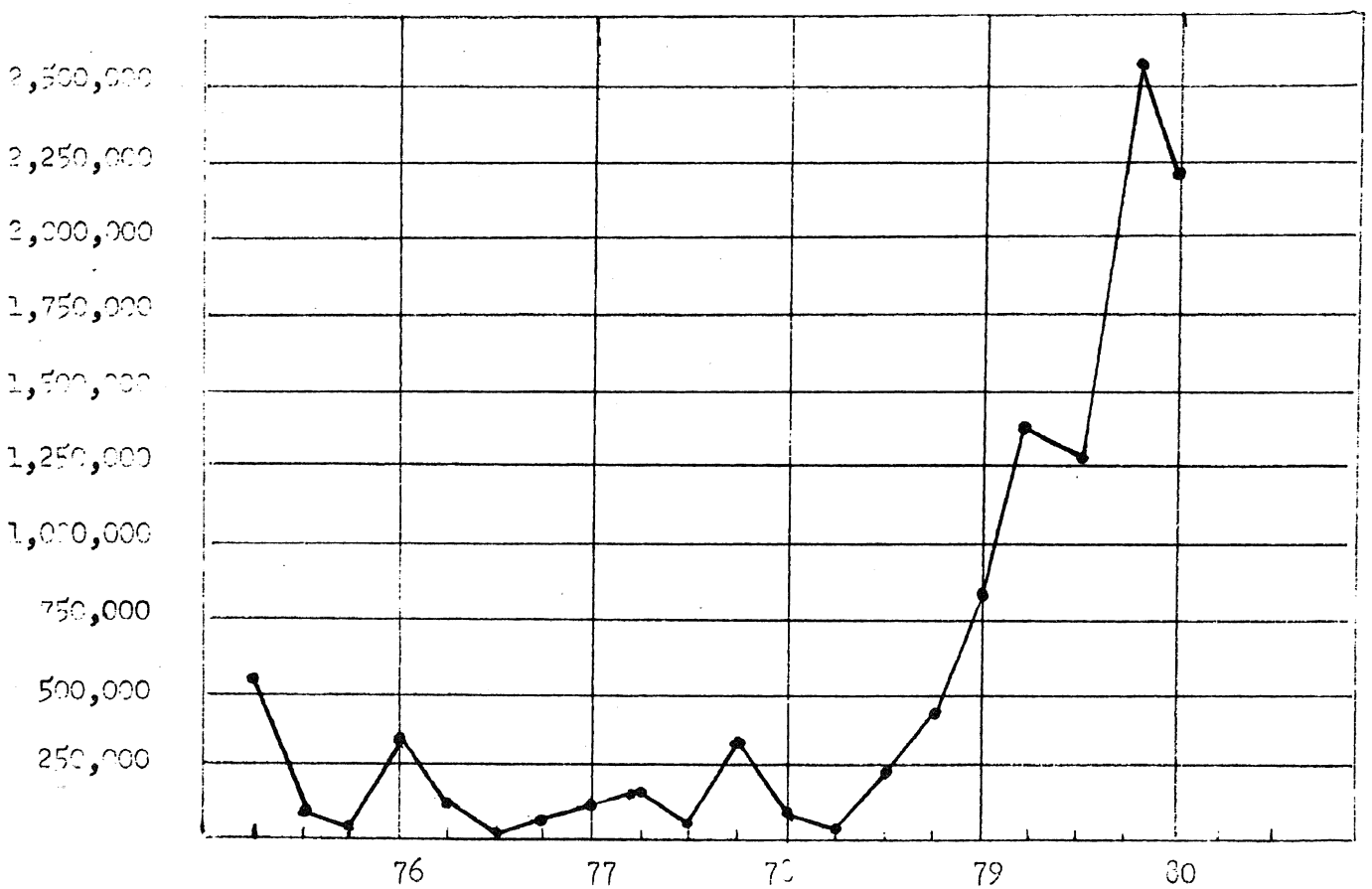
1979	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	206500	
MARCH	-175125	31375
APRIL	111225	
MAY	83680	
JUNE	53350	248255
JULY	122130	
AUGUST	299635	
SEPTEMBER	0	421765
OCTOBER	138401	
NOVEMBER	473450	
DECEMBER	168845	780696
YEARLY TOTAL		1.48209E+06

1980	MONTHLY	QUARTERLY
JANUARY	215650	
FEBRUARY	994797	
MARCH	123688	1.33414E+06
APRIL	-15825	
MAY	714080	
JUNE	590308	1.28856E+06
JULY	395720	
AUGUST	751051	
SEPTEMBER	1.45046E+06	2.59723E+06
OCTOBER	1.85843E+06	
NOVEMBER	42650	
DECEMBER	24502	1.92558E+06
YEARLY TOTAL		7.14551E+06

MEXICO - ANNUAL



MEXICO - QUARTERLY



SALES SOUTH AFRICA

1976	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	29235	
MARCH	29935	59170
APRIL	0	
MAY	0	
JUNE	98890	98890
JULY	-10	
AUGUST	0	
SEPTEMBER	0	-10
OCTOBER	0	
NOVEMBER	0	
DECEMBER	0	0
YEARLY TOTAL		158050

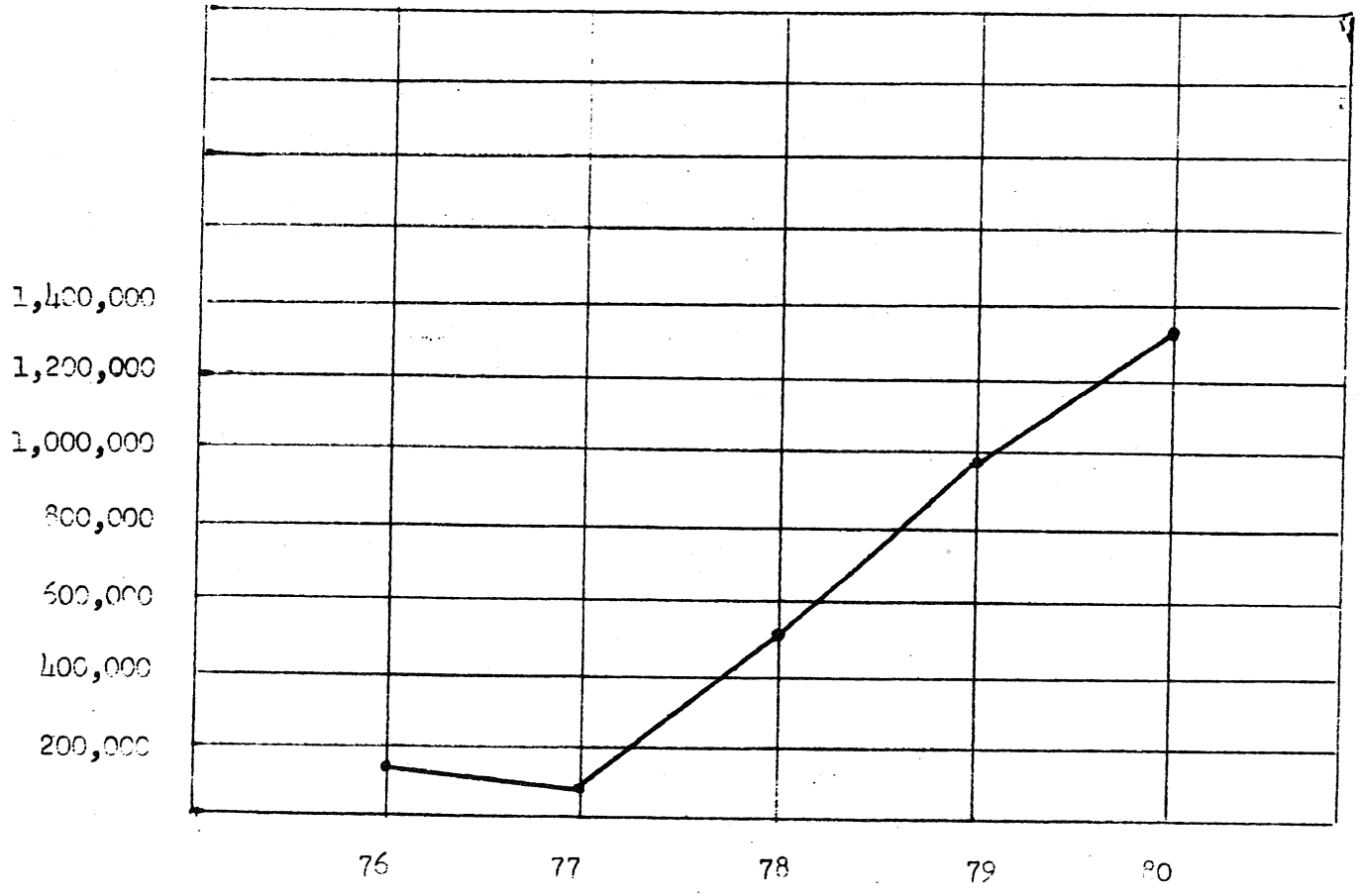
1977	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	0	0
APRIL	0	
MAY	0	
JUNE	0	0
JULY	21578	
AUGUST	4373	
SEPTEMBER	0	25951
OCTOBER	0	
NOVEMBER	53900	
DECEMBER	26173	80073
YEARLY TOTAL		106024

1978	MONTHLY	QUARTERLY
JANUARY	99775	
FEBRUARY	0	
MARCH	-158	99617
APRIL	0	
MAY	0	
JUNE	0	0
JULY	46830	
AUGUST	-101	
SEPTEMBER	240251	286980
OCTOBER	-780	
NOVEMBER	33985	
DECEMBER	153575	186780
YEARLY TOTAL		573377

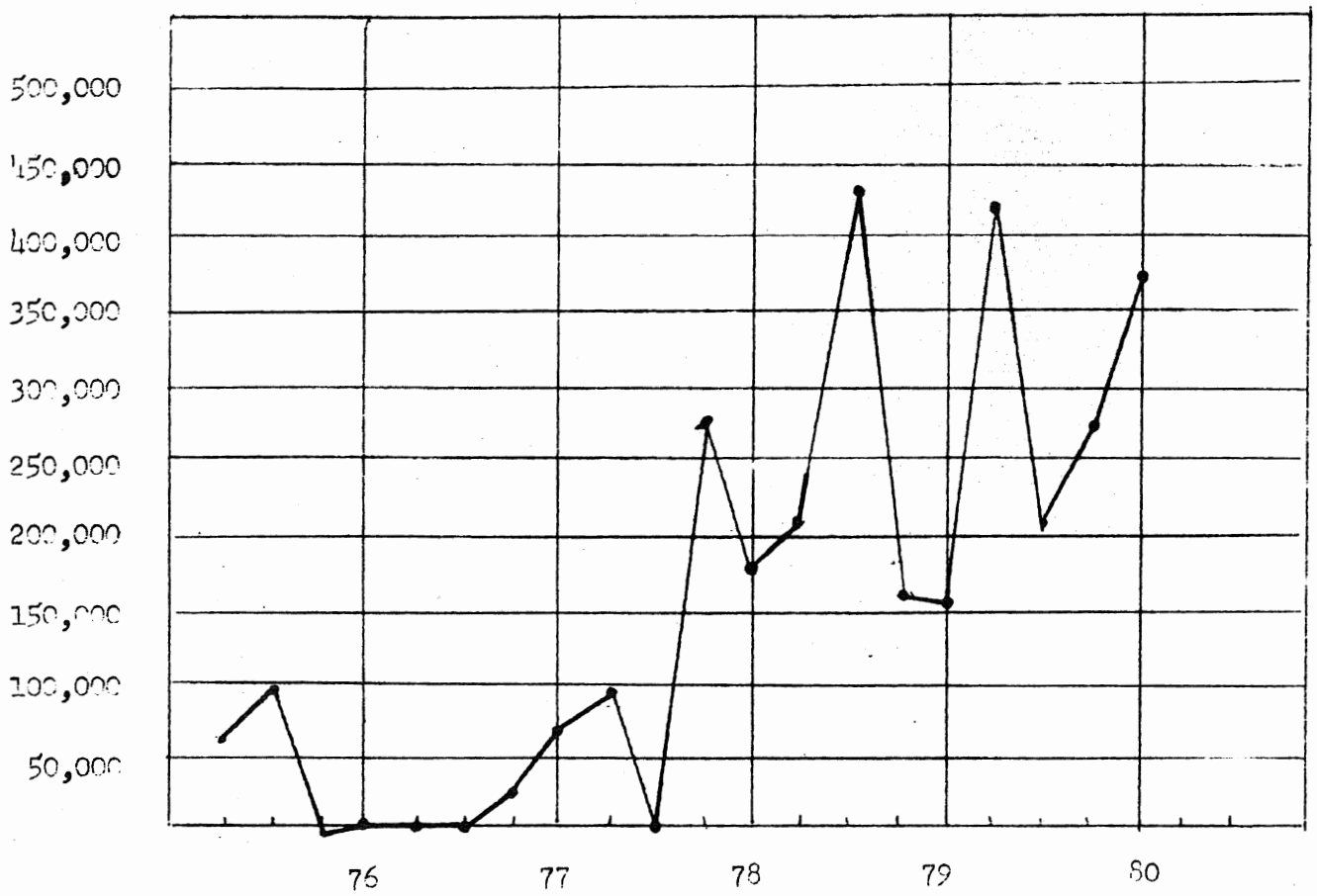
1979	MONTHLY	QUARTERLY
JANUARY	61453	
FEBRUARY	104767	
MARCH	43047	209267
APRIL	190365	
MAY	203220	
JUNE	46085	439670
JULY	171875	
AUGUST	-15105	
SEPTEMBER	780	157550
OCTOBER	86740	
NOVEMBER	27078	
DECEMBER	39556	153374
YEARLY TOTAL		959861

1980	MONTHLY	QUARTERLY
JANUARY	70	
FEBRUARY	249530	
MARCH	173738	423338
APRIL	171	
MAY	80161	
JUNE	127630	207962
JULY	108755	
AUGUST	72480	
SEPTEMBER	101848	283083
OCTOBER	96615	
NOVEMBER	56050	
DECEMBER	221621	374286
YEARLY TOTAL		1.28867E+06

SOUTH AFRICA - ANNUAL



SOUTH AFRICA - QUARTERLY



SALES SPAIN

1976	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	0	0
APRIL	0	
MAY	0	
JUNE	276425	276425
JULY	-60380	
AUGUST	3569.47	
SEPTEMBER	2048.88	-54761.7
OCTOBER	0	
NOVEMBER	145405	
DECEMBER	48595	194000
YEARLY TOTAL		415663

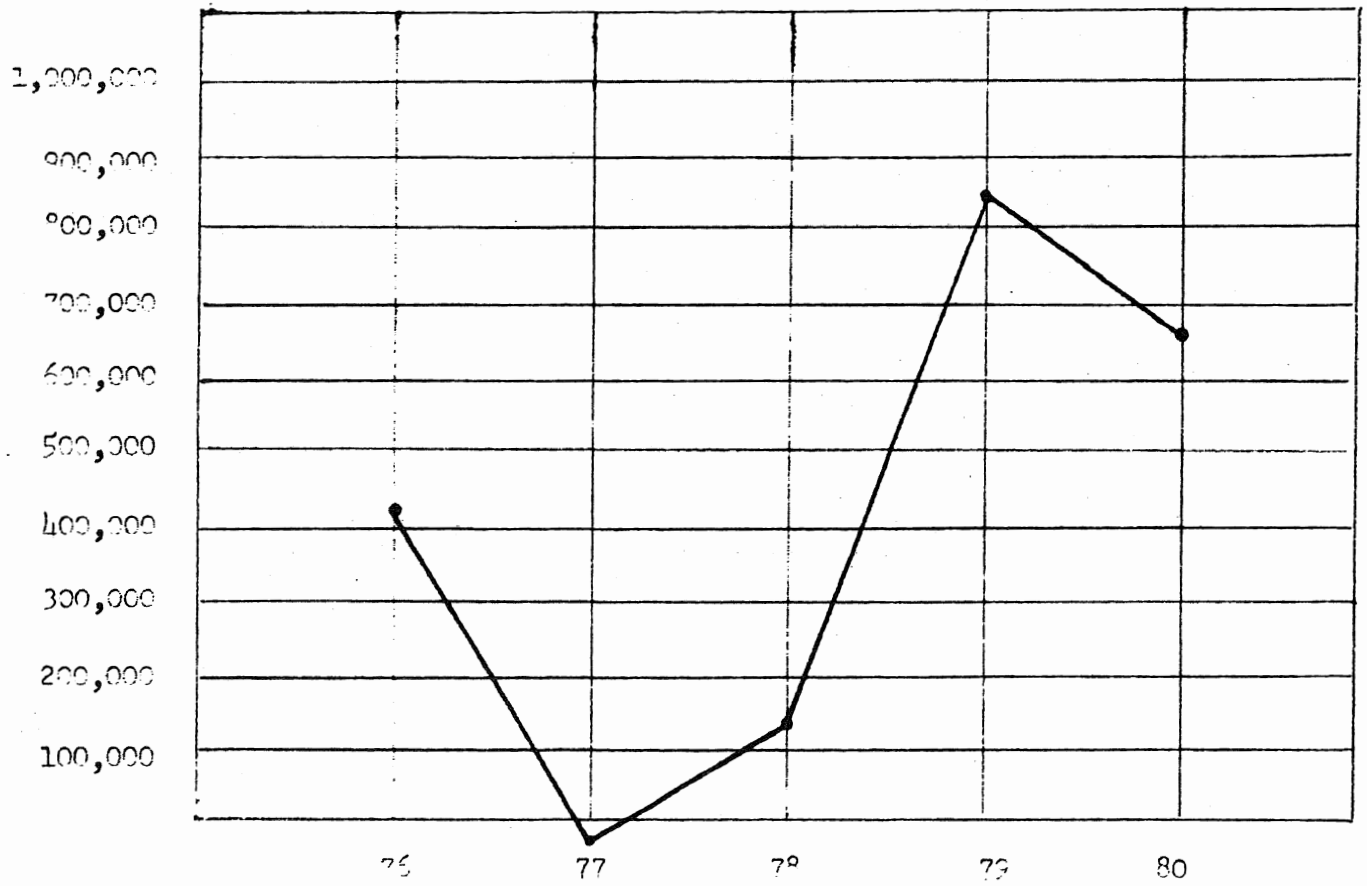
1977	MONTHLY	QUARTERLY
JANUARY	-92865	
FEBRUARY	-9835	
MARCH	885	-101815
APRIL	0	
MAY	0	
JUNE	0	0
JULY	0	
AUGUST	31440	
SEPTEMBER	0	31440
OCTOBER	0	
NOVEMBER	0	
DECEMBER	0	0
YEARLY TOTAL		-70375

