

QUARTERLY ESTIMATES OF NEW ZEALAND  
MEAT PRICE, CONSUMPTION  
AND  
ALLIED DATA,  
1946-1965

by

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## P R E F A C E

This paper is one of a series based on research carried out by Mr Yandle on the New Zealand meat market.

In the course of this work it was necessary to compile on a quarterly basis the basic statistical data relating to supplies, consumption and prices of various types of meat for the post-war period.

The series of statistics so compiled, including in some cases new estimates, are presented here since it was thought they would be of general interest in their own right to other research workers in the field of marketing and to persons connected with the meat trade.

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B.P. Philpott

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### EDITORIAL NOTE

This publication is one of a series based on a thesis by Mr C.A. Yandle entitled "An Econometric Study of the New Zealand Meat Market", written for the Degree of Master of Agricultural Science at Lincoln College.

The papers in this series will be:-

A.E.R.U. Publication No. 43, "Survey of Christchurch Consumer Attitudes to Meat".

A.E.R.U. Technical Paper No. 3, "The Theory and Estimation of Engel Curves: Some Estimates for Meat in New Zealand".

A.E.R.U. Technical Paper No. 7, "An Econometric Model of the New Zealand Meat Market".

A.E.R.U. Discussion Paper No. 8, "Quarterly Estimates of New Zealand Meat Price, Consumption and Allied Data, 1946-1965".

In this series of publications no attempt has been made to alter the original thesis presentation, thus where, in a particular publication, a section of the thesis is not presented, page numbering has not been corrected and foot-note cross references may in some cases refer to page numbers not included in the same publication.

This discussion paper consists of Chapter 7 of the thesis and appendices C and D. It is concerned with the data used in the time series model. Each set of statistics is described as regards source, working methods employed to put the data into a suitable form and the reliability of each set. Graphical illustrations of the main data sets are given along with some discussion. The actual data estimates are contained in an appendix.



## CHAPTER 7

### TIME-SERIES DATA: SOURCES AND ESTIMATION PROCEDURES USED

#### Introduction

In this chapter the sources of all aggregate time-series data used in the estimation of the New Zealand model parameters are explained. Extensive working of some 'raw' data was required to put it in a suitable form. Where this was necessary the procedures used will be outlined. Presentation of the sources and procedures will follow the order; retail prices, wholesale prices, wholesale-to-retail margins, export prices, consumption data, income, and other data. All data were required as quarterly averages for the New Zealand models, although other time periods were calculated.

#### Retail Meat Prices

The Government Statistician, as part of the collection of data for the consumer price index, records retail prices of selected meat cuts. These statistics, which are collected on the 15th of each month for specified cuts of beef, mutton, pork, ham, and bacon, were the raw data for all retail price series.

Collected prices are reported in a Statistics Department publication which will be referred to as 'Price Statistics'.<sup>1</sup> For the period considered the form of presentation of data varied from year to year as regards;

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1. The publication repeatedly changed title over the period in which the data were collected. For full titles see References; Statistical Series.



- (a) number of centres (cities or towns) for which prices were collected,
- (b) whether the data was shown as a weighted New Zealand average, or the prices in each centre were shown separately,
- (c) the meat cuts for which data were collected,
- (d) the length of time period covered (i.e. monthly, quarterly, annually).

Besides published data in 'Price Statistics', the Statistics Department generously provided, for this study, a more detailed series for the period 1946 to 1962. Between the years 1926 and 1965 nine different groups of retail price information were available. The groups differed from one another in one (or more) of the above respects. The nine groups were:

- A. 1926 to 1930 inclusive. Data were available as quarterly averages for each of the four main centres (Auckland, Wellington, Christchurch, Dunedin). Meat cuts for which prices were collected and used for estimating the weighted average retail price of carcass meat are shown in Appendix C.
- B. 1931 to 1942 inclusive. Data were annual averages for each of the four main centres. Prices were collected for the same meat cuts as in period (A) except for ham, the price of which was not collected from 1939 onwards.
- C. 1943 to 1948 inclusive. As for (B) except data were the weighted annual average of the four main centres. Weights were calculated on a population basis. The price of ham does not appear in this series.

Prices in 'Price Statistics' for the years 1949 to 1955 were incomplete and not used.