1978	MONTHLY	QUARTERLY
JANUARY	27702	
FEBRUARY	0	
MARCH	0	27702
APRIL	90451	
MAY	19243	
JUNE	0	109694
JULY	0	
AUGUST	0	
SEPTEMBER	0	0
OCTOBER	0	
NOVEMBER	0	
DECEMBER	0	0
YEARLY TOTAL		137396

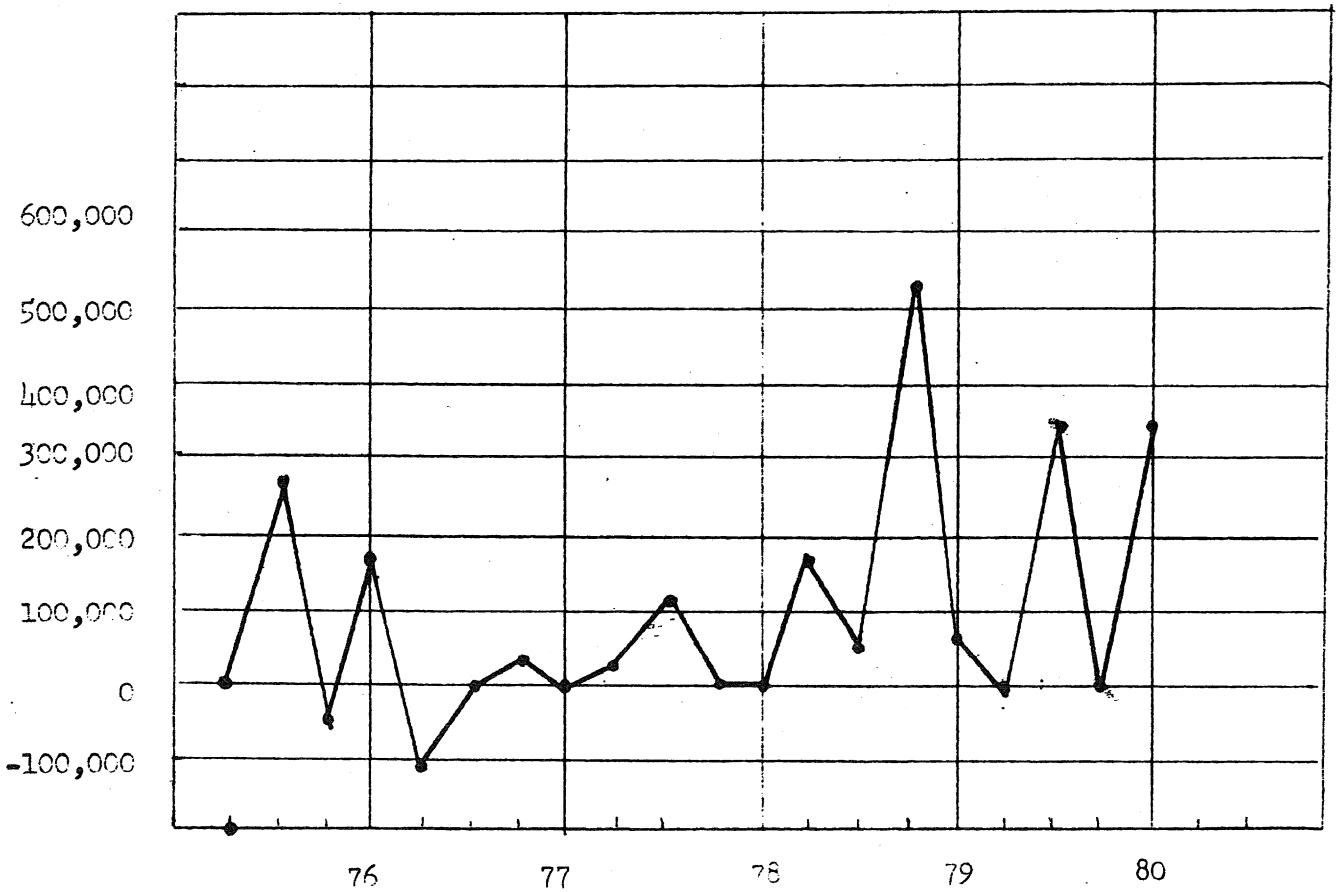
1979	MONTHLY	QUARTERLY
JANUARY	161950	
FEBRUARY	27000	
MARCH	0	188950
APRIL	0	
MAY	0	
JUNE	61520	61520
JULY	264095	
AUGUST	232100	
SEPTEMBER	28990	525185
OCTOBER	46575	
NOVEMBER	0	
DECEMBER	26175	72750
YEARLY TOTAL		848405

1980	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	0	0
APRIL	0	
MAY	341245	
JUNE	-2875	338370
JULY	0	
AUGUST	0	
SEPTEMBER	0	0
OCTOBER	0	
NOVEMBER	0	
DECEMBER	339020	339020
YEARLY TOTAL		677390

SPAIN - ANNUAL



SPAIN - QUARTERLY



SALES SWEDEN

1976	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	53690	
MARCH	93420	147110
APRIL	1305	
MAY	-7561	
JUNE	336025	329769
JULY	93793	
AUGUST	2145	
SEPTEMBER	0	95938
OCTOBER	19975	
NOVEMBER	53788	
DECEMBER	229024	302787
YEARLY TOTAL		875604

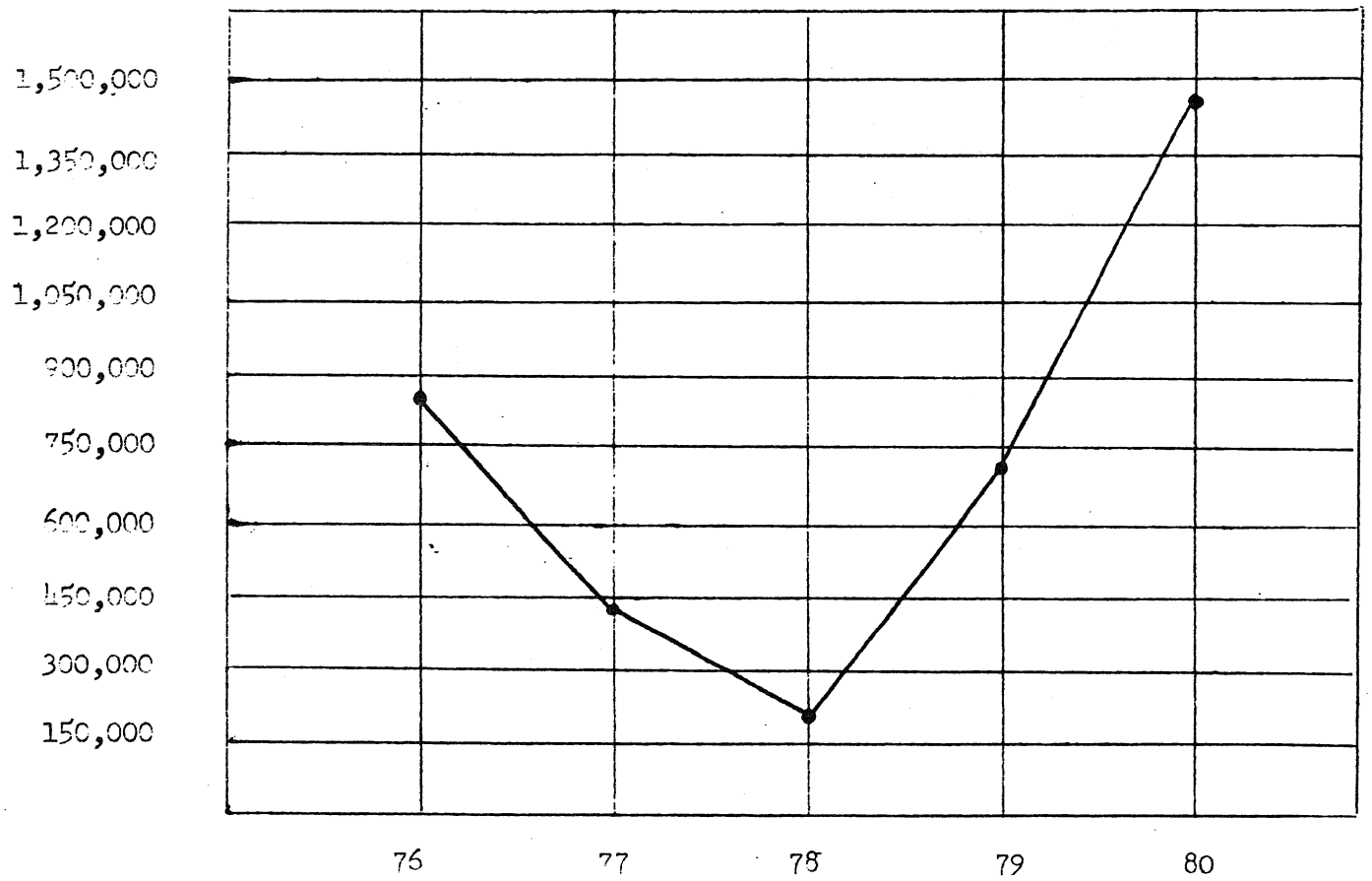
1977	MONTHLY	QUARTERLY
JANUARY	67975	
FEBRUARY	63415	
MARCH	57750	189140
APRIL	0	
MAY	61220	
JUNE	0	61220
JULY	140893	
AUGUST	14176	
SEPTEMBER	-2865	152204
OCTOBER	0	
NOVEMBER	-41175	
DECEMBER	75260	34085
YEARLY TOTAL		436649

1978	MONTHLY	QUARTERLY
JANUARY	2710	
FEBRUARY	22135	
MARCH	4120	28965
APRIL	0	
MAY	8300	
JUNE	7865	16165
JULY	0	
AUGUST	0	
SEPTEMBER	35985	35985
OCTOBER	26640	
NOVEMBER	124875	
DECEMBER	-2540	148975
YEARLY TOTAL		230090

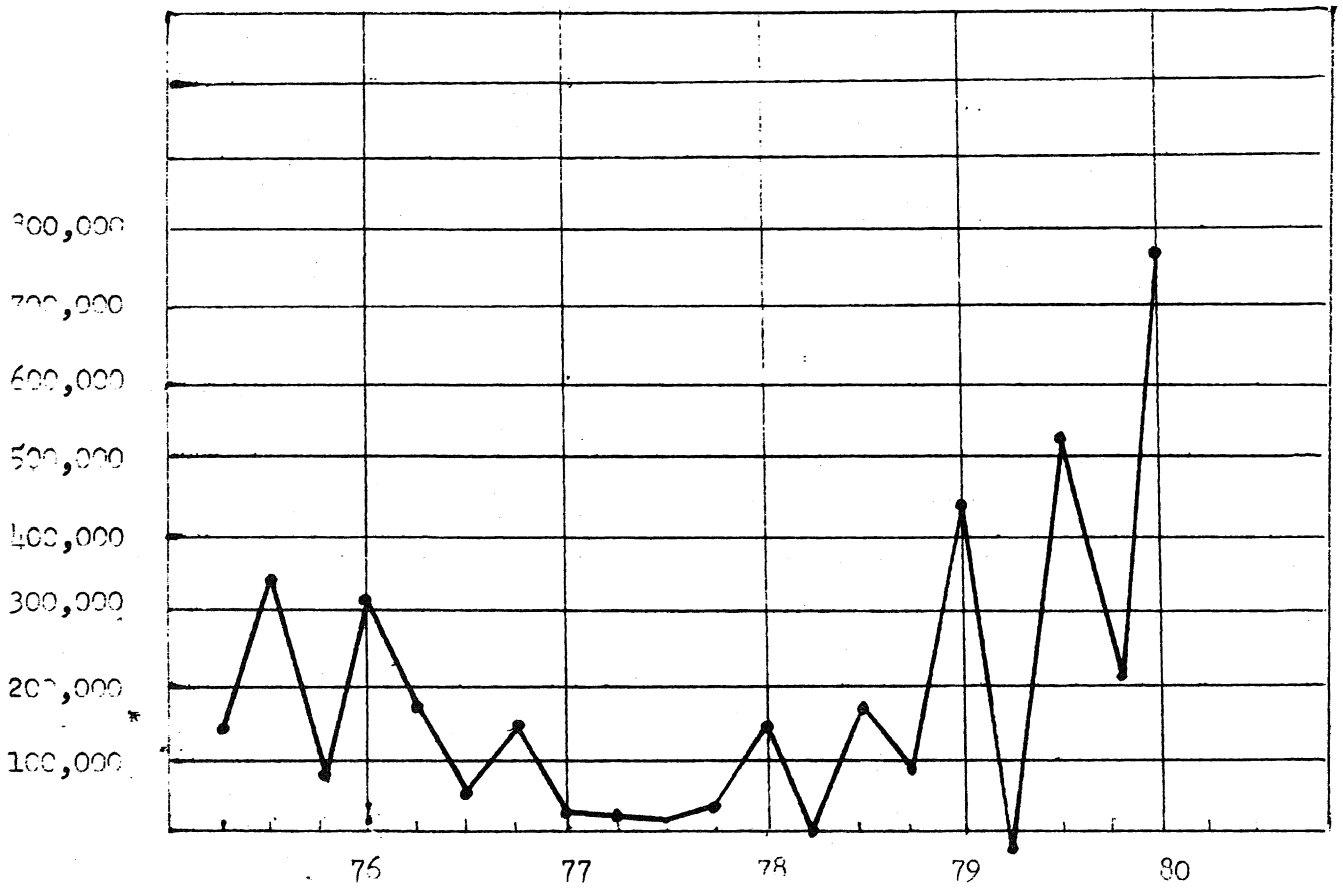
1979	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	0	0
APRIL	72535	
MAY	115275	
JUNE	1800	189610
JULY	99235	
AUGUST	-1090	
SEPTEMBER	550	98695
OCTOBER	0	
NOVEMBER	28830	
DECEMBER	407300	436130
YEARLY TOTAL		724435

1980	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	-40730	
MARCH	0	-40730
APRIL	311556	
MAY	194035	
JUNE	2615	508206
JULY	197084	
AUGUST	2050	
SEPTEMBER	2200	201334
OCTOBER	31025	
NOVEMBER	42070	
DECEMBER	708725	781820
YEARLY TOTAL		1.45063E+06

SWEDEN - ANNUAL



SWEDEN - QUARTERLY



SALES UNITED KINGDOM

1976	MONTHLY	QUARTERLY
JANUARY	28401	
FEBRUARY	27100	
MARCH	35555	91056
APRIL	23000	
MAY	411	
JUNE	90652	114063
JULY	0	
AUGUST	205240	
SEPTEMBER	-16655	188585
OCTOBER	805	
NOVEMBER	22058	
DECEMBER	80510	103373
YEARLY TOTAL		497077

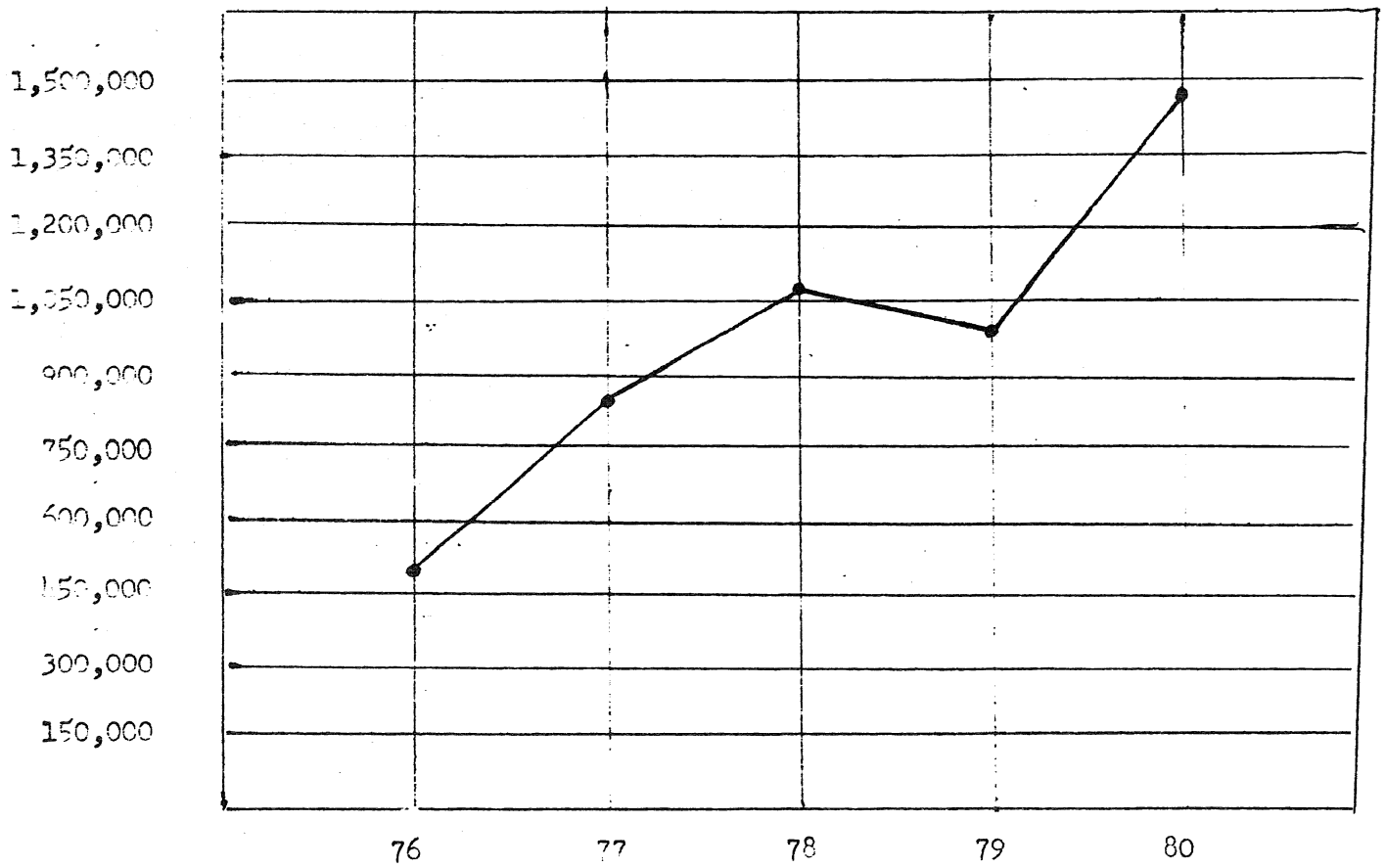
1977	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	0	
MARCH	270750	270750
APRIL	6640	
MAY	133981	
JUNE	-105894	34727
JULY	300165	
AUGUST	109693	
SEPTEMBER	-1400	408458
OCTOBER	6125	
NOVEMBER	94695	
DECEMBER	37557	138377
YEARLY TOTAL		852312

1978	MONTHLY	QUARTERLY
JANUARY	249076	
FEBRUARY	0	
MARCH	0	249076
APRIL	0	
MAY	0	
JUNE	215270	215270
JULY	2000	
AUGUST	31250	
SEPTEMBER	35784	69034
OCTOBER	245518	
NOVEMBER	131958	
DECEMBER	145780	523256
YEARLY TOTAL		1.05664E+06

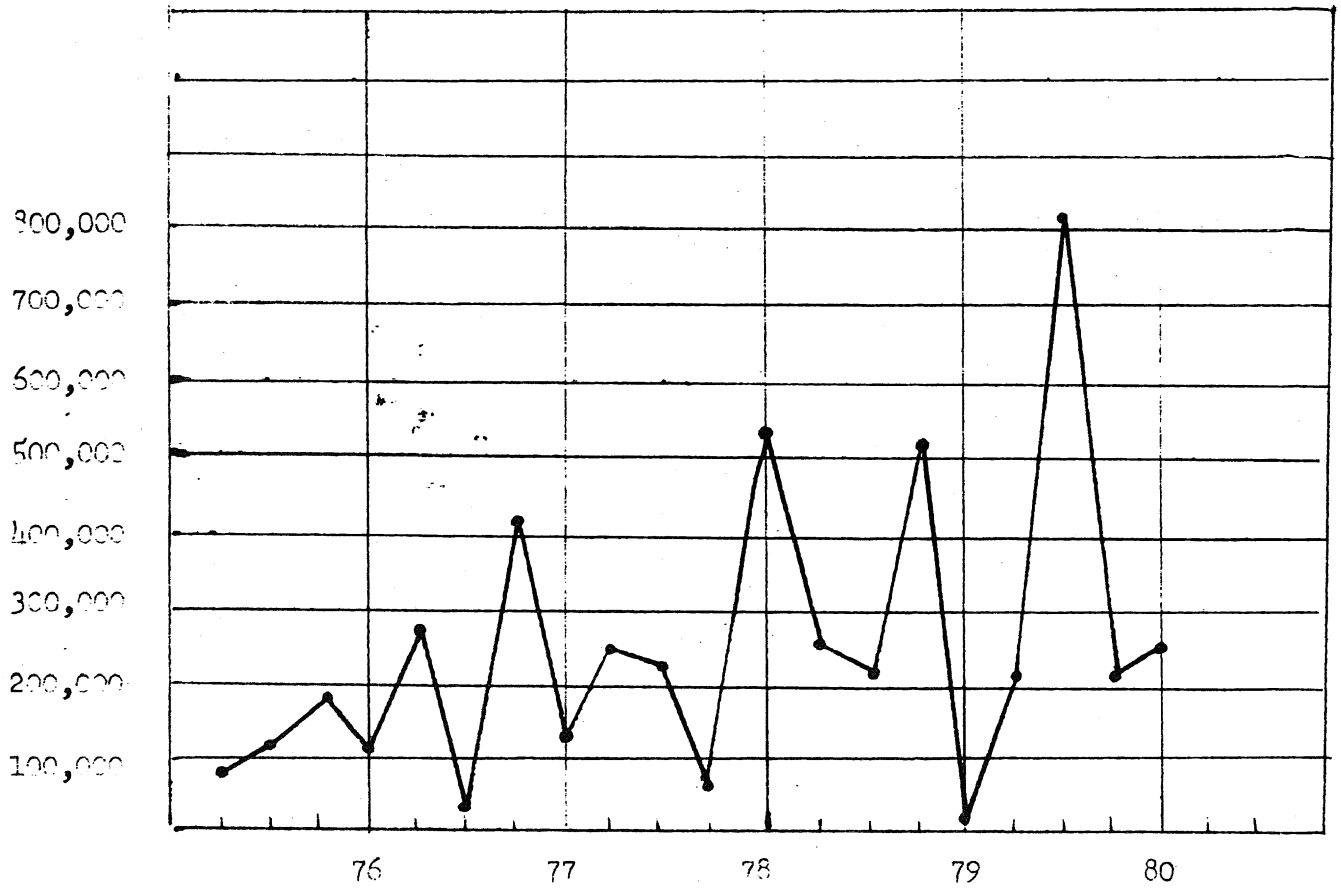
1979	MONTHLY	QUARTERLY
JANUARY	57525	
FEBRUARY	0	
MARCH	206490	264015
APRIL	110475	
MAY	0	
JUNE	100874	211349
JULY	175285	
AUGUST	117775	
SEPTEMBER	207190	500250
OCTOBER	23020	
NOVEMBER	0	
DECEMBER	0	23020
YEARLY TOTAL		998634

1980	MONTHLY	QUARTERLY
JANUARY	0	
FEBRUARY	155475	
MARCH	53175	208650
APRIL	509375	
MAY	272103	
JUNE	37156	818634
JULY	165245	
AUGUST	43375	
SEPTEMBER	-1259	207361
OCTOBER	165650	
NOVEMBER	80175	
DECEMBER	11750	257575
YEARLY TOTAL		1.49222E+06

UNITED KINGDOM - ANNUAL



UNITED KINGDOM - QUARTERLY



SALES WEST GERMANY

1976	MONTHLY	QUARTERLY
JANUARY	236270	
FEBRUARY	123679	
MARCH	6457	366406
APRIL	117086	
MAY	-11581	
JUNE	780059	885564
JULY	59634	
AUGUST	13940	
SEPTEMBER	48154	121728
OCTOBER	200	
NOVEMBER	647365	
DECEMBER	489042	1.13661E+06
YEARLY TOTAL		2.51031E+06

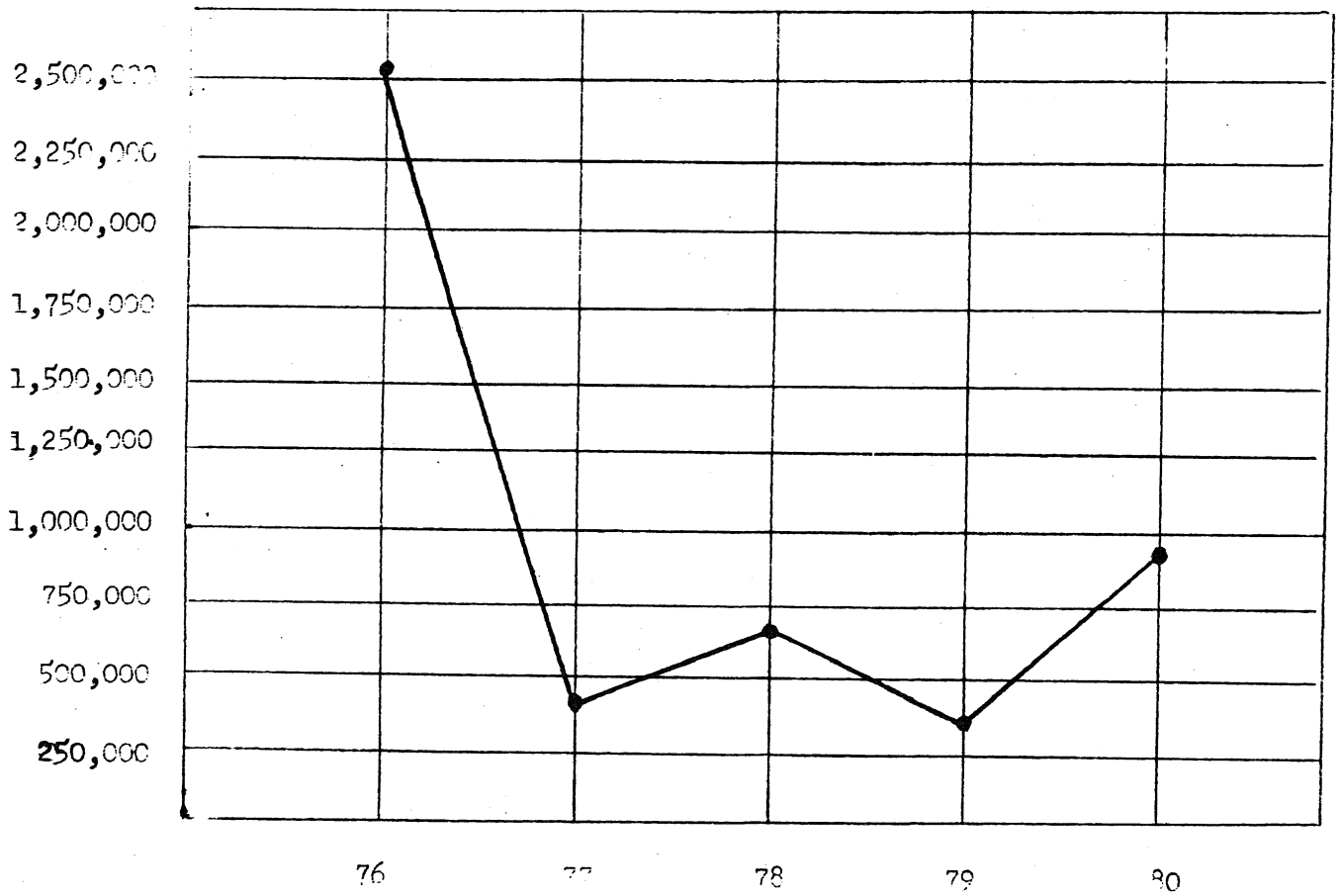
1977	MONTHLY	QUARTERLY
JANUARY	42835	
FEBRUARY	8500	
MARCH	734300	785635
APRIL	-90000	
MAY	-114075	
JUNE	25575	-178500
JULY	90118	
AUGUST	-101318	
SEPTEMBER	-248136	-259336
OCTOBER	0	
NOVEMBER	79425	
DECEMBER	-34825	44600
YEARLY TOTAL		392399

1978	MONTHLY	QUARTERLY
JANUARY	89860	
FEBRUARY	0	
MARCH	0	89860
APRIL	399445	
MAY	23129	
JUNE	0	422574
JULY	162023	
AUGUST	0	
SEPTEMBER	80945	242968
OCTOBER	-34060	
NOVEMBER	-330681	
DECEMBER	288398	-76343
YEARLY TOTAL		679059

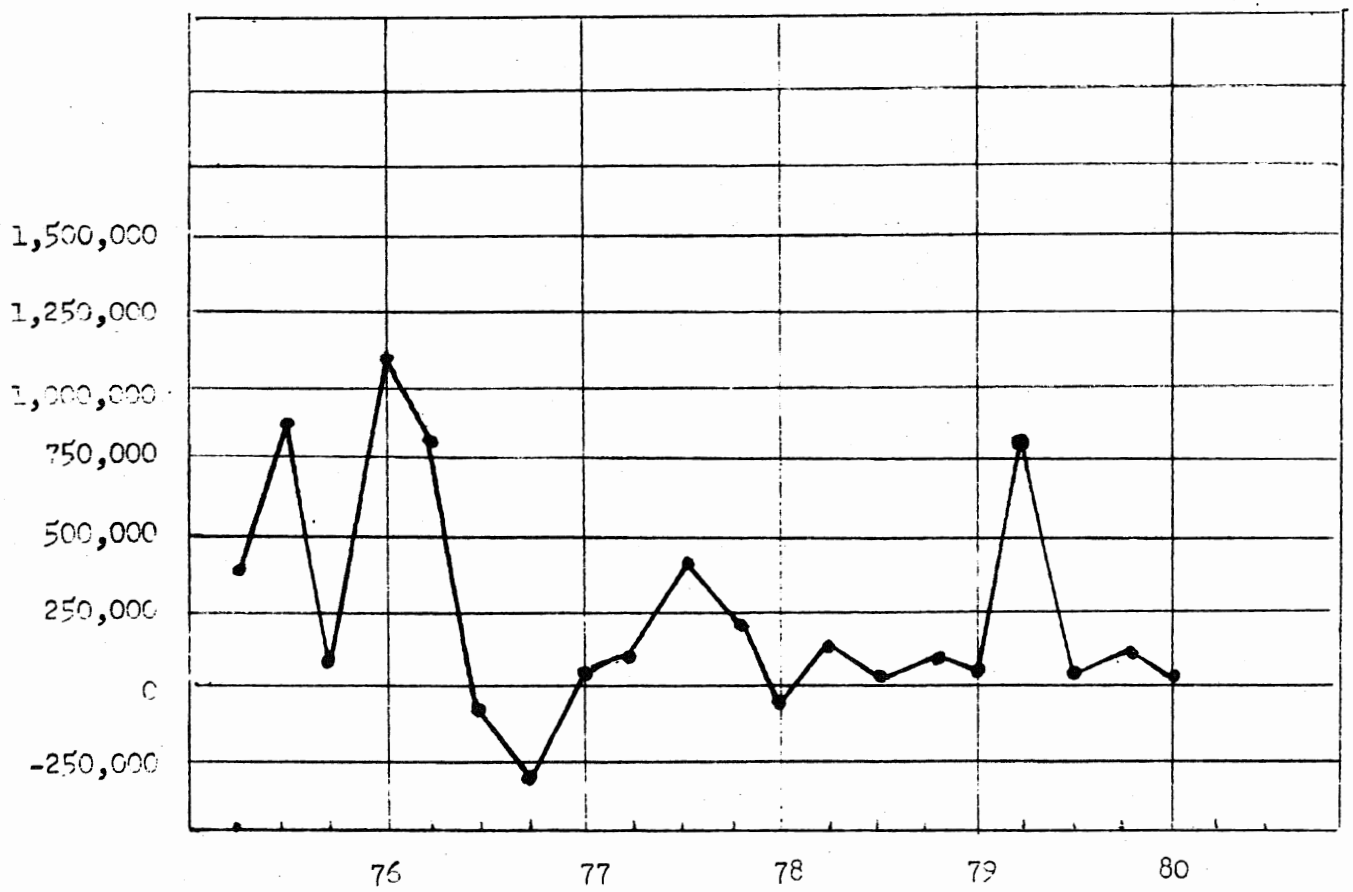
1979	MONTHLY	QUARTERLY
JANUARY	131075	
FEBRUARY	0	
MARCH	35815	166890
APRIL	620	
MAY	0	
JUNE	0	620
JULY	0	
AUGUST	0	
SEPTEMBER	132280	132280
OCTOBER	0	
NOVEMBER	0	
DECEMBER	68495	68495
YEARLY TOTAL		368285

1980	MONTHLY	QUARTERLY
JANUARY	535318	
FEBRUARY	222475	
MARCH	31024	788817
APRIL	8838	
MAY	0	
JUNE	-2857	5981
JULY	5275	
AUGUST	69218	
SEPTEMBER	15852	90345
OCTOBER	19490	
NOVEMBER	-575	
DECEMBER	0	18915
YEARLY TOTAL		904058

WEST GERMANY - ANNUAL



WEST GERMANY - QUARTERLY



APPENDIX B
PRICE AND PRODUCT MIX INDEX

	BASE YEAR 1969-1970			FIRST 1975			NEW BASE	
TYPE	P0	Q0	V0=P0Q0	P1	P1/P0	(P/P)*V0	Q1	VA=P1Q1
1	22331	167	3729420	33890	1.518	5659943	52	1762310
2	19982	37	739346	32987	1.651	1220552	12	395850
3	33900	137	4644414	62797	1.852	8603523	30	1883937
4	11613	158	1834904	21774	1.875	3440452	73	1589533
5	15572	19	295874	24462	1.571	464796	4	97850
6	64146	51	3271453	86190	1.344	4395727	80	6895244
7				145734			11	1603074
8				49605			13	644866
9								
10								
11								
12								
		B0						B1
TOTALS		14515411			23784998			14572664

I(1975)=163.9

	SECOND YEAR 1975			NEW BASE 1976		THIRD YEAR 1976	
TYPE	P2	P2/P1	(P/P)*VA	Q2	V2=P2Q2	P3	P3/P2
1	38233	1.128	1988198	49	1873463	35812	.937
2	38140	1.156	457602	17	648380	34579	.907
3	74346	1.184	2230581	26	1933013	130383	1.754
4	25121	1.154	1833904	103	2587513	25358	1.009
5	24450	1.000	97850				
6	84862	.985	6789021	189	16038962	93128	1.097
7	132185	.907	1454043	16	2114973	145769	1.103
8	61736	1.245	802579	45	2778156	66116	1.071
9	87336			8	698695	106597	1.221
10						20633	
11						35991	
12							

		B2
TOTALS	15653778	28673155

B1 I(1976)=107.4

	THIRD YEAR 1976			FOURTH YEAR 1977			
TYPE	(P/P)V2	Q3	V3	P4	P4/P3	(P/P)*V3	Q4
1	1755434	23	823685	53108	1.483	1221511	11
2	588080	20	691590	46773	1.353	935489	17
3	3390504						
4	2612019	76	1927278	27440	1.082	2085543	38
5							
6	17601401	122	11361720	115353	1.239	14073269	177
7	2332321	18	2623845	197607	1.356	3556935	16
8	2975282	36	2380195	72479	1.096	2609299	27
9	852785	7	746180	111264	1.044	778850	18
10		22	453945	22023	1.067	484530	62
11		45	1619626	40116	1.115	1805263	129
12				284995			1