- D. 1956 to 1959 inclusive. Data were quarterly average for each of the four main centres. Ham prices were included, but for other meats prices for a different group of cuts from those above were collected.<sup>1</sup>
- E. 1960 to 1965 inclusive. Data were quarterly weighted averages of twenty-one towns, weighting between towns was on a population basis. Price information was collected for the same cuts as in (D). In addition to the above published data the Statistics Department was able to provide the following additional series:
- F. 1946 to 1948 inclusive. Meat prices were weighted monthly averages of the four main centres, the meat cuts for which prices were collected were the same as for (A).
- G. 1949 to 1954 inclusive. Meat prices were weighted quarterly averages of the four main centres. The cuts for which prices were collected were different to other groups and are shown in Appendix C.
- H. 1955 only. Meat prices were weighted monthly averages of the four main centres, with the cuts for which prices were collected the same as for group (G).
- I. 1956 to 1962 inclusive. Meat prices were monthly weighted averages of twenty-one towns, with the cuts for which prices were collected the same as group (D).

For all cuts the prices collected were for first or prime quality.

To make full use of the price information available a system of weights was required for the calculation of the weighted average retail price of each type of meat. Every price needed to be weighted by the proportion that the meat cut it referred to was of total carcase weight. The weights used were derived from carcase cutting tests used for retail

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1. See Appendix C.

price calculation in the latest period of price control.<sup>1</sup> For ham and bacon this procedure was not necessary, the product being uniform and of unvarying price per pound within any one grade. Although no two carcasses will yield the same weight of each meat cut when expressed as a percentage of total carcass weight, it will be evident that a representative or average cutting test will give the closest approximation to reality. As cutting tests were used as a basis for estimating the allowable wholesale to retail margin in the most recent period of price control, it was felt that a cutting test acceptable to both the meat retailing industry and the pricing authority would provide the most reasonable set of weights. For both mutton and pork this procedure was adopted as the cutting tests for both meats were not disputed.

For calculation of the average retail price per pound of beef there was, however, no clearly acceptable cutting test. The Prices Control Division of the Department of Industries and Commerce favoured a cutting test which gave a higher recovery of meat as saleable cuts from the carcass than did the New Zealand Meat Retailers Federation. It was therefore decided to use both the cutting test used during price control, and the one preferred by the Department of Industries and Commerce, on the same data to estimate the sensitivity of the final weighted average price to the cutting test. This procedure was adopted after several butchers were unable to give a clear preference for either test, or for any third test. Provided the two series were to show a constant percentage difference, elasticities estimated from these data would not be affected although there would be a difference in the calculated wholesale-to-retail margin.

Because the whole beef, mutton, and pork carcass is not completely saleable to consumers, two series of prices were calculated for these

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1. Chapter 1, pp. 12-13.

meats. The first series which will be referred to as 'Saleable Cuts' considered the price from the consumer's point of view. This series was a weighted average price of those cuts which are sold over the counter. For example, if, of a 30 lb. side of mutton, 24 lb. is sold to consumers, the weights were calculated with 24 lb. = 1.0000. This therefore is a weighted average of the price regime the consumer faces.

The second series, which will be called the 'Total' series, considers the 30lb. of the previous example = 1.0000. Waste, (fat, bones, etc.), do have some commercial value, but the requisite data for valuing waste during the time period considered was not available.

Information which was available indicated that in no case would the neglect of the commercial value of waste be serious, as 'Total' average carcass price expressed in pence per lb. would be usually affected only in the second decimal place through neglecting value of waste.<sup>1</sup> This series was therefore calculated with the value of waste placed at zero pence per lb. The 'Total' series therefore gives the average retail price from the retailers' point of view, because when buying a carcass he buys the whole carcass at an average wholesale price per lb. Hence an average retail price per lb. over the whole carcass is essential to estimate the retailer's margin.

Most groups of retail price data were given as the weighted average New Zealand retail price for included meat cuts. The weights for each of the towns and cities being calculated on a population basis. In two periods however the prices related to each of the four main centres, and thus required weighting to obtain the weighted New Zealand average price. This weighting was carried out on a population basis after the average retail price for each of the carcass meats had

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1. J.H. Sproston, Managing Director, The Canterbury Bye-Products Co., Ltd, personal communication.

been calculated for each centre. The periods in which this was necessary were 1926 to 1942 inclusive (data groups (A) and (B) above), and 1956 to 1959 inclusive (data group (E) above). In both cases an average population weight was calculated from census figures for the mid-point of the period. The method used is shown in Appendix C. For ham and bacon one extra problem existed. In the New Zealand 'ham and bacon' model these two meats are treated as a single commodity, retail price of each was therefore weighted to give a 'bacon and ham' retail price series. The meats were given equal weights (i.e. a simple average was taken) as they appear in approximately equal proportions in the baconer carcass. Because of the very high correlation between the retail prices of bacon and ham,<sup>1</sup> the combination of the two into a single variable was statistically desirable, and did not result in a significant loss of information.