B3

TOTALS 32107828 22628064 27550694

B2 I(1977)=112.0 B3 I(1978)=121.8

FIFTH YEAR 1979

TYPE	V4	P5	P5/P4	(P/P)V4	Q5	V5
1	584195	60120	1.132	661332	20	1202409
2	795155	50831	1.087	864147	15	762470
3						
4	1042734	38039	1.386	1445530	38	1445511
5						
6	20417590	134535	1.166	23812874	190	25561706
7	3161717	188026	.952	3008426	11	2068290
8	1956959	86851	1.198	2345012	20	1737023
9	2002756	115257	1.036	2074637	22	2535663
10	1365439	24070	1.093	1492359	89	2142237
11	5174990	45487	1.134	5867887	168	7641862
12	284995	435842	1.529	435842	7	3050897

B4

TOTALS 36786530 42008051

B4 I(1979)=114.2

SIXTH YEAR 1980

TYPE	P6	P6/P4	(P/P)V4	Q6	V6
1	73187	1.378	805071	9	658687
2	55280	1.182	939777	17	939761
3					
4	37671	1.373	1431545	19	715763
5					
6	161417	1.399	28570961	174	28086560
7	268701	1.360	4299223	17	4567918
8	93937	1.296	2536353	17	1596942
9	153129	1.376	2756336	20	3062590
10	28170	1.279	1746574	82	2309963
11	56149	1.400	7243316	105	5895693
12				0	20775

TOTALS 50329158

B4 I(1980)=137.9

APPENDIX C
COMPUTER PRINTOUTS FOR ANNUAL RESULTS

TITLE= YEARLY ARGENTINA ID N = 5

VAR. NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.000	0.9203	0.7691	-0.7183	0.0	0.9611	0.3975								
2	0.9203	1.0000	0.5996	-0.4506	0.0	0.8822	0.2449								
3	0.7691	0.5996	1.000	-0.8342	0.0	0.8427	-0.0949								
4	-0.7183	-0.4506	-0.8342	0.9999	0.0	-0.8143	-0.1868								
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
6	0.9611	0.8822	0.8427	-0.8143	0.0	1.0000	0.1959								
7	0.3975	0.2449	-0.0949	-0.1868	0.0	0.1959	1.000								

MEANS	433245.563	14313595.037	1.600	0.0	81.20	243.558	97.600
STDV.	446711.813	8004085.033	0.490	0.000	0.000	53.234	3.441

REGRESSION EQUATION NO. 1 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
3	498125.8753	0.5568
4	-4380928.0307	-0.7522
CONSTANT =	-251377.9475	

MULTPL-R = 0.7816
R-SQUARE = 0.6139

REGRESSION EQUATION NO. 2 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
3	-125489.3753	-0.1408
6	8536.8984	1.0797
CONSTANT =	-1445200.0000	

MULTPL-R = 0.9641
R-SQUARE = 0.9294

REGRESSION EQUATION NO. 3 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
3	-50140.4727	-0.0562
4	28724448.0000	3.1653
6	9037.7930	1.1431
CONSTANT =	-1761634.0000	

MULTPL-R = 0.9678
R-SQUARE = 0.9366

REGRESSION EQUATION NO. 4 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
6	8820.0085	1.1158
4	-31 17720.[illegible]	[illegible]

```
               2          8922.0385       1.1158
               4      3317728.0000        0.1900
     CONSTANT =      -1800357.0000

     MULTPL-R =         0.9674
     R-SQUARE =         0.9359
*************************************************************************************************************
*************************************************************************************************************
   REGRESSION EQUATION NO.  5          CRITERION IS VAR. NO.  1                                RANK =   4.
*************************************************************************************************************
        VAR.NO.      B-WEIGHT      Z-WEIGHT
               2            0.1722        3.1631
               3        279715.4375       0.5138
               4    -379068416.0000      -2.1818
               6        -30598.0898      -3.8579
     CONSTANT =       5748926.0000

     MULTPL-R =         1.0000
     R-SQUARE =         1.0000
*************************************************************************************************************
*************************************************************************************************************
   REGRESSION EQUATION NO.  6          CRITERION IS VAR. NO.  1                                RANK =   3.
*************************************************************************************************************
        VAR.NO.      B-WEIGHT      Z-WEIGHT
               2            0.0406        0.7457
               3          9020.4102       0.7111
               4     -64954720.0000      -0.3739
     CONSTANT =          4932.5625

     MULTPL-R =         0.9811
     R-SQUARE =         0.9626
*************************************************************************************************************
*************************************************************************************************************
   REGRESSION EQUATION NO.  7          CRITERION IS VAR. NO.  1                                RANK =   2.
*************************************************************************************************************
        VAR.NO.      B-WEIGHT      Z-WEIGHT
               2            0.0390        0.7168
               3        302509.5625       0.3394
     CONSTANT =       -609148.1875

     MULTPL-R =         0.9595
     R-SQUARE =         0.9206
*************************************************************************************************************
*************************************************************************************************************
   REGRESSION EQUATION NO.  8          CRITERION IS VAR. NO.  1                                RANK =   4.
*************************************************************************************************************
        VAR.NO.      B-WEIGHT      Z-WEIGHT
               7         40223.3438       0.3169
               6          7249.5313       0.0169
               4      62530048.0000       0.3599
               3        291271.2500       0.3267
     CONSTANT =      -5885091.0000

     MULTPL-R =         1.0000
     R-SQUARE =         1.0000
*************************************************************************************************************
*************************************************************************************************************
   REGRESSION EQUATION NO.  9          CRITERION IS VAR. NO.  1                                RANK =   3.
*************************************************************************************************************
        VAR.NO.      B-WEIGHT      Z-WEIGHT
               7         67516.2500       0.5320
               4      37024624.0000       0.2131
               3        889150.4375       0.7774
     CONSTANT =      -7674135.0000

     MULTPL-R =         0.7004
```

MULTPL-R = 0.9996
R-SQUARE = 0.9992

****

REGRESSION EQUATION NO. 10 CRITERION IS VAR. NO. 1 RANK = 3.

****

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	2848P.3196	0.2245
6	8595.9023	1.0872
4	36255696.0000	0.2087
CONSTANT =	-4534764.0000	

MULTPL-R = 0.9921
R-SQUARE = 0.9842

****

REGRESSION EQUATION NO. 11 CRITERION IS VAR. NO. 1 RANK = 4.

****

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	42223.3594	0.3163
6	7249.5469	0.7169
4	62532224.0000	0.3599
3	291271.2500	0.3267
2	-0.0000	-0.0000
CONSTANT =	-5885096.0000	

MULTPL-R = 1.0000
R-SQUARE = 1.0000

****

FULL MODEL 11 RES. MODEL 9 F = 0.0 DF = 1, 1

****

TITLE: YEARLY AUSTRALIA IN N = 5

VAR.NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.000	0.9935	0.0	-0.4689	0.0	0.9448	0.9745								
2	0.9935	1.000	0.0	-0.3545	0.0	0.8822	0.9708								
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
4	-0.4689	-0.3545	0.0	1.000	0.0	-0.4251	-0.2613								
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
6	0.9448	0.8822	0.0	-0.4251	0.0	1.000	0.9267								
7	0.9745	0.9708	0.0	-0.2613	0.0	0.9267	1.000								

MEAN	1332477.000	14313595.000	0.000	1.147	132.000	243.558	108.407
STDV.	717293.625	8004385.000	0.000	0.355	0.000	55.234	4.758

REGRESSION EQUATION NO. 1 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	111574.1250	0.7010
4	4044.8398	0.2950
CONSTANT =	-11757309.0000	

MULTPL-R = 0.9808
R-SQUARE = 0.9619

REGRESSION EQUATION NO. 2 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	145529.4375	0.9144
4	-4007523.0000	-0.2800
CONSTANT =	-8821545.0000	

MULTPL-R = 0.9995
R-SQUARE = 0.9989

REGRESSION EQUATION NO. 3 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	269303.1875	1.6921

```
          VAR.NO.      B-WEIGHT      Z-WEIGHT
              6        12475.1680     0.9099
              4      -1752495.0[illegible]  -[illegible]
     CONSTANT =        295222.0[illegible]

     MULTPL-R =          0.9477
     R-SQUARE =          0.8982
**********************************************************************************************************
**********************************************************************************************************
   REGRESSION EQUATION NO.  5          CRITERION IS VAR. NO.  1                          RANK =    2.
**********************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
              6          2135.527[illegible]    0.6663
              2          [illegible]        0.3157
     CONSTANT =       -1327018.0[illegible]

     MULTPL-R =          0.9564
     R-SQUARE =          0.9145
**********************************************************************************************************
**********************************************************************************************************
   REGRESSION EQUATION NO.  6          CRITERION IS VAR. NO.  1                          RANK =    4.
**********************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
              7        132993.[illegible]     0.6471
              6          -366.830[illegible]    -0.[illegible]
              4      -6664373.0[illegible]  -0.3124
              2           [illegible]2        0.3[illegible]5
     CONSTANT =      -2392239.0[illegible]

     MULTPL-R =          1.0000
     R-SQUARE =          1.000[illegible]
**********************************************************************************************************
**********************************************************************************************************
   REGRESSION EQUATION NO.  7          CRITERION IS VAR. NO.  1                          RANK =    3.
**********************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
              7        146225.875[illegible]    0.7189
              6           -68.5184    -[illegible]
              4      -4728452.0[illegible]  -[illegible]31[illegible]
     CONSTANT =      -8856333.0[illegible]

     MULTPL-R =          0.9995
     R-SQUARE =          0.9989
**********************************************************************************************************
**********************************************************************************************************
   REGRESSION EQUATION NO.  8          CRITERION IS VAR. NO.  1                          RANK =    3.
**********************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
              6         -1901.515[illegible]   -0.1187
              4     -10099781.0[illegible]   -[illegible]724
              2          [illegible]144        1.[illegible]
     CONSTANT =       12[illegible]2435P.0[illegible]

     MULTPL-R =          0.9973
     R-SQUARE =          0.9945
**********************************************************************************************************
   FULL MODEL  6     RES. MODEL  7     F =      [illegible]        DF =  1.
**********************************************************************************************************
```

```
************************************************************************************************************************
            VAR.NC.      B-WEIGHT      Z-WEIGHT
                  6         15991.7363       1.4738
                  4      13743762.0000       0.6112
     CONSTANT =          -4577844.000

     MULTPL-R =            0.9013
     R-SQUARE =            0.8124
************************************************************************************************************************
************************************************************************************************************************
   REGRESSION EQUATION NO.  5          CRITERION IS VAR. NO.  1                                  RANK =    4.
************************************************************************************************************************
            VAP.NC.      B-WEIGHT      Z-WEIGHT
                  2             0.1074       2.3560
                  3        -365715.6875      -0.3327
                  4      -94579312.0000      -4.2062
                  6         -53055.3572      -4.9370
     CONSTANT =          16865072.0000

     MULTPL-R =            1.0003
     R-SQUARE =            1.0000
************************************************************************************************************************
************************************************************************************************************************
   REGRESSION EQUATION NO.  6          CRITERION IS VAR. NO.  1                                  RANK =    3.
************************************************************************************************************************
            VAR.NC.      B-WEIGHT      Z-WEIGHT
                  2             0.2351       0.4776
                  3          49558.8125       0.4132
                  4       -2851210.0000      -0.1268
     CONSTANT =           -477210.9125

     MULTPL-R =            0.9725
     R-SQUARE =            0.9447
************************************************************************************************************************
************************************************************************************************************************
   REGRESSION EQUATION NO.  7          CRITERION IS VAR. NO.  1                                  RANK =    2.
************************************************************************************************************************
            VAR.NC.      B-WEIGHT      Z-WEIGHT
                  2             0.2362       0.5717
                  3         599442.1875       0.4998
     CONSTANT =           -806962.2500

     MULTPL-R =            0.9697
     R-SQUARE =            0.9404
************************************************************************************************************************
************************************************************************************************************************
   REGRESSION EQUATION NO.  8          CRITERION IS VAR. NO.  1                                  RANK =    4.
************************************************************************************************************************
            VAR.NC.      B-WEIGHT      Z-WEIGHT
                  7         -67006.8125      -0.5076
                  6          10360.5309       0.9739
                  4      24162320.0000       1.0746
                  3       1631687.0000       1.3604
     CONSTANT =            784643.7500

     MULTPL-R =            1.0000
     R-SQUARE =            1.0001
```

```
      MULTPL-R =        0.9847
      R-SQUARE =        0.9696
*****************************************************************************************************************************************************
*****************************************************************************************************************************************************
   REGRESSION EQUATION NO. 10          CRITERION IS VAR. NO.  1                                    RANK =   3.
*****************************************************************************************************************************************************
         VAR.NO.      B-WEIGHT      Z-WEIGHT
               7        10139.3516        0.7768
               6        14685.5020        1.3804
               4     11865529.0 00        3.9277
      CONSTANT =      -4675013.0703

      MULTPL-R =        0.9039
      R-SQUARE =        0.8171
*****************************************************************************************************************************************************
*****************************************************************************************************************************************************
   REGRESSION EQUATION NO. 11          CRITERION IS VAR. NO.  1                                    RANK =   4.
*****************************************************************************************************************************************************
         VAR.NO.      B-WEIGHT      Z-WEIGHT
               7       -67026.8125       -0.5076
               6        10369.5947        0.9739
               4     24162320.0000        1.4746
               3      1631687.0000        1.3694
               2           -0.0000       -0.0000
      CONSTANT =       984642.8125

      MULTPL-R =        1.0000
      R-SQUARE =        1.0000
*****************************************************************************************************************************************************
   FULL MODEL 11    RES. MODEL  9    F =     0.0       DF =  1,
*****************************************************************************************************************************************************
```

TITLE YEARLY JAPAN ID N = 5

VAR.NO.	1	2	3	4	5	6	7
1	1.0000	-0.1382	0.0	0.8297	0.0	0.2135	0.4411
2	-0.1382	1.0000	0.0	0.3371	0.0	0.8822	0.6214
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.8297	0.3371	0.0	0.9990	0.0	0.7021	0.7551
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.2135	0.8822	0.0	0.7021	0.0	1.0000	0.8115
7	0.4411	0.6214	0.0	0.7551	0.0	0.8115	1.0000

MEANS	521666.000	14313595.000	3.000	0.004	97.000	243.558	118.760
STDV.	263377.313	8024095.000	0.000	0.001	0.000	55.234	8.453

REGRESSION EQUATION NO. 1 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	24429.0664	0.7841
6	-2015.6626	-0.4227
CONSTANT =	-1878593.0000	

MULTPL-R = 0.5055
R-SQUARE = 0.2556

REGRESSION EQUATION NO. 2 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	-13461.5977	-0.4321
4	562288640.0000	1.1564
CONSTANT =	-227872.0000	

MULTPL-R = 0.8768
R-SQUARE = 0.7689

REGRESSION EQUATION NO. 3 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	26744.3789	0.8584
2	-3.0229	-0.6716

```
           6        -3472.6036         -0.7283
           4     652.56960.000          1.2419
  CONSTANT =    -1358285.0000

  MULTPL-R =        0.9785
  R-SQUARE =        0.9575
****************************************************************************************************************
****************************************************************************************************************
  REGRESSION EQUATION NO.  5        CRITERION IS VAR. NO.  1                                  RANK =    2.
****************************************************************************************************************
       VAR.NO.     B-WEIGHT      Z-WEIGHT
           6        7213.7461       1.3128
           2          -0.0483      -1.4728
  CONSTANT =     -333350.0000

  MULTPL-R =        0.7256
  R-SQUARE =        0.5265
****************************************************************************************************************
****************************************************************************************************************
  REGRESSION EQUATION NO.  6        CRITERION IS VAR. NO.  1                                  RANK =    4.
****************************************************************************************************************
       VAR.NO.     B-WEIGHT      Z-WEIGHT
           7        1375.1321       0.3441
           6       -8448.3439      -1.7717
           4    861190656.0000      1.7710
           2           0.0263       0.8064
  CONSTANT =    -1561836.0000

  MULTPL-R =        1.0000
  R-SQUARE =        1.0000
****************************************************************************************************************
****************************************************************************************************************
  REGRESSION EQUATION NO.  7        CRITERION IS VAR. NO.  1                                  RANK =    3.
****************************************************************************************************************
       VAR.NO.     B-WEIGHT      Z-WEIGHT
           7        2175.5293       0.0698
           6       -3657.2661      -0.7670
           4    639875840.0000      1.3157
  CONSTANT =    -1519581.0000

  MULTPL-R =        0.9792
  R-SQUARE =        0.9588
****************************************************************************************************************
****************************************************************************************************************
  REGRESSION EQUATION NO.  8        CRITERION IS VAR. NO.  1                                  RANK =    3.
****************************************************************************************************************
       VAR.NO.     B-WEIGHT      Z-WEIGHT
           6       -8368.1133      -1.7549
           4    870670080.0000      1.7705
           2           0.0265       0.8064
  CONSTANT =    -1463648.0000

  MULTPL-R =        0.9997
  R-SQUARE =        0.9995
****************************************************************************************************************
  FULL MODEL   6    RES. MODEL   7    F =     0.0      DF =  1,    0
****************************************************************************************************************
```

TITLE YEARLY MEXICO ID N = 5

VAR.NO.	1	2	3	4	5	6	7
1	1.0000	0.9407	0.0	-0.2235	0.0	0.8227	0.7810
2	0.9407	1.0000	0.0	-0.2174	0.0	0.8822	0.8806
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	-0.2235	-0.2174	0.0	1.0000	0.0	-0.6305	-0.6129
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.8227	0.8822	0.0	-0.6305	0.0	1.0000	0.9925
7	0.7810	0.8806	0.0	-0.6129	0.0	0.9925	1.0000

MEANS	2116786.000	14313595.000	3.000	0.049	71.000	243.558	118.620
STDV.	2546518.000	8024085.000	0.000	0.010	0.000	55.234	13.411

REGRESSION EQUATION NO. 1 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	-453223.7500	-2.3869
6	147154.6250	3.1918
CONSTANT =	20037504.0000	

MULTPL-R = 0.8728
R-SQUARE = 0.7619

REGRESSION EQUATION NO. 2 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	195834.4375	1.0314
4	104570976.0000	0.4086
CONSTANT =	-26230560.0000	

MULTPL-R = 0.8451
R-SQUARE = 0.7141

REGRESSION EQUATION NO. 3 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	-40088.1016	-0.2111
2	0.3575	1.1266
CONSTANT =	1754437.0000	

MULTPL-R = 0.9460
R-SQUARE = 0.8949

```
           6     -52171.3984      1.1316
           4  1253[illegible]
  CONSTANT =  -16726286.0000

  MULTPL-R =       0.9064
  R-SQUARE =       0.8215
****************************************************************************************************
****************************************************************************************************
 REGRESSION EQUATION NO.  5        CRITERION IS VAR. NO.  1                           RANK =   2.
****************************************************************************************************
   VAR.NO.      B-WEIGHT      Z-WEIGHT
           6     -1483.0388      -0.0322
           2         0.3075       0.9691
  CONSTANT =   -1923967.0000

  MULTPL-R =       0.9408
  R-SQUARE =       0.8851
****************************************************************************************************
****************************************************************************************************
 REGRESSION EQUATION NO.  6        CRITERION IS VAR. NO.  1                           RANK =   4.
****************************************************************************************************
   VAR.NO.      B-WEIGHT      Z-WEIGHT
           7   -503931.3125      -2.6540
           6     96816.6250       2.0999
           4 -58089424.0000      -0.2270
           2         0.4366       1.3759
  CONSTANT =   34905456.0000

  MULTPL-R =       1.0000
  R-SQUARE =       1.0000
****************************************************************************************************
****************************************************************************************************
 REGRESSION EQUATION NO.  7        CRITERION IS VAR. NO.  1                           RANK =   3.
****************************************************************************************************
   VAR.NO.      B-WEIGHT      Z-WEIGHT
           7   -543553.3750      -2.8626
           6    184941.5000       4.0114
           4 141047312.0000       0.5511
  CONSTANT =   14646533.0000

  MULTPL-R =       0.9703
  R-SQUARE =       0.9415
****************************************************************************************************
****************************************************************************************************
 REGRESSION EQUATION NO.  8        CRITERION IS VAR. NO.  1                           RANK =   3.
****************************************************************************************************
   VAR.NO.      B-WEIGHT      Z-WEIGHT
           6    -37021.0938      -0.8030
           4 -99727536.0000      -0.3896
           2         0.4965       1.5643
  CONSTANT =    8907936.0000

  MULTPL-R =       0.9476
  R-SQUARE =       0.8980
****************************************************************************************************
 FULL MODEL  6    RES. MODEL  7    F =     0.0      DF =  1,    0
****************************************************************************************************
```

VAR.NO.	B-WEIGHT	Z-WEIGHT
6	8598.8555	1.0366
4	-[illegible]	[illegible]
CONSTANT =	-873313.6257	

MULTPL-R = 0.9835
R-SQUARE = 0.9672

****

REGRESSION EQUATION NO. 5 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
6	6894.9175	0.8312
2	3.0.98	0.1722
CONSTANT =	-1204490.0000	

MULTPL-R = 0.9864
R-SQUARE = 0.9731

****

REGRESSION EQUATION NO. 6 CRITERION IS VAR. NO. 1 RANK = 4.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	1953.1489	0.2317
6	7883.1523	0.9503
4	-5315563.0000	-0.7364
2	0.0364	0.0377
CONSTANT =	4286545.0000	

MULTPL-R = 1.0000
R-SQUARE = 1.0000

****

REGRESSION EQUATION NO. 7 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	36199.8516	0.5867
6	7821.9609	0.9429
4	-4538702.0000	-0.6348
CONSTANT =	396551.3750	

MULTPL-R = 0.9991
R-SQUARE = 0.9981

****

REGRESSION EQUATION NO. 8 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
6	7889.0508	0.9510
4	-5343418.0000	-0.6297
2	0.0384	0.0718
CONSTANT =	4493306.0000	

MULTPL-R = 1.0000
R-SQUARE = 1.0000

****

TITLE YEARLY SPAIN IE N = 5

VAR.NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.0000	0.7935	0.9523	0.7187	0.0	0.6395	0.1261								
2	0.7935	1.0000	0.8082	0.2487	0.0	0.8822	0.2955								
3	0.9523	0.8082	1.0000	0.6555	0.0	0.6303	0.0981								
4	0.7187	0.2487	0.6555	0.9997	0.0	-0.0723	-0.4683								
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
6	0.6395	0.8822	0.6303	-0.0723	0.0	1.0000	0.6918								
7	0.1261	0.2955	0.0981	-0.4683	0.0	0.6918	1.0000								

MEAN	4 1695.750	1433595.000	2.600	0.114	92.000	243.558	118.233
STDV.	337191.313	8024085.000	1.427	0.011	0.000	55.234	6.675

REGRESSION EQUATION NO. 1 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
2	0.2075	0.6553
4	238548624.0000	0.5559
CONSTANT =	-3339748.0000	

MULTPL-R = 0.9589
R-SQUARE = 0.9195

REGRESSION EQUATION NO. 2 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
3	205291.8125	0.9112
6	397.8652	0.0652
CONSTANT =	-228966.0000	

MULTPL-R = 0.9537
R-SQUARE = 0.9095

REGRESSION EQUATION NO. 3 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
3	20837.8125	0.0925
4	302106112.0000	0.7040
6	3858.7192	0.6321
CONSTANT =	-6831452.0000	

VAR.NO.	B-WEIGHT	Z-WEIGHT
6	4243.1616	0.4751
4	330284352.0000	0.7692
CONSTANT =	-5263548.0000	

MULTPL-R = 0.9987
R-SQUARE = 0.9974

****

REGRESSION EQUATION NO. 5 CRITERION IS VAR. NO. 1 RANK = 4.

VAR.NO.	B-WEIGHT	Z-WEIGHT
2	-0.0151	-0.1223
3	2E935.1758	0.1284
4	307724032.0000	0.7171
6	4384.7500	0.7183
CONSTANT =	-4985907.0000	

MULTPL-R = 1.0000
R-SQUARE = 1.0000

****

REGRESSION EQUATION NO. 6 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
2	0.0142	0.3383
3	103826.1875	0.4699
4	142726992.0000	0.3126
CONSTANT =	-2074495.0000	

MULTPL-R = 0.9728
R-SQUARE = 0.9464

****

REGRESSION EQUATION NO. 7 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
2	0.0129	0.3688
3	202021.5000	0.8967
CONSTANT =	-164931.0625	

MULTPL-R = 0.9532
R-SQUARE = 0.9085

****

REGRESSION EQUATION NO. 8 CRITERION IS VAR. NO. 1 RANK = 4.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	4889.0156	0.3268
6	2974.4739	0.4872
4	283686144.0000	0.6611
3	47568.3086	0.2111
CONSTANT =	-5005061.0000	

MULTPL-R = 1.0000
R-SQUARE = 1.0000

****

REGRESSION EQUATION NO. 9 CRITERION IS VAR. NO. 1 RANK = 3.

```
      MULTPL-R =        0.9932
      R-SQUARE =        0.9865
********************************************************************************************************************************
********************************************************************************************************************************
   REGRESSION EQUATION NO. 10         CRITERION IS VAR. NO.  1                                    RANK =    3.
********************************************************************************************************************************
         VAR.NO.      B-WEIGHT      Z-WEIGHT
               7          777.4407        0.1154
               6         4181.2131        0.6847
               4      332662464.0103        0.7757
      CONSTANT =       -5379286.0000

      MULTPL-R =        0.9987
      R-SQUARE =        0.9974
********************************************************************************************************************************
********************************************************************************************************************************
   REGRESSION EQUATION NO. 11         CRITERION IS VAR. NO.  1                                    RANK =    4.
********************************************************************************************************************************
         VAR.NO.      B-WEIGHT      Z-WEIGHT
               7         4889.0547        0.7268
               6         2974.4614        0.4872
               4      283686144.0003        0.6611
               3        47368.4727        0.2111
               2            0.0000        0.0000
      CONSTANT =       -5005063.0000

      MULTPL-R =        1.0000
      R-SQUARE =        1.0000
********************************************************************************************************************************

ILF223I PROGRAM INTERRUPT    OLD PSW IS    0710003F62104ED8
   FULL MODEL 11    RES. MODEL  9    F =     0.0      DF =  1,
********************************************************************************************************************************
```

TITLE YEARLY SWEDEN ID N = 5

VAR. NO.	1	2	3	4	5	6	7
1	1.0000	0.8885	0.0	0.8660	0.0	0.5900	0.9472
2	0.8885	1.0000	0.0	0.6883	0.0	0.9822	0.7991
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.8660	0.8883	0.0	1.0000	0.0	0.6533	0.9267
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.5900	0.9822	0.0	0.6533	0.0	1.0000	0.4386
7	0.9472	0.7991	0.0	0.9267	0.0	0.4386	1.0000

MEANS	743481.625	14313595.000	4.000	0.229	110.000	243.558	96.839
STDV.	418472.188	8024385.000	0.000	0.006	0.000	55.234	3.311

REGRESSION EQUATION NO. 1 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	107745.3750	0.8524
6	1637.8289	0.2162
CONSTANT =	-10085174.0000	

MULTPL-R = 0.9669
R-SQUARE = 0.9349

REGRESSION EQUATION NO. 2 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	129504.1250	1.0245
4	-6182566.0000	-0.1834
CONSTANT =	-10376349.0000	

MULTPL-R = 0.9677
R-SQUARE = 0.9362

REGRESSION EQUATION NO. 3 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	82964.3750	0.6563
2	0.0130	0.3640
CONSTANT =	-7559181.0000	

```
              4      320.4492        0.3423
              4    62125424.0000     0.3384
  CONSTANT =     -13564888.0000

  MULTPL-R =        0.8666
  R-SQUARE =        0.7510
**********************************************************************************************************
**********************************************************************************************************
REGRESSION EQUATION NO.  5        CRITERION IS VAR. NO.  1                          RANK =   2.
**********************************************************************************************************
      VAR.NC.     B-WEIGHT      Z-WEIGHT
            6      -6621.0117     -0.6739
            2          0.0365      1.6394
  CONSTANT =     1117348.0000

  MULTPL-R =        0.9791
  R-SQUARE =        0.9587
**********************************************************************************************************
**********************************************************************************************************
REGRESSION EQUATION NO.  6        CRITERION IS VAR. NO.  1                          RANK =   4.
**********************************************************************************************************
      VAR.NC.     B-WEIGHT      Z-WEIGHT
            7     185606.6250      1.4684
            6       2575.8765      0.3400
            4   -69342704.0000    -0.7358
            2          0.0129      0.2464
  CONSTANT =     -2151036.0000

  MULTPL-R =        1.0000
  R-SQUARE =        1.0000
**********************************************************************************************************
**********************************************************************************************************
REGRESSION EQUATION NO.  7        CRITERION IS VAR. NO.  1                          RANK =   3.
**********************************************************************************************************
      VAR.NC.     B-WEIGHT      Z-WEIGHT
            7     207048.1875      1.6380
            6       3933.2346      0.5191
            4   -73443920.0000    -0.9711
  CONSTANT =     -3433830.0000

  MULTPL-R =        0.9998
  R-SQUARE =        0.9995
**********************************************************************************************************
**********************************************************************************************************
REGRESSION EQUATION NO.  8        CRITERION IS VAR. NO.  1                          RANK =   3.
**********************************************************************************************************
      VAR.NC.     B-WEIGHT      Z-WEIGHT
            6      -7851.0313     -1.0362
            4   -20468896.0000    -0.2762
            2          0.1068      2.0480
  CONSTANT =     5815410.0000

  MULTPL-R =        0.9844
  R-SQUARE =        0.9690
**********************************************************************************************************
FULL MODEL   6    RES. MODEL   7    F =     0.0      DF =  1,    0
**********************************************************************************************************
```

TITLE YEARLY UNITED KINGDOM 10 N = 5

VAR.NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.0000	0.7341	0.0	0.8564	0.0	0.9391	0.2990								
2	0.7341	1.0000	0.0	0.9468	0.0	0.8822	-0.0144								
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
4	0.8564	0.9468	0.0	1.0000	0.0	0.9790	0.2853								
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
6	0.9391	0.8822	0.0	0.9790	0.0	1.0000	0.3551								
7	0.2990	-0.0144	0.0	0.2853	0.0	0.3551	1.0000								

MEAN	579379.750	14313595.000	4.000	1.991	96.000	243.558	107.040
STDV.	301896.438	8074085.000	0.000	0.215	0.000	55.234	3.737

REGRESSION EQUATION NO. 1 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	-3393.6990	-0.3324
6	5554.3516	0.9531
CONSTANT =	-10165.8125	

MULTPL-R = 0.9398
R-SQUARE = 0.8832

REGRESSION EQUATION NO. 2 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	5125.7617	0.0595
4	1257292.0000	0.8324
CONSTANT =	-2072159.0000	

MULTPL-R = 0.8583
R-SQUARE = 0.7367

REGRESSION EQUATION NO. 3 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	26675.4531	0.3097
2	0.0796	0.7385
CONSTANT =	-2300026.0000	

TITLE YEARLY W.GERMANY 10 N = 5

VAR.NO.	1	2	3	4	5	6	7	8	10	11	12	13	14	15
1	1.000	-0.0333	0.908	-0.6279	0.0	-0.4568	-0.59[illegible]							
2	-0.0333	1.0000	0.1227	0.676[illegible]	0.0	0.8822	0.771[illegible]							
3	0.908	0.1227	1.000	-0.3214	0.	-0.2484	-0.323[illegible]							
4	-0.6279	0.6763	-0.3214	1.000	0.0	0.9178	0.36[illegible]							
5	0.	0.	0.0	0.	0.0	0.0	0.0							
6	-0.4568	0.8822	-0.2484	0.9178	0.0	1.0000	0.9431							
7	-0.599[illegible]	0.7716	-0.3238	0.3694	0.0	0.9431	1.000							

MEANS	970816.00	14313590.000	2.200	[illegible]	100.00	243.558	113.44[illegible]
STD.	74636.500	8014185.000	1.60[illegible]	[illegible].51	0.00	55.234	4.57[illegible]

REGRESSION EQUATION NO. 1 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
3	331106.6875	0.7875
4	-4934334.0000	-0.3764

CONSTANT = 2516786.0000

MULTIPL-R = 0.9759[illegible]
R-SQUARE = 0.9524

REGRESSION EQUATION NO. 2 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
3	420801.0025	0.8473
6	-3544.6492	-0.2464

CONSTANT = 908380.8123

MULTIPL-R = 0.9273
R-SQUARE = 0.8923

REGRESSION EQUATION NO. 3 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
3	377100.2500	0.7593
4	-11583435.0000	-0.8837
6	7809.4336	0.5428

CONSTANT = 3888224.0000

```
                       11737.5 78          0.7672
             4      -17481584.0 0         -1.3357
   CONSTANT =        6808067.0000

   MULTPL-R =          0.6934
   R-SQUARE =          0.4891
****************************************************************************************************
****************************************************************************************************
  REGRESSION EQUATION NO.  5          CRITERION IS VAR. NO.  1                        RANK =    4.
****************************************************************************************************
        VAR.NO.     B-WEIGHT       Z-WEIGHT
             2           -0.3742       -0.0441
             3       413277.5625        0.8321
             4     -13726615.0000      -1.0472
             6        12333.4492        0.0268
   CONSTANT =        3855167.0000

   MULTPL-R =          1.0000
   R-SQUARE =          1.0000
****************************************************************************************************
****************************************************************************************************
  REGRESSION EQUATION NO.  6          CRITERION IS VAR. NO.  1                        RANK =    3.
****************************************************************************************************
        VAR.NO.     B-WEIGHT       Z-WEIGHT
             7            0.0031        0.0317
             3       334271.4375        0.3731
             4      -8071595.0000      -0.6173
   CONSTANT =        3753936.0000

   MULTPL-R =          0.9950
   R-SQUARE =          0.9900
****************************************************************************************************
****************************************************************************************************
  REGRESSION EQUATION NO.  7          CRITERION IS VAR. NO.  1                        RANK =    2.
****************************************************************************************************
        VAR.NO.     B-WEIGHT       Z-WEIGHT
             2           -0.2146       -0.0477
             3       466156.2500        0.7265
   CONSTANT =         166870.375

   MULTPL-R =          0.9201
   R-SQUARE =          0.8466
****************************************************************************************************
****************************************************************************************************
  REGRESSION EQUATION NO.  8          CRITERION IS VAR. NO.  1                        RANK =    4.
****************************************************************************************************
        VAR.NO.     B-WEIGHT       Z-WEIGHT
             7        -36820.8906       -0.2128
             6         8869.2756        0.6165
             4      -9817316.0000      -0.7462
             3       373761.8125        0.7526
   CONSTANT =        6348064.0000

   MULTPL-R =          1.0000
   R-SQUARE =          1.0000
****************************************************************************************************
****************************************************************************************************
  REGRESSION EQUATION NO.  9          CRITERION IS VAR. NO.  1                        RANK =    3.
```

```
MULTIPL-R =        [illegible].9773
R-SQUARE =         [illegible].9535
*****************************************************************************************************
*****************************************************************************************************
REGRESSION EQUATION NO. 10          CRITERION IS VAR. NO.  1                        RANK =   3.
*****************************************************************************************************
VAR.NO.      B-WEIGHT         Z-WEIGHT
      7      -.23[illegible]2.1[illegible]5       -[illegible].71[illegible]
      6       145[illegible]7.[illegible]71[illegible]        1.[illegible]84
      4      -1132823[illegible].[illegible]      -[illegible].[illegible]42
CONSTANT =    17[illegible]17424.[illegible]

MULTIPL-R =        [illegible].7145
R-SQUARE =         [illegible].51[illegible]
*****************************************************************************************************
*****************************************************************************************************
REGRESSION EQUATION NO. 11          CRITERION IS VAR. NO.  1                        RANK =   4.
*****************************************************************************************************
VAR.NO.      B-WEIGHT         Z-WEIGHT
      7      -3[illegible]3[illegible]0.75[illegible]       -[illegible].[illegible]11[illegible]
      6        8[illegible]5[illegible].277[illegible]        [illegible].[illegible]16[illegible]
      4      -9[illegible]7[illegible]2[illegible].[illegible]       -[illegible].7482
      3       37[illegible]761.[illegible]75[illegible]        [illegible].[illegible]526
      2          -[illegible]       -[illegible].[illegible]
CONSTANT =    [illegible]948[illegible]52.[illegible]

MULTIPL-R =        1.[illegible]
R-SQUARE =         1.[illegible]
*****************************************************************************************************
FULL MODEL 11    RES. MODEL       F =      .        DF =  1,
*****************************************************************************************************
```