The method used here for estimating average retail price of each meat has been used in several previous works.<sup>2</sup> The need for such a method arises from the fact that there is no single product called 'beef'. In estimating demand parameters for (say) beef at the retail level, what is being estimated is the weighted average demand of the whole series of individual cuts arising from the beef carcass. The use of the proportions (by weight) in which each of the cuts appear in the carcass to determine average per lb. retail price of carcass meat assumes that a butcher must sell all the cuts from a carcass in their fixed proportions if he is to maximise profit. It is possible for a

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1. Chapter 5, pp. 124-125.

2. See, for example: E.J. Working, Demand for Meat, Institute of Meat Packing, University of Chicago, 1954, pp. 31-35.

also

G.W. Taylor, op. cit., 1963, p. 81.

and

R. Dalziel (Editor), "Cattle and Meat Price Disparities - I", The Review of the River Plate, Vol. 129, No. 3423, 1961, pp. 21-22.

retailer to buy 'broken meat' (less than a complete carcass or side), but this practice is not common because broken meat costs the retailer more per lb. While normally the market as a whole at some stage would be required to absorb the sections of the carcass not bought, in New Zealand's case these extra portions could in fact be exported. However local trade in broken meat is slight, and for all practical purposes regarding the constructing of this price series may be ignored.

There are some possible inadequacies with these price series. The Government Statistician does not survey all cuts of meat from the carcass, because of this cases where one cut of meat had to be aggregated with another of approximately the same price occurred. This problem only arose with the retail price of beef, and it is thought that the possible error in the accuracy of the resulting estimate is not serious. The use of fixed weights derived from cutting tests are not without problems as there are probably as many 'cutting tests' as there are carcasses, and butchers. The resulting weights from the tests used can therefore at best be considered reasonable averages. Finally, the use of population weights to express the relative importance of price in each of the centres surveyed is again an 'average' device. It is doubtful however whether a more accurate series could be calculated given the available data.

The price series which resulted from the weighting of the prices of individual cuts was consistent between data groups, and where an 'overlap' between groups occurred, agreement was high. The Industries and Commerce Department's Price Control Division has maintained a separate retail price series since 1958, and there is close agreement as regards the movement of prices between their series and the one calculated here, although the absolute level differs slightly.

Prices were calculated for two different time intervals. The first was annual average prices for the period 1926 to 1965 inclusive, and the second was quarterly average prices from 1946 to 1965 inclusive.

In assessing the difference between alternative cutting tests for beef the quarterly data from 1946 to 1965 was used. For the 'Saleable Cuts' data the average difference between all quarterly observations was 0.33d/lb. In the first year the difference was 0.18d/lb. and in the last year was 0.52d/lb. Put in percentage terms with the series based on the Meat Retailer's cutting test equal to 100 per cent, the average difference was 1.3 per cent, with the first year 2.1 per cent, and the last year 1.1 per cent.

Differences were larger with the 'Total' series because the greater allowance for waste in the Meat Retailers' test was now important in estimating average carcase price at retail. The absolute differences were:

First year (1946 average of four quarters)	0.64d/lb.
Average of all observations (quarterly 1946 to 1965)	1.78d/lb.
Last year (1965) average of four quarters)	3.13d/lb.

In percentage terms:

First year, difference based as above	11.8 per cent
Average of whole period	11.0 per cent
Last year	11.0 per cent

It would seem that the difference in the estimated price series due to the use of alternative cutting tests was one of constant percentage, rather than constant absolute difference. This result was expected as the prices of different cuts in the carcase are weighted on a percentage

basis. It was decided to use the Meat Retailers' cutting tests in the New Zealand models as this test gave a greater breakdown of individual cuts of meat, and the wholesale-to-retail margin appeared the more reasonable.

Listed below are the groups of data used for the final series of retail prices:

1926 to 1930 inclusive:	Data group (A) was used for all five years
1931 to 1942 inclusive:	Data group (B) was used for all twelve years
1943 to 1945 inclusive:	Data group (C) was used only for these three years
1946 to 1948 inclusive:	Data group (F) was used for these three years
1949 to 1954 inclusive:	Data group (G) was used for these six years
1955 only:	Data group (H) was used
1956 to 1962 inclusive:	Data group (I) was used for all seven years
1963 to 1965 inclusive:	Data group (E) was used for these three years.

The calculated retail prices, both annually from 1926 to 1965, and quarterly from 1946 to 1965, are shown in Appendix D.

#### Wholesale Meat Prices

The raw data for the wholesale price series were wholesalers' weekly price quotations to retailers for the 676 weeks from 1953 to 1965 inclusive. These statistics, which were made available for this study by confidential sources, were for wholesalers in the four main centres in New Zealand. To obtain a weighted New Zealand average wholesale price series for each meat, quotations for the wholesalers in each centre were initially averaged to calculate the simple average price in each city. The average wholesale prices for each of the four main centres were then weighted on a population basis to give a New Zealand



weighted average wholesale price. Population weights used were the same as the weights for retail prices in the 1956-1959 time period.<sup>1</sup> Although the prices were in the form of quotations and hence subject to change within the week, it was assumed that prices are true wholesale prices as the true wholesale prices vary only occasionally from the weekly quotations.

The basic data for each meat was initially averaged and weighted to give average weekly price in each of the four main centres, and the weighted average New Zealand weekly price. These data were then averaged to monthly, quarterly, and annual averages. Because there is not an even number of weeks in each month there is a problem as to which month into which to put each month's end-week observation. The method employed was; where four or more days of the new month were covered by the Monday quotation of the last week in the old month, then that week's quotation was included in the calculation of the new month's average price. Average prices for monthly, quarterly and annual series are all simple averages of the weekly observations.

Wholesale prices were calculated for five different meats. These were:

- (a) Beef. Prime quality, with a carcass weight range of 501/650 lb., or the nearest weight range available. Beef price quotations were per 100 lb., these were converted to pence per lb.
- (b) Lamb. Spring lamb of prime quality, with a weight range of 29/36 lb.
- (c) Hogget. Prime grade, 41/48 lb. or nearest weight range.
- (d) Mutton. Wether mutton, first grade, 49/56 lb. weight range or nearest weight range available.

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1. See Appendix C, Part B, 'Calculation of Population Weights' for the 1956-1959 period.

(e) Pork. First quality head on 31/90 lb. weight range, or the firm's nearest equivalent.

Data were not available for all firms, and in some cases for all cities, over the whole thirteen year period. Because the sources of data are confidential, these periods cannot be defined. However after careful examination of the resulting series no noticeable changes were detected where data for a firm or city began or ended. There were also occasions where, because of seasonal shortage of supply, pork was not quoted in one centre. The absence of a price quotation at a time of non-availability would not, however, affect the accuracy of a weighted average price.

Wholesale prices for ham and bacon were not available from firms' price quotations. A few firms do quote ham and bacon prices but they were not in sufficient number to form a representative price series for a city, or for New Zealand. 'Price Statistics' does, however, report ham and bacon wholesale prices for the periods:

- (a) 1926 to 1930, quarterly for each of the four main centres. Ham is quoted as uncooked flats and bacon as side bacon.
- (b) 1939 and 1942 to 1958. Weighted annual average of the four main centres. Bacon and ham classification is as above.

Besides these data the Statistics Department provided additional information, using the same ham and bacon classification from 1946 to 1964. These data were monthly weighted average prices to 1958, and quarterly thereafter. Two price series were calculated from these data: quarterly weighted average prices from 1946 to 1964, and a weighted average annual series for those years available up to 1946,

and for all years 1946 to 1964. From 1926 to 1930 the four main centres were weighted by the population weights used for the same period in retail price calculations.<sup>1</sup>

As was discussed in the estimation of the retail prices, the New Zealand 'ham and bacon' model required a single price variable for ham and bacon at both the retail and wholesale level. The method of combining the two wholesale price data sets was the same as that described for the retail prices.

The wholesale price data for bacon and ham did not extend beyond 1964. For the four 1965 quarterly observations the following estimation method was employed. The wholesale price variable for 'bacon and ham' was determined by subtracting from the retail price an estimated wholesale-to-retail margin. The margin in each quarter was estimated from the average movement in the margin for the appropriate quarter over the previous three years. Estimated quarterly data are shown in Appendix D.