APPENDIX D
COMPUTER PRINTOUTS FOR QUARTERLY RESULTS

TITLE QUARTERLY ARGENTINA N = 21

VAR.NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.0000	0.7116	0.4442	-0.2894	0.0	0.3406	0.5765	0.3571							
2	0.7116	1.0000	0.7004	-0.3527	0.0	0.5756	0.1578	0.3242							
3	0.4442	0.7004	1.0000	-0.5462	0.0	0.8231	-0.0321	0.4244							
4	-0.2894	-0.3527	-0.5462	0.9999	0.0	-0.5552	0.0056	-0.4673							
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							
6	0.3406	0.5756	0.8231	-0.5552	0.0	1.0000	-0.0697	0.1685							
7	0.5765	0.1578	-0.0321	0.0056	0.0	-0.0697	1.0000	-0.0503							
8	0.3571	0.3242	0.4244	-0.4673	0.0	0.1685	-0.0503	1.0000							
MEANS	1 3535.063		3560395.000		1.429		0.002	82.000		109.790		0.242			
STDV.	212605.125		2331561.000		0.495		0.003	0.000		21.160		0.281			

REGRESSION EQUATION NO. 1 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	437217.5625	0.5782
4	-21889920.0000	-0.2926
CONSTANT =	50723.5742	

MULTPL-R = 0.6465
R-SQUARE = 0.4180

REGRESSION EQUATION NO. 2 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	447220.9375	0.5914
3	198973.6250	0.4631
CONSTANT =	-289025.3125	

MULTPL-R = 0.7394
R-SQUARE = 0.5467

REGRESSION EQUATION NO. 3 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	456159.6875	0.6032
6	3844.9192	0.3827
CONSTANT =	-429077.7500	

MULTPL-R = 0.6915
R-SQUARE = 0.4781

```
                 7        [illegible]          [illegible]
                 8        1580333.0000         0.3871
   CONSTANT =            -1578806.0000

   MULTPL-R =                0.6942
   R-SQUARE =                0.4819
****************************************************************************************************
****************************************************************************************************
   REGRESSION EQUATION NO.   5         CRITERION IS VAR. NO.  1                          RANK =    2.
****************************************************************************************************
      VAR.NO.       B-WEIGHT       Z-WEIGHT
            5      1259351.0000         0.3265
            6         2900.1689         0.2886
   CONSTANT =     -1468567.0000

   MULTPL-R =                0.4566
   R-SQUARE =                0.2085
****************************************************************************************************
****************************************************************************************************
   REGRESSION EQUATION NO.   6         CRITERION IS VAR. NO.  1                          RANK =    2.
****************************************************************************************************
      VAR.NO.       B-WEIGHT       Z-WEIGHT
            8      1158311.0000         0.2839
            4    -11724732.0000        -0.1567
   CONSTANT =     -1021701.9375

   MULTPL-R =                0.3831
   R-SQUARE =                0.1468
****************************************************************************************************
****************************************************************************************************
   REGRESSION EQUATION NO.   7         CRITERION IS VAR. NO.  1                          RANK =    2.
****************************************************************************************************
      VAR.NO.       B-WEIGHT       Z-WEIGHT
            6         2613.6313         0.2601
            4    -10344983.0000        -0.1450
   CONSTANT =      -157119.9375

   MULTPL-R =                0.3613
   R-SQUARE =                0.1306
****************************************************************************************************
****************************************************************************************************
   REGRESSION EQUATION NO.   8         CRITERION IS VAR. NO.  1                          RANK =    2.
****************************************************************************************************
      VAR.NO.       B-WEIGHT       Z-WEIGHT
            6         -778.7039        -0.0775
            3       218231.4375         0.5080
   CONSTANT =      -122729.6875

   MULTPL-R =                0.4463
   R-SQUARE =                0.1992
****************************************************************************************************
****************************************************************************************************
   REGRESSION EQUATION NO.   9         CRITERION IS VAR. NO.  1                          RANK =    2.
****************************************************************************************************
      VAR.NO.       B-WEIGHT       Z-WEIGHT
            7       447220.9375         0.5914
            3       198973.6250         0.4431
   CONSTANT =      -289025.3125
```

	8	839624.0000	0.2057
	3	153321.3125	0.3569
CONSTANT =		-952319.9375	

MULTPL-R = 0.4816
R-SQUARE = 0.2320

****

REGRESSION EQUATION NO. 11 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
4	-4988882.0000	-0.0667
3	175174.5625	0.4077
CONSTANT =	-134617.1875	

MULTPL-R = 0.4477
R-SQUARE = 0.2004

****

REGRESSION EQUATION NO. 12 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	446708.2500	0.5907
4	-4235665.0000	-0.0566
3	185677.2500	0.4322
CONSTANT =	-259635.7500	

MULTPL-R = 0.7409
R-SQUARE = 0.5489

****

REGRESSION EQUATION NO. 13 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	363740.3125	0.4810
4	-5799808.0000	-0.0775
2	0.0555	0.6083
CONSTANT =	-167998.0625	

MULTPL-R = 0.8559
R-SQUARE = 0.7326

****

REGRESSION EQUATION NO. 14 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
8	1359246.0000	0.3330
7	465920.7500	0.6161
6	3290.2883	0.3275
CONSTANT =	-1723643.0000	

MULTPL-R = 0.7653
R-SQUARE = 0.5857

****

REGRESSION EQUATION NO. 15 CRITERION IS VAR. NO. 1 RANK = 3.

```
        CONSTANT =      -1399110.0000

        MULTPL-R =          0.7730
        R-SQUARE =          0.5976
*****************************************************************************************************************************
*****************************************************************************************************************************
    REGRESSION EQUATION NO. 27          CRITERION IS VAR. NO.  1                                    RANK =    5.
*****************************************************************************************************************************
          VAR.NO.     B-WEIGHT      Z-WEIGHT
                8    838164.9375        0.2053
                7    379359.3750        0.5017
                6       316.7236        0.0315
                4   1232644.0000        0.0165
                2         0.0505        0.5535
        CONSTANT =    -1040182.9375

        MULTPL-R =          0.8732
        R-SQUARE =          0.7624
*****************************************************************************************************************************
*****************************************************************************************************************************
    REGRESSION EQUATION NO. 28          CRITERION IS VAR. NO.  1                                    RANK =    5.
*****************************************************************************************************************************
          VAR.NO.     B-WEIGHT      Z-WEIGHT
                8   1212437.0000        0.2970
                7    462528.7500        0.6116
                6      1960.1353        0.1951
                4   5445607.0000        0.0728
                3     93191.7500        0.2169
        CONSTANT =    -1576973.0000

        MULTPL-R =          0.7749
        R-SQUARE =          0.6004
*****************************************************************************************************************************
*****************************************************************************************************************************
    REGRESSION EQUATION NO. 29          CRITERION IS VAR. NO.  1                                    RANK =    6.
*****************************************************************************************************************************
          VAR.NO.     B-WEIGHT      Z-WEIGHT
                8    992195.2500        0.2431
                7    377208.5625        0.4988
                6      1340.4429        0.1334
                4   1353230.0000        0.0181
                3    -68880.1875       -0.1603
                2         0.0543        0.5960
        CONSTANT =    -1221054.0000

        MULTPL-R =          0.8760
        R-SQUARE =          0.7674
*****************************************************************************************************************************
    FULL MODEL 28    YES. MODEL 22    F =     3.417    DF =  1,   15
*****************************************************************************************************************************
    FULL MODEL 28    YES. MODEL 23    F =     1.930    DF =  1,   15
*****************************************************************************************************************************
    FULL MODEL 28    YES. MODEL 24    F =    13.808    DF =  1,   15
*****************************************************************************************************************************
    FULL MODEL 28    YES. MODEL 25    F =     0.343    DF =  1,   15
*****************************************************************************************************************************
```

```
                8        6740583.0000          0.5147
                7        1589603.0000          0.4627
        CONSTANT =      -6960699.0000

        MULTPL-R =          0.6230
        R-SQUARE =          0.3881
*****************************************************************************************************************************************
*****************************************************************************************************************************************
    REGRESSION EQUATION NO.  5          CRITERION IS VAR. NO.  1                                        RANK =    2.
*****************************************************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
                8        4623442.0000          0.3530
                6           3697.5613          0.1938
        CONSTANT =      -4792988.0000

        MULTPL-R =          0.4626
        R-SQUARE =          0.2140
*****************************************************************************************************************************************
*****************************************************************************************************************************************
    REGRESSION EQUATION NO.  6          CRITERION IS VAR. NO.  1                                        RANK =    2.
*****************************************************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
                8        4383797.0000          0.3347
                4       -1660316.0000         -0.1899
        CONSTANT =      -2236027.0000

        MULTPL-R =          0.4577
        R-SQUARE =          0.2095
*****************************************************************************************************************************************
*****************************************************************************************************************************************
    REGRESSION EQUATION NO.  7          CRITERION IS VAR. NO.  1                                        RANK =    2.
*****************************************************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
                6           6147.6914          0.3221
                4       -3030167.0000         -0.3466
        CONSTANT =       3140081.0000

        MULTPL-R =          0.4767
        R-SQUARE =          0.2273
*****************************************************************************************************************************************
*****************************************************************************************************************************************
    REGRESSION EQUATION NO.  8          CRITERION IS VAR. NO.  1                                        RANK =    3.
*****************************************************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
                7        1210487.0000          0.3523
                4       -2037468.0000         -0.2330
                2              0.0037          0.5408
        CONSTANT =       2028962.0000

        MULTPL-R =          0.7329
        R-SQUARE =          0.5371
*****************************************************************************************************************************************
*****************************************************************************************************************************************
    REGRESSION EQUATION NO.  9          CRITERION IS VAR. NO.  1                                        RANK =    3.
*****************************************************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
```

FLLL MODEL 13 RES. MODEL 11 F = 4.942 DF = 1, 16

FLLL MODEL 13 RES. MODEL 12 F = 2.016 DF = 1, 16

```
          VAR.NC.      B-WEIGHT      Z-WEIGHT
                7     572527.7500        0.3869
                8     841340.4375        0.5589
       CONSTANT =     -959915.3125

       MULTPL-R =          0.6646
       R-SQUARE =          0.4416
*****************************************************************************************************************************************************
*****************************************************************************************************************************************************
    REGRESSION EQUATION NO.  5          CRITERION IS VAR. NO.  1                                                          RANK =   2.
*****************************************************************************************************************************************************
          VAR.NC.      B-WEIGHT      Z-WEIGHT
                8     772527.3750        0.5132
                6        427.5132        0.0396
       CONSTANT =     -784859.3750

       MULTPL-R =          0.5414
       R-SQUARE =          0.2931
*****************************************************************************************************************************************************
*****************************************************************************************************************************************************
    REGRESSION EQUATION NO.  6          CRITERION IS VAR. NO.  1                                                          RANK =   2.
*****************************************************************************************************************************************************
          VAR.NC.      B-WEIGHT      Z-WEIGHT
                8     685917.3125        0.4556
                4    -875336.7500       -0.1055
       CONSTANT =     -592401.5000

       MULTPL-R =          0.5442
       R-SQUARE =          0.2962
*****************************************************************************************************************************************************
*****************************************************************************************************************************************************
    REGRESSION EQUATION NO.  7          CRITERION IS VAR. NO.  1                                                          RANK =   2.
*****************************************************************************************************************************************************
          VAR.NC.      B-WEIGHT      Z-WEIGHT
                6       -351.7537       -0.0325
                4   -4151390.0000       -0.5004
       CONSTANT =      402247.5000

       MULTPL-R =          0.4728
       R-SQUARE =          0.2236
*****************************************************************************************************************************************************
*****************************************************************************************************************************************************
    REGRESSION EQUATION NO.  8          CRITERION IS VAR. NC.  1                                                          RANK =   2.
*****************************************************************************************************************************************************
          VAR.NC.      B-WEIGHT      Z-WEIGHT
                6       -2558.6833       -0.2368
                3      355094.8125        0.7684
       CONSTANT =      -85771.3125

       MULTPL-R =          0.5891
       R-SQUARE =          0.3470
*****************************************************************************************************************************************************
*****************************************************************************************************************************************************
    REGRESSION EQUATION NO.  9          CRITERION IS VAR. NC.  1                                                          RANK =   2.
*****************************************************************************************************************************************************
          VAR.NC.      B-WEIGHT      Z-WEIGHT
                7     526813.3750        0.3560
                3     263735.2500        0.5707
       CONSTANT =     -368439.4375

       MULTPL-R =          0.6751
       R-SQUARE =          0.4557
```

8	369418.1250	0.2454
3	178247.9375	0.3857
CONSTANT =	-534150.5625	

MULTPL-R = 0.5949
R-SQUARE = 0.3539

****

REGRESSION EQUATION NO. 11 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
4	333451.4375	0.0402
3	280717.1875	0.6075
CONSTANT =	-278351.8750	

MULTPL-R = 0.5740
R-SQUARE = 0.3294

****

REGRESSION EQUATION NO. 12 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	544982.5000	0.3683
4	-886784.3125	-0.1069
3	221999.9375	0.4804
CONSTANT =	-265735.1250	

MULTPL-R = 0.6774
R-SQUARE = 0.4588

****

REGRESSION EQUATION NO. 13 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	458044.4375	0.3095
4	-822715.4375	-0.0992
2	0.0651	0.6635
CONSTANT =	-161303.3125	

MULTPL-R = 0.8113
R-SQUARE = 0.6581

****

REGRESSION EQUATION NO. 14 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
8	815592.3750	0.5418
7	571795.7500	0.3864
6	265.3343	0.0246
CONSTANT =	-959648.3125	

MULTPL-R = 0.6648
R-SQUARE = 0.4420

****

REGRESSION EQUATION NO. 15 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT

REGRESSION EQUATION NO. 16 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
8	686723.3125	0.4562
6	-437.4299	-0.0405
4	-1159178.0000	-0.1397
CONSTANT =	-530042.5000	

MULTPL-R = 0.5446
R-SQUARE = 0.2966

REGRESSION EQUATION NO. 17 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	635603.6250	0.4295
6	-1738.8855	-0.1609
4	-5448275.0000	-0.6567
CONSTANT =	464642.8750	

MULTPL-R = 0.6336
R-SQUARE = 0.4015

REGRESSION EQUATION NO. 18 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
8	499392.6250	0.3317
4	1859843.0000	0.2242
3	235147.6875	0.5089
CONSTANT =	-863164.8125	

MULTPL-R = 0.6044
R-SQUARE = 0.3653

REGRESSION EQUATION NO. 19 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	520673.8125	0.3519
6	-2331.9307	-0.2158
3	345823.9375	0.7484
CONSTANT =	-228143.8125	

MULTPL-R = 0.6861
R-SQUARE = 0.4707

REGRESSION EQUATION NO. 20 CRITERION IS VAR. NO. 1 RANK = 3.