#### Wholesale-to-Retail Meat Margins

The method by which retail quarterly average prices have been estimated for beef, mutton, pork, ham, and bacon over the period 1946 to 1965 for New Zealand has been discussed. Similarly, quarterly average wholesale prices have been estimated for the period 1953 to 1965 for beef, lamb, hogget, mutton, and pork, with ham and bacon quarterly wholesale price series calculated for the years 1946 to 1965. Using the identity specified in the New Zealand model;

$$P_t^r = P_t^w + M_t$$

the wholesale-to-retail margins were calculated for beef, mutton, pork, and 'ham and bacon' for the period 1953 to 1965 inclusive.

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1. See Appendix C, Part B, 'Calculation of Population Weights'.

The wholesale-to-retail margin data are shown in Appendix D.

### Export Meat Prices

The New Zealand model required export price variables to summarise the influence of export market conditions on the internal market. The most desirable point for measurement would therefore be the f.o.b. price of bare meat on the New Zealand coast. Export price variables measured at this point would enable direct comparison for internal wholesale prices.

Unfortunately data were not available to construct a data series at the f.o.b. level, and the market level chosen was ex-hooks at Smithfield, London. The major inaccuracies resulting from choosing the Smithfield level are:

- (a) Movements in freight and other costs between f.o.b.

New Zealand and ex-hooks Smithfield could not be allowed for.

In the model this would result in greater unexplained variance in the wholesale price formation equation, or bias in the export price coefficient if the movement in these costs were correlated with the wholesale price in New Zealand.

- (b) No direct effect of meat shipped to markets other than the United Kingdom was shown in the export price variables.

For lamb this problem was not severe as the majority of New Zealand lamb exports are sold in the United Kingdom. Significant quantities of mutton were sold in other markets (especially Japan) only in the last three years (1962-1965) in which the data used for the model were drawn, hence this problem was not serious for mutton.

Beef exports are, however, very different. New Zealand has sold

large quantities of beef to the United States since 1957. In addition New Zealand beef prices are quoted only intermittently on the London market. It was noted, however, that New Zealand and Australian beef prices were, when both prices were quoted, very similar in all cases and often identical. Australian beef prices were therefore used as an indicator of movement in New Zealand beef prices on the London market. As there were no reliable statistics available of New Zealand beef prices in the United States, the London prices were used as the export beef price variable. If it can be assumed that exporters allocate beef supplies between markets on the basis of price, the London prices could be satisfactory. The correlation coefficients reported earlier<sup>1</sup> indicate, however, that the export beef prices were not as highly correlated with internal wholesale price as lamb and mutton export prices. This could indicate that the export beef prices used were not fully satisfactory.

For most years (1955-1964) the export price data used were provided by J.M. Chetwin as average monthly prices.<sup>2</sup> These average monthly prices were, for the New Zealand models, transformed into average quarterly prices and extended both forward and backward to provide a uniform data series over the years 1953 to 1965.

For lamb the prices used between 1955 and 1965 were the Imported Meat Trades Association (I.M.T.A.) quotations at ex-hooks Smithfield.<sup>3</sup> These prices were reported ex-store prior to the 7th March, 1958, and were adjusted to ex-hooks by the addition of the average difference in price between ex-store and ex-hooks (0.63d/lb.) in the preceding period. During the years 1953-1954 the estimation method was more complex.

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1. Chapter 5, pp. 110-111.

2. Mr Chetwin collected these data as part of an econometric investigation into the demand for New Zealand meat in the United Kingdom.

3. Reported in: New Zealand Meat Board, Annual Report(s), Wellington. also Australian Meat Board, The Australian Meat Producer and Exporter, Sydney.

Nationing and price control in the United Kingdom ended in June 1954, and the wartime bulk purchase agreements expired in September of that year. Up to September 1954 the bulk purchase prices were therefore used. For the remaining quarterly observation of 1954 the price quotation used was from a different source,<sup>1</sup> adjusted by the difference in price quoted between the two sources for the first quarter of 1955 (2.53d/lb.).

Mutton prices were assembled in the same manner as those for lamb apart for the final quarter in 1954, this observation was derived from the Central Markets Committee, Smithfield, London.<sup>2</sup> For beef the same method was used as for lamb. The adjustment factor for the fourth quarter of 1954 was 1.75d/lb.

The grade of each meat for which price quotations were used was:

Beef: Australian frozen beef, first quality.

Mutton: New Zealand ewes, first quality 49-56 lb.  
weight range.