VAR.NO.	B-WEIGHT	Z-WEIGHT
8	438084.6250	0.2910
6	-3184.1052	-0.2946
3	274181.3750	0.5933
CONSTANT =	-399700.7500	

MULTPL-R = 0.6173
R-SQUARE = 0.3810

```
CONSTANT =      -3620398.0000

MULTPL-R =         0.7071
R-SQUARE =         0.4999
*****************************************************************************************************************************************
*****************************************************************************************************************************************
 REGRESSION EQUATION NO. 27          CRITERION IS VAR. NO.  1                                          RANK =    5.
*****************************************************************************************************************************************
     VAR.NO.      B-WEIGHT      Z-WEIGHT
           8     2448697.0000        0.3071
           7      656771.9375        0.2443
           6         666.0706        0.0689
           4    -1833333.0000       -0.1367
           2           0.0584        0.6664
CONSTANT =      -2348704.0000

MULTPL-R =         0.8086
R-SQUARE =         0.6538
*****************************************************************************************************************************************
*****************************************************************************************************************************************
 REGRESSION EQUATION NO. 28          CRITERION IS VAR. NO.  1                                          RANK =    5.
*****************************************************************************************************************************************
     VAR.NO.      B-WEIGHT      Z-WEIGHT
           8     3448385.0000        0.4325
           7     1096589.0000        0.4078
           6        1177.5339        0.1219
           4     1868848.0000        0.1394
           3       35832.5313        0.2765
CONSTANT =      -4249457.0000

MULTPL-R =         0.7140
R-SQUARE =         0.5098
*****************************************************************************************************************************************
*****************************************************************************************************************************************
 REGRESSION EQUATION NO. 29          CRITERION IS VAR. NO.  1                                          RANK =    6.
*****************************************************************************************************************************************
     VAR.NO.      B-WEIGHT      Z-WEIGHT
           8     2115331.0000        0.2653
           7      661695.8125        0.2461
           6          20.3305        0.0021
           4    -1861805.0000       -0.1388
           3       13726.6758        0.1359
           2           0.0563        0.6421
CONSTANT =      -1960214.0000

MULTPL-R =         0.8107
R-SQUARE =         0.6572
*****************************************************************************************************************************************
 FULL MODEL 28    RES. MODEL 22    F =     0.769    DF =  1,   15
*****************************************************************************************************************************************
 FULL MODEL 28    RES. MODEL 23    F =     3.152    DF =  1,   15
*****************************************************************************************************************************************
 FULL MODEL 28    RES. MODEL 24    F =     4.910    DF =  1,   15
*****************************************************************************************************************************************
 FULL MODEL 28    RES. MODEL 25    F =     3.127    DF =  1,   15
*****************************************************************************************************************************************
 FULL MODEL 28    RES. MODEL 26    F =     0.301    DF =  1,   15
*****************************************************************************************************************************************

IEF22I PROGRAM INTERRUPT    OLD PSW IS    071D0000E42106ED0
 FULL MODEL 28    RES. MODEL 27    F =    -2.160    DF =  0,   15
*****************************************************************************************************************************************
```

TITLE QUARTERLY JAPAN N = 21

VAR.NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.0000	0.0542	0.0	0.1670	0.0	0.1175	0.5383	0.2177							
2	0.0542	1.0000	0.0	0.2072	0.0	0.5756	-0.0589	0.1038							
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							
4	0.1670	0.2072	0.0	0.9997	0.0	0.7236	0.0616	0.1707							
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							
6	0.1175	0.5756	0.0	0.7236	0.0	1.0000	0.0019	-0.0512							
7	0.5383	-0.0589	0.0	0.0616	0.0	0.0019	1.0000	0.0004							
8	0.2177	0.1038	0.0	0.1707	0.0	-0.0512	0.0004	1.0000							

MEAN	131866.688	3560395.000	0.000	0.004	97.000	109.790	0.254
STD..	155007.313	2331561.000	0.000	0.001	0.000	21.160	0.161

REGRESSION EQUATION NO. 1 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	509748.8125	0.5300
4	34443408.0000	0.1345
CONSTANT =	-143112.8750	

MULTPL-R = 0.5548
R-SQUARE = 0.3078

REGRESSION EQUATION NO. 2 CRITERION IS VAR. NO. 1 RANK = 1.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	517708.2500	0.5383
2	0.0	0.0
CONSTANT =	164.0625	

MULTPL-R = 0.5383
R-SQUARE = 0.2898

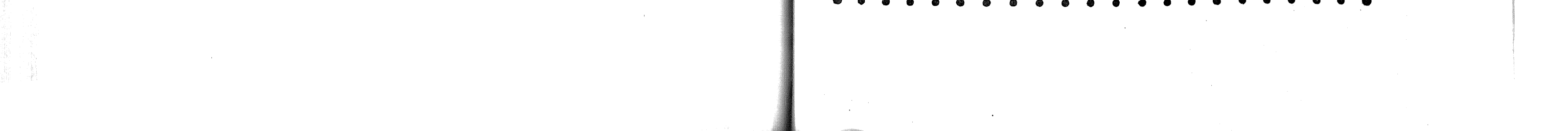
REGRESSION EQUATION NO. 3 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	517496.1250	0.5381
6	853.2261	0.1165
CONSTANT =	-93458.0000	

MULTPL-R = 0.5508
R-SQUARE = 0.3033

```
          VAR.NO.      B-WEIGHT      Z-WEIGHT
                8      676731.0000        0.3417
                7     1898432.0000        0.1831
        CONSTANT =     -7138196.0000

        MULTPL-R =        0.3877
        R-SQUARE =        0.1503
**********************************************************************************************************************************
**********************************************************************************************************************************
    REGRESSION EQUATION NO.  5          CRITERION IS VAR. NO.  1                                    RANK =    2.
**********************************************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
                8    -14116719.0000      -0.7134
                6        40435.9727       1.2426
        CONSTANT =     11183562.0000

        MULTPL-R =        0.7398
        R-SQUARE =        0.5473
**********************************************************************************************************************************
**********************************************************************************************************************************
    REGRESSION EQUATION NO.  6          CRITERION IS VAR. NO.  1                                    RANK =    2.
**********************************************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
                8     6322834.0000       0.3195
                4    -8340975.0000      -0.1412
        CONSTANT =     -5793939.0000

        MULTPL-R =        0.3691
        R-SQUARE =        0.1362
**********************************************************************************************************************************
**********************************************************************************************************************************
    REGRESSION EQUATION NO.  7          CRITERION IS VAR. NO.  1                                    RANK =    2.
**********************************************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
                6        20816.5781       0.6397
                4       559209.6250       0.0095
        CONSTANT =     -1761549.0000

        MULTPL-R =        0.6368
        R-SQUARE =        0.4055
**********************************************************************************************************************************
**********************************************************************************************************************************
    REGRESSION EQUATION NO.  8          CRITERION IS VAR. NO.  1                                    RANK =    3.
**********************************************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
                7     2845632.0000       0.2745
                4     -278623.1250      -0.0047
                2           0.1934       0.6549
        CONSTANT =      -830162.8125

        MULTPL-R =        0.6750
        R-SQUARE =        0.4556
**********************************************************************************************************************************
**********************************************************************************************************************************
    REGRESSION EQUATION NO.  9          CRITERION IS VAR. NO.  1                                    RANK =    3.
**********************************************************************************************************************************
          VAR.NO.      B-WEIGHT      Z-WEIGHT
                8    -13757779.0000      -0.6953
                7     1291575.0000       0.1246
                6       39738.8047       1.2211
        CONSTANT =     10556369.0000
```

```
            8       -1197128.0000       -0.4232
CONSTANT =           1283044.0000

MULTPL-R =           0.4625
R-SQUARE =           0.2139
****************************************************************************************************
****************************************************************************************************
 REGRESSION EQUATION NO.  5          CRITERION IS VAR. NO.  1                           RANK =   2.
****************************************************************************************************
   VAR.NO.      B-WEIGHT       Z-WEIGHT
        8       -648619.3125      -0.2293
        6          2172.9202       0.2879
CONSTANT =        542707.5625

MULTPL-R =           0.4674
R-SQUARE =           0.2185
****************************************************************************************************
****************************************************************************************************
 REGRESSION EQUATION NO.  6          CRITERION IS VAR. NO.  1                           RANK =   2.
****************************************************************************************************
   VAR.NO.      B-WEIGHT       Z-WEIGHT
        8      -1353993.0000      -0.4786
        4     -25551392.0000      -0.1858
CONSTANT =       1866660.0000

MULTPL-R =           0.4452
R-SQUARE =           0.1982
****************************************************************************************************
****************************************************************************************************
 REGRESSION EQUATION NO.  7          CRITERION IS VAR. NO.  1                           RANK =   2.
****************************************************************************************************
   VAR.NO.      B-WEIGHT       Z-WEIGHT
        6          3261.1262       0.4320
        4      -1126092.0000      -0.0082
CONSTANT =       -231424.0000

MULTPL-R =           0.4321
R-SQUARE =           0.1868
****************************************************************************************************
****************************************************************************************************
 REGRESSION EQUATION NO.  8          CRITERION IS VAR. NO.  1                           RANK =   2.
****************************************************************************************************
   VAR.NO.      B-WEIGHT       Z-WEIGHT
        6          1702.8579       0.2256
        3         33441.0195       0.2862
CONSTANT =       -170000.1250

MULTPL-R =           0.4754
R-SQUARE =           0.2260
****************************************************************************************************
****************************************************************************************************
 REGRESSION EQUATION NO.  9          CRITERION IS VAR. NO.  1                           RANK =   2.
****************************************************************************************************
   VAR.NO.      B-WEIGHT       Z-WEIGHT
        7        362072.0000       0.3035
        3         60367.5938       0.5166
CONSTANT =       -151169.8125

MULTPL-R =           0.5[illegible]
```



TITLE QUARTERLY U.KINGDOM N = 21

VAR.NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.0000	0.4282	0.0	0.3038	0.0	0.1747	0.2115	0.1504							
2	0.4282	1.0000	0.0	0.6664	0.0	0.5756	0.0314	-0.2131							
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							
4	0.3038	0.6664	0.0	1.0000	0.0	0.8940	-0.0773	-0.4916							
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							
6	0.1747	0.5756	0.0	0.8940	0.0	1.0000	0.0060	-0.4253							
7	0.2115	0.0314	0.0	-0.0773	0.0	0.0060	1.0000	0.1137							
8	0.1504	-0.2131	0.0	-0.4916	0.0	-0.4253	0.1137	1.0000							
MEANS	233644.938		3560395.000		4.000		2.091		96.000		109.790		0.249		
STDV.	189848.688		2331561.000		0.000		0.229		0.000		21.160		0.033		

REGRESSION EQUATION NO. 1 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	1379115.0000	0.2364
4	267154.1250	0.3220
CONSTANT =	-643887.5625	

MULTPL-R = 0.3845
R-SQUARE = 0.1478

REGRESSION EQUATION NO. 2 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
7	1227919.0000	0.2105
6	1556.3931	0.1735
CONSTANT =	-242533.6250	

MULTPL-R = 0.2735
R-SQUARE = 0.0748

REGRESSION EQUATION NO. 3 CRITERION IS VAR. NO. 1 RANK = 2.

VAR.NO.	B-WEIGHT	Z-WEIGHT
8	667020.3125	0.1280
7	1149016.0000	0.1969
CONSTANT =	-725633.1875	

MULTPL-R = 0.2468
R-SQUARE = 0.0609

```
      CONSTANT =      -3942802.0000

      MULTPL-R =         0.7823
      R-SQUARE =         0.6120
*****************************************************************************************************************************************************
*****************************************************************************************************************************************************
   REGRESSION EQUATION NO. 27         CRITERION IS VAR. NO.  1                                  RANK =    5.
*****************************************************************************************************************************************************
         VAR.NO.      B-WEIGHT      Z-WEIGHT
               8     2974453.0000     0.2200
               7      689944.5625     0.2682
               6         209.4660     0.0123
               4    -3689264.0000    -0.6287
               2           0.0722     0.4671
      CONSTANT =      -1494242.0000

      MULTPL-R =         0.6533
      R-SQUARE =         0.4267
*****************************************************************************************************************************************************
*****************************************************************************************************************************************************
   REGRESSION EQUATION NO. 28         CRITERION IS VAR. NO.  1                                  RANK =    5.
*****************************************************************************************************************************************************
         VAR.NO.      B-WEIGHT      Z-WEIGHT
               8     2739832.0000     0.2026
               7      558010.9375     0.2169
               6       -3662.3413    -0.2150
               4      939264.8750     0.1601
               3      157643.1250     0.6957
      CONSTANT =      -3171898.0000

      MULTPL-R =         0.7857
      R-SQUARE =         0.6173
*****************************************************************************************************************************************************
*****************************************************************************************************************************************************
   REGRESSION EQUATION NO. 29         CRITERION IS VAR. NO.  1                                  RANK =    6.
*****************************************************************************************************************************************************
         VAR.NO.      B-WEIGHT      Z-WEIGHT
               8     1598403.0000     0.1182
               7      495487.3125     0.1926
               6       -5187.9648    -0.3046
               4      293485.3750     0.0500
               3      142732.0625     0.6299
               2           0.0385     0.2490
      CONSTANT =      -1598489.0000

      MULTPL-R =         0.8019
      R-SQUARE =         0.6431
*****************************************************************************************************************************************************
   FULL MODEL 28    RES. MODEL 22    F =    11.384    DF =  1,   15
*****************************************************************************************************************************************************
   FULL MODEL 28    RES. MODEL 23    F =     1.092    DF =  1,   15
*****************************************************************************************************************************************************
   FULL MODEL 28    RES. MODEL 24    F =     1.700    DF =  1,   15
*****************************************************************************************************************************************************
   FULL MODEL 28    RES. MODEL 25    F =     3.439    DF =  1,   15
*****************************************************************************************************************************************************
   FULL MODEL 28    RES. MODEL 26    F =     0.205    DF =  1,   15
*****************************************************************************************************************************************************

ILF223I PROGRAM INTERRUPT    OLD PSW IS    07ID000F42106ED0
```

APPENDIX E
FORMS TO USE FORTRAN PROGRAM

CARDS FOR MARKET RESEARCH MULTIPLE REGRESSION PROGRAM

1. title
1 2 3 4 5 6 7 8 9101112131415161718192021222324252627282930313233343 5

2. control
1 2 3 4 5 6 7 8 9101112131415161718192021222324 25

3. format
1 2 3 4 5 6 7 8 9101112131415161718192021222324252627282930313233343536373839 40
(41)

4. DATA CARDS ARE PLACED HERE
See next sheet for information

5. equations

	3	6	9	12	15	18	21	24	27	30
1)										
2)										
3)										
4)										
5)										
6)										
7)										
8)										
9)										
10)										
11)										
12)										
13)										
14)										
15)										
16)										
17)										
18)										
19)										
20)										
21)										
22)										
23)										
24)										
25)										
26)										
27)										
28)										
29)										
30)										

6. F-tests
1 2 3 4 5 6 7 8 910

4. DATA CARDS

1 2 3 4 5 6 7 8 9101112131415161718192021222324252627282930313233343536373839404142434445464748495051525354555657585960616263

1)
2)
3)
4)
5)
6)
7)
8)
9)
10)
11)
12)
13)
14)
15)
16)
17)
18)
19)
20)
21)
22)

APPENDIX F
FORTRAN PROGRAM

```
C MULTIPLE REGRESSION WITH VARIABLE GENERATION AND
F-STATISTICS
B FIRST USER CARD IS TITLE CARD.
C 2ND USER CARD IS MAIN CONTROL IN I5 REPORTING N, NVD, NEQ,
NF, NGEN.
C     N = # DATA CARDS, NVD = # VARIABLES ON EACH DATA CARD,
NEQ = # EQUATIONS, NF = # F-STATISTICS, NGEN = # VARIABLES TO
BE GENERATED.
C N DATA CARDS FOLLOW IN 1 FORMAT.  ALL DATA IN FLOATING POINT
MODE.
C NEQ CONTROL CARDS (ONE FOR EACH EQUATION ) IN I3 FORMAT,
REPORTING TOTAL # VARIABLES IN EQUATION, LISTING OF VARIABLES,
CRITERION LAST
C NF CONTROL CARDS IN I5 REPORTING FULL MODEL #, REST MODEL #,
DF1, DF2.
C     REMAINING SPACE ON F-STAT CARD MAY BE USED FOR LABEL OF
HYPOTHESIS.
      DIMENSION R(24,25), B(25), RSQ(50), IX(25), LABEL(15),
RANK(50)
      DIMENSION TITLE(20), X(70), SUM(70), SS(70,70),
STDV(70), C(70)
      IR = 5
      IP = 6
    3 FORMAT (26I3)
    4 FORMAT (4I5,15A4)
    5 FORMAT (16I5)
    9 FORMAT (20A4)
   21 FORMAT ('1', '      TITLE:  ', 20A4, '  N = ',
15//1X,80('*'))
   22 FORMAT (1X, 132('*')  / 2X, 'VAR.NO.',
15(5X,I3)/,1X,80('*'))
   23 FORMAT (/5X, I3, 3X, 15F8.4)
   24 FORMAT (/1X, 132('*')  / 3X, 'MEANS', 3X, 15F16.3)
   25 FORMAT (/3X, 'STDV.', 3X, 15F16.3)
   31 FORMAT (1X,132('*')/5X, 'REGRESSION EQUATION NO.',I3,9X,
-'CRITERION IS VAR.NO.',I3,25X,'RAND =',F5.0/1X,132('*')/ =
11X,'VAR.NO.'5X,'B-WEIGHT',5X,'X-WEIGHT')
   32 FORMAT  (  15X, I3, 3X, FI6.4, 3X, F10.4)
   33 FORMAT  (8X, 'CONSTANT =', 3X, F16.4//8X,'MULTPL-R ='3X,
F15.4/ - 8X, 'R-SQUARE =', 3X, F10.4/1X,132('*'))
   51 FORMAT  (5X, 'FULL MODEL', I3, 4X, 'RES. MODEL',I3,4X, -
'F =', F9.3, 4X, 'DF =', I3, ',', I5,4X,15A4/1X,132('*'))
C READ TITLE AND CONTROL CARD, ZERO STORAGE.
  100 READ (IR,9,END=800) TITLE
      READ (IR,5) N, NVD, NEQ, NF, NGEN,
      READ (IR,9)  IFMT
      RSQ(50) = 0.0
      RANK(50) = 0.0
      NV = NVD + NGEN
      DO 110 J=1,NV
      SUM (J) = 0.0
      DO 110 I=1,NV
  110 SS(I,J) = 0.0
```

```
C READ AND CODE DATA,ACCUMULATE SUMS AND RAW SUMS OF SQUARES.
      DO 130 K=1,N
      DO 120 J=NVD,NV
  120 X(J) = 0.0
      READ (IR,IFMT) (X(J), J=1,NVD)
C VARIABLE GENERATION CARDS (IF ANY) FOLLOW THIS CARD.
      X(7)=(X(1)-970816)/794626.5
      X(8)=(X(2)-14313592)/8024087
      X(9)=(X(3)-2.2)/1.60
      X(10)=(X(4)-.488)/.061
      X(11)=(X(6)-106.914)/21.609
C VARIABLE GENERATION CARDS (IF ANY) PRECEDE THIS CARD.
      IF (K.GT.1) GO TO 125
      DO 122 J=1,NV
  122 C(J) = X(J)
  125 DO 126 J=1,NV
      X(J) = X(J) - C(J)
  126 SUM(J) = SUM(J) + X(J)
      DO 130 I=1,NV
      DO 130 J=1,NV
  130 SS(I,J) = SS(I,J) + X(I) * X(J)
  200 WRITE (IP,21) TITLE, N
C CALCULATE SUMS OF SQUARES, THEN MEANS AND STDVS, THEN
CORRELATIONS.
      FN = N
      DO 240 I = 1,NV
      DO 240 J=1,NV
  240 SS(I,J) = SS(I,J) - (SUM(I) * SUM(J) / FN)
      DO 250 J=1,NV
      SUM(J) = SUM(J) / FN + C(J)
  250 STDV(J) = SQRT (SS(J,J) / FN) + 0.0000001
      DO 260 I=1,NV
      DO 260 J=1,NV
  260 SS(I,J) = SS(I,J) / (FN * STDV(I) * STDV(J))
C PRINT CORRELATIONS, MEANS, AND STANDARD DEVIATIONS IN MATRIX
FORM.
      JJ = 1
      MM = (NV - 1) /15 + 1
      DO 280 M=1,MM
      JJJ = M * 15
      WRITE (IP,22) (J, J=JJ,JJJ)
      JJJ = JJ + 14
      IF (NV.LE.JJJ) JJJ =NV
      DO 270 I=1,NV
  270 WRITE (IP,23) I, (SS(I,J), J=JJ,JJJ)
      WRITE (IP,24) (SUM(J), J=JJ,JJJ)
      WRITE (IP,25) (STDV(J), J=JJ,JJJ)
  280 JJ = JJ + 15
      IF (NEQ.EQ.0) STOP
C GENERATE R-MATRIX OF CORRELATIONS FOR KTH PREDICTION
EQUATION.
  290 DO 500 K=1,NEQ
      READ (IR,3) NC, (IX(J), J=1,NC)
```

```
      NR = NC - 1
      IC = IX(NC)
      DO 300 I=1,NR
      II = IX(I)
      DO 300 J=1,NC
      JJ = IX(J)
  300 R(I,J) = SS(II,JJ)
C SOLVE FOR STANDARD-WEIGHTS USING MODIFIED GAUSS-JORDAN
PROCEDURE.
      DO 400 I=1,NR
      BB = R(I,I)
      IF (ABS(BB).LR.0.0001) BB = 1.0
      DO 310 J=I,NC
  310 R(I,J) = R(I,J) / BB
      DO 400 L=1,NR
      IF (I.EQ.L) GO TO 400
      AA = -R(L,I)
      DO 340 J=1,NC
  340 R(L,J) = R(L,J) + R(I,J) * AA
  400 CONTINUE
      RANK(K) = 0.0
      DO 410 J=1,NR
  410 RANK(K) = RANK(K) + R(J,J)
      WRITE (IP,31) K, IC, RANK(K)
C CONVERT STD-WEIGHTS TO B-WEIGHTS, CALCULATE CONSTANT, RSQ,
MULTIPLE-R.
      RSQ(K) = 0.0
      CONST = 0.0
      DO 430 I=1,NR
      II = IX(I)
      RSQ(K) = RSQ(K) + R(I,NC) * SS(II,IC)
      B(I) = R(I,NC) * STDV(IC) / STDV(II)
      WRITE (IP,32) II, B(I), R(I,NC)
  430 CONST = CONST + B(I) * SUM(II)
      CONST = SUM(IC) - CONST
      RMULT = SQRT (RSQ(K))
  500 WRITE (IP,33) CONST, RMULT, RSQ(K)
      IF (NF.EQ.0) STOP
      DO 600 K=1,NF
      READ (IR,4) IRSQF, IRSQR, IDF1, IDF2, LABEL
      IF (IDF1.NE.0) GO TO 590
      IDF1 = RANK(IRSQF) - RANK(IRSQR) + 0.4999
      IDF2 = FN-RANK(IRSQF) - 0.5001
  590 F = (RSQ(IRSQF) - RSQ(IRSQR)) * IDF2 /((1.0 -
RSQ(IRSQF)) * IDF1)
  600 WRITE (IP,51) IRSQF, IRSQR, F, IDF1, IDF2, LABEL
      GO TO 100
  800 STOP
      END
```

APPENDIX G
BASIC TREND PROGRAM

```
60 CLEAR 5
70 DEFSTRQ:DEFINTE,N,Z:DEFDBLA-D,S,T,V,X,Y
80 CLS
90 PRINT:PRINT'                              Trending'
100 PRINT:PRINT:PRINT'Do you want instructions?'
110 QM=INKEY$
120 IFQM=''THEN110
130 IFQM='Y'THEN1830
140 IFQM='N'THEN160
150 GOTO100
160 CLS
170 PRINT:PRINT'                              Trending
180 PRINT:PRINT'  How many data points are there in this series?'
190 PRINT:PRINT' (how many entries will you be making this time?)'
200 PRINT:PRINT:INPUT'                                ';N
210 IFN<3THEN:CLS:PRINT:PRINT'Sorry, you need at least three data points to ana
yse a trend.':GOTO170
220 IFINT(N/2)<N/2THENE=1ELSEE=0
230 N2=INT(N*1.5)
240 DIMX(N2),Y(N2),TL(N2),TG(N2),TP(N2),GD(N2)
250 BN=INT(5*(N+1))/10
260 PRINT:PRINT'Enter your sequence of data:':PRINT
270 FORZ=1TON2
280 IFZ>NTHEN350
290 PRINT'Period';Z;
300 INPUTY(Z)
310 IFY(Z)=0THENPRINT'Sorry, your entry for period';Z;'was zero.  Please redo.'
GOTO290
320 IFZ=1THENYL=Y(Z):YN=Z
330 IFY(Z)>YHTHENYH=Y(Z):YZ=Z
340 IFY(Z)<YLTHENYL=Y(Z):YN=Z
350 IFE=0THENX(Z)=Z-BNELSEX(Z)=2*(Z-BN)
360 NEXTZ
370 FORZ=1TO1000:NEXT
380 CLS
390 PRINT@76,'Computation'
400 PRINT@210,'Summations'
410 FORZ=1TON
420 PRINT@278,'Period';Z
430 X2=X2+X(Z)[2
440 X4=X4+X(Z)[4
450 XL=XL+X(Z)*Y(Z)
460 XG=XG+X(Z)*LOG(Y(Z))
470 SL=SL+Y(Z)
480 SG=SG+LOG(Y(Z))
490 XX=XX+X(Z)[2*Y(Z)
500 NEXTZ
510 BL=XL/X2
520 BG=XG/X2
530 AL=SL/N
540 AG=SG/N
550 C=((N*XX)-(X2*SL))/((X4*N)-X2[2)
560 AP=(SL-(C*X2))/N
570 PRINT@402,'Regressions'
580 FORZ=1TON2
590 TL(Z)=AL+X(Z)*BL
600 TG(Z)=EXP(AG+(X(Z)*BG))
610 TP(Z)=AP+(X(Z)*BL+(X(Z)[2*C))
```

```
1180 Q="Linear"
1190 PRINT:PRINT"The curve of best fit (lowest error) is the ";Q;" Curve."
1200 PRINT:INPUT"Return to menu";MM
1210 GOTO730
1220 MN=0
1230 FORZ=1TON2
1240 IFZM=1GD(Z)=Y(Z)
1250 IFZM=2GD(Z)=TL(Z)
1260 IFZM=3GD(Z)=TG(Z)
1270 IFZM=4GD(Z)=TP(Z)
1280 IFGD(Z)>MNTHENMN=GD(Z)
1290 NEXTZ
1300 CLS
1310 IFN2<127THENGX=1ELSEGX=127/N2
1320 IFN2<64GX=2
1330 IFN2<43GX=3
1340 IFN2<32GX=4
1350 GY=39/MN
1360 FORZ=6TO47
1370 SET(0,Z)
1380 NEXT
1390 FORZ=1TO127
1400 SET(Z,47)
1410 NEXT
1420 IFZM=1THEN1480
1430 FORZ=1TON2
1440 GH=INT(Z*GX)
1450 GV=47-INT(Y(Z)*GY)
1460 IFGV>0SET(GH,GV)
1470 NEXTZ
1480 FORZ=1TON2
1490 GH=INT(Z*GX)
1500 GV=47-INT(GD(Z)*GY)
1510 IF(GV>0)AND(GV<48)SET(GH,GV)
1520 NEXTZ
1530 INPUT"Return to menu";MM
1540 GOTO730
1550 CLS:Z1=0
1560 PRINT:PRINT"Interpolation and extrapolation.  (Enter the numbers
of the periods for which you want estimated values.)
   To return to the menu, enter the number 999.":PRINT
1570 INPUT"Period";Z
1580 IFZ=999THEN730
1590 PRINT,"Linear","Geometric","Parabolic"
1600 IFE=0THENXZ=Z-BNELSEXZ=2*(Z-BN)
1610 PRINT,INT(.5+10*(AL+XZ*BL))/10,INT(.5+10*(EXP(AG+(XZ*BG))))/10,INT(.5+10*(X
Z*BL+XZ[2*C+AP))/10
1620 Z1=Z1+1
1630 IFZ1>5THENZ1=0ELSEGOTO1570
1640 GOTO1560
1650 CLS
1660 PRINTTAB(16)"Solution of regression equations":PRINT
1670 PRINT"Linear trend."
1680 PRINT"      Predicition = a + (b * ( ";
1690 IFE=0PRINT"x -";BN;") )"ELSEPRINT"Z * ( x -";BN;") ) )"
1700 PRINT,"a =";INT(.5+10000*AL)/10000,"b =";INT(.5+100000*BL)/100000
1710 PRINT:PRINT"Geometric trend."
1720 PRINT"      Prediction ="antilog (a + (b * ( ";
```

```
1730 IFE=0PRINT"x -";BN;") ) )"ELSEPRINT"2 * ( x -";BN;") ) ) )"
1740 PRINT,"a =";INT(.5+10000*AG)/10000,"b =";INT(.5+100000*BG)/100000
1750 PRINT:PRINT"Parabolic trend.      Prediction ="
1760 PRINT" a + (b * ( ";
1770 IFE=0PRINT"x -";BN;") ) + ( c * ( x -";BN;")[2 )"ELSEPRINT"2 * ( x -";BN;")
  ) ) + ( c * ( 2 * ( x -";BN;") )[2 )"
1780 PRINT,"a =";INT(.5+10000*AF)/10000,"b =";INT(.5+100000*BL)/100000,"c =";INT
(.5+1000000*C)/1000000
1790 PRINT
1800 PRINT"The value of ";CHR$(34);"x";CHR$(34);" is the number of the period to
 be predicted.
1810 INPUT"                    Return to menu";MM
1820 GOTO730
1830 CLS
1840 PRINT"                              Trending
1850 PRINT:PRINT"This program is designed to help you find the trend in a
1860 PRINT"series of data.
1870 PRINT:PRINT"Any time-sequenced series can be analysed for trend.
1880 PRINT"Monthly phone bills.  Miles driven per year.  Calories
1890 PRINT"eaten.  All you need is the records and ";CHR$(34);"Trending";CHR$(34
);" does the
1900 PRINT"rest.
1910 PRINT:PRINT
1920 PRINT:PRINT:PRINT"(Press ";CHR$(34);"enter";CHR$(34);" key) next page";
1930 INPUTMM
1940 CLS:PRINTTAB(22)"- 2 -"
1950 PRINT:PRINT"If you input your monthly sales data, for example,
1960 PRINTCHR$(34);"Trending";CHR$(34);" will find the straight line that best m
atches
1970 PRINT"the overall trend of your sales.  You may be surprised to
1980 PRINT"learn where the business has been heading and how fast it's
1990 PRINT"heading there!
2000 PRINT:PRINTCHR$(34);"Straight line";CHR$(34);" trending assumes that the da
ta has been
2010 PRINT"changing pretty much by some constant amount.  If your sales
2020 PRINT"have been increasing by 100 dollars a month (on the average)
2030 PRINT"then you have a straight line or linear trend.
2040 PRINT:PRINT:INPUT"Next page";MM
2050 CLS:PRINTTAB(22)"- 3 -"
2060 PRINT:PRINT"Sometimes (in fact, more often than not) the data is
2070 PRINT"changing by a constant rate of change rather than a
2080 PRINT"constant amount of change.  If your sales have been increasing
2090 PRINT"by about 10% a month, your trend is better described by a
2100 PRINT"geometric curve, not a straight line.  ";CHR$(34);"Trending";CHR$(34)
;" finds the best";
2110 PRINT"curve of constant change to match your data.
2120 PRINT:PRINT"Finally, your rate of change may be changing.  Maybe you once
2130 PRINT"enjoyed 10% increases, but now you're only getting 2 or 3%
2140 PRINT"increases, and next year you're actually expecting a loss.
2150 PRINT"This kind of trend is best described by a parabola.  ";CHR$(34);"Tren
ding";CHR$(34)
2160 PRINT"also finds the best fitting parabolic curve for your data.
2170 PRINT:INPUT"Next page";MM
2180 CLS:PRINTTAB(22)"- 4 -
2190 PRINT:PRINT"If you're interested in learning which of the three curves
2200 PRINT"best describes your data, the key statistic is called the
2210 PRINTCHR$(34);"Standard error of estimate.";CHR$(34);"  The curve of lowest
 error
```

```
2220 PRINT"has the best fit.  ";CHR$(34);"Trending";CHR$(34);" computes this sta
tistic
2230 PRINT"for each of the three statistical curves:  linear, goemetric
2240 PRINT"and parabolic.
2250 PRINT:PRINT"The curve of best fit is probably the best curve to use for
2260 PRINT"predicting the future.  But be careful --  using current trends
2270 PRINT"to make predictions is a very iffy business.  You might be
2280 PRINT"wise to hedge your predictions with some statement like,
2290 PRINTCHR$(34);"If present trends continue...";CHR$(34);" or the like.  And
be especially
2300 PRINT"careful if you have fewer than about 30 data points.
2310 INPUT"          Next page";MM
2320 CLS:PRINTTAB(22)"- 5 -
2330 PRINT:PRINT"Just a few more things:
2340 PRINT:PRINTTAB(8)"-Enter your data in chronological sequence.
2350 PRINTTAB(8)"-Don't mix data kinds (e.g. dollars with tons).
2360 PRINTTAB(8)"-Don't input negative or zero data.
2370 PRINTTAB(8)"-If you're missing some data, try guesstimating it.
2380 PRINTTAB(8)"-For the very best results use seasonally adjusted data.";
2385 PRINTTAB(12)"(Look up CLOAD's ";CHR$(34);"Seasonal";CHR$(34);" program for
this.)
2390 PRINT:PRINT"To reread these instructions, enter ";CHR$(34);"R";CHR$(34)
2400 PRINT"      To start your trend analysis, enter ";CHR$(34);"T";CHR$(34)
2410 PRINT:PRINT"And happy trending!
2420 QM=INKEY$
2430 IFQM=""THEN2420
2440 IFQM="R"THEN1830
2450 IFQM="T"THEN160
2460 GOTO2390
```

TRENDS IN EXCHANGE RATES

COUNTRY		LINEAR	GEOMETRIC	PARABOLIC
ARGENTINA	Q	-.000157	.00029	.000192
	M	.000256	.000247	.000122
	Y	-.000366	.00012	.000606
AUSTRALIA	Q	1.167	1.167	1.179
	M	1.174	1.1761	1.099
	Y	1.106	1.107	1.198
BRAZIL	Q	.008	.0132	.068
	M	.0097	.0105	.0094
	Y	.0003	.0154	.00
FRANCE	Q	.222	.2212	.1951
	M	.1774	.1781	.1549
	Y	.2474	.2486	.2462
ITALY	Q	.000955	.000953	.00076
	M	.000837	.000845	.000737
	Y	.001179	.001179	.001177
JAPAN	Q	.004986	.005063	.004341
	M	.004623	.004622	.004013
	Y	.005067	.005186	.003887
MEXICO	Q	.03509	.0376	.05102
	M	.04117	.04117	.04013
	Y	.03366	.0365	.05804
SOUTH AFRICA	Q	1.252	1.2496	1.280
	M	2.2169	1.4006	1.3813
	Y	1.2828	1.2831	1.4039
SPAIN	Q	.01159	.01158	.00914
	M	.01022	.01035	.00958
	Y	.01385	.01385	.01528
SWEDEN	Q	.2181	.2176	.1922
	M	.2009	.2011	.1822
	Y	.2361	.2361	.2511
UNITED KINGDOM	Q	2.3429	2.3586	2.3841
	M	2.092	2.081	1.77
	Y	2.423	2.452	2.672
WEST GERMANY	Q	.4758	.4736	.3859
	M	.4663	.4645	.3272
	Y	.6104	.6255	.5558

M - MONTHLY Q - QUARTERLY Y - YEARLY

INDUSTRIAL PRODUCTION TRENDS

Country	1976	1977	1978	1979	1980	1981	1982	Linear	Geometric	Parabolic
Argentina	96	100	92	102	98			99.4 100	99.3 99.9	100.4 102
Australia	105	104	105	112	116			117.4 120.4	117.6 120.8	125.4 136.4
Brazil	99.1	91.7	96.2	105.4	98.6			102 103.3	102 103.3	105 109.2
France	108	110	111	117	116			119.3 121.6	119.5 121.9	118.8 120.6
Italy	112.4	113.6	115.9	123.5	129.7			132.4 136.8	132.8 137.8	140 152.1
Japan	108.4	111.1	118.8	131.6	123.9			134.2 139.4	135 141.1	126.4 123.7
Mexico	102.7	106.3	116.9	129	138.2			146.7 156.1	149.3 161.5	153.1 168.8
South Africa	99.8	93.6	98.3	104.8	115.4			115.1 119.3	115.3 120	132.8 154.7
Spain	105	120	121	123	121			127.7 131	128.4 132.2	110.2 96
Sweden	99	94	92	98	101			99.2 100	99.1 100	111.2 124
United Kingdom	102	105.9	109.8	112.6	104.9			110.8 112	110.8 112.1	98.6 87.7
West Germany	107.2	110.0	112.8	118.6	118.6			122.9 126	123.2 126.6	121.6 123.4

QUARTERLY INDUSTRIAL PRODUCTION TRENDS

	Linear	Geometric	Parabolic
Argentina	1.0423	1.0414	.9959
Australia	1.0524	1.0527	1.0636
Brazil	1.3586	1.3564	1.5523
Japan	1.067	1.068	.9362
Italy	1.0641	1.0644	1.0637
Mexico	1.1103	1.111	1.1066
South Africa	1.138	1.1541	1.1882
Spain	1.0103	1.0104	.9169
Sweden	.9987	.9971	.9744
United Kingdom	1.0062	1.0054	.9273
West Germany	1.0341	1.0341	1.020

APPENDIX H
MULTIPLE REGRESSION CHARTS