Lamb: New Zealand first prime down cross lamb, 29-36 lb.  
29-36 lb. weight range.

These data are shown in Appendix D.

For the monthly correlations reported earlier,<sup>3</sup> the same data sources were used with prices as monthly averages rather than quarterly averages. Data for United Kingdom wholesale prices of pork were also supplied by Mr Chetwin.<sup>4</sup> The grade used was for first grade pork, 100 lb. and under.

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1. Commonwealth Economic Committee, Meat, Her Majesty's Stationary Office, London, 1955.

2. New Zealand Meat and Wool Board's Economic Service, Wellington, personal communication.

3. Chapter 5, pp. 110-111.

4. The basic source of Pork data was Commonwealth Economic Committee, Meat, op. cit.

## Meat Consumption

Quarterly consumption data are available from the Monthly Abstracts of Statistics from the quarter ended December 1950. Consumption is shown in thousand tons, bone in carcase weight, for beef, veal, mutton, lamb and pigmeats. Consumption data are also given for edible offals, but were not used in this study.

The method of compiling these figures is of importance as a guide to their accuracy. At the point of slaughter there are four sources of meat for consumption in New Zealand. These are abattoirs, export meat works, rural slaughterhouses, and meat killed on farms. The New Zealand Department of Agriculture collects data on slaughterings at abattoirs and rural slaughterhouses, and also makes an assessment of stock killed on farms. In addition the department collects information from export meat works regarding the destination of all meat slaughtered at export works. New Zealand consumption is not therefore assessed as the difference between production and exports, but is an assessment of meat entering local trade after stock charges have been allowed for.

The consumption series is adequate except for the aggregation of pigmeats into one grouping. For this study it would have been desirable for pigmeat consumption to be divided into pork, and 'ham and bacon'. Although these data were not available quarterly, an annual breakdown into the two classes was available in the New Zealand Official Yearbook. This annual series has the same classification for meats other than pigmeats as that of the Monthly Abstracts, but with pigmeats further subdivided into porker, baconer, and chopper meats. The sub-division is therefore on the basis of carcase type. Porker carcasses are used mostly for pork,<sup>1</sup> chopper carcasses for smallgoods, and baconer carcasses for

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1. Some porker carcasses are used as lightweight baconers, there was however no way of eliminating this source of error.

Bacon and ham. Porkers and choppers were therefore aggregated to provide a pork series, and baconers became 'bacon and ham'. These data were available annually for year ended 30th September.

The above data were used to estimate quarterly consumption of pork, and bacon and ham. Put in equation form relationships are:

$$P_i = a_i + b_i, \quad i = 1, 4$$

$$A = \sum_{i=1}^4 a_i$$

$$B = \sum_{i=1}^4 b_i$$

$$A + B = \sum_{i=1}^4 P_i = C$$

where  $a_i$  = consumption of pork in the  $i^{\text{th}}$  quarter

$b_i$  = consumption of 'bacon and ham' in the  $i^{\text{th}}$  quarter

$P_i$  = consumption of pigmeat in the  $i^{\text{th}}$  quarter

A = annual consumption of pork

B = annual consumption of 'bacon and ham'

C = annual consumption of pigmeats.

A, B, C, and  $P_i$  are known and it is desired to estimate  $a_i$  and  $b_i$  for each of the four quarters.

Expressed in the equations there are eight unknowns ( $a_i$  and  $b_i$ ,  $i = 1, 4$ ) in terms of six equations linking  $a_i$  and  $b_i$  to the known values  $P_i$ , A, and B. Further information is therefore required to obtain estimates of  $a_i$  and  $b_i$ .

This information was obtained from unpublished data supplied by the Industrial Production Division of the Department of Statistics. Data supplied were for the years ended 30th September 1957 to 1964, by quarters. Statistics used were quarterly production and New Zealand



consumption of porker, baconer, and chopper meats. As before, porker and chopper meats were aggregated to pork, baconer for 'bacon and ham'. These statistics did not apply to all consumption sources of these meats, but only the output from the export meat works destined for the New Zealand market. From these figures it was found that the export works supplied an average of 76.9 per cent of all 'bacon and ham' consumed in New Zealand over these eight years, and 38.4 per cent of the pork. It was decided that the consumption figures for 'bacon and ham' would be the best available indicator of the quarterly consumption pattern within New Zealand. Because the export works supply such a high proportion of the annual consumption of 'bacon and ham', the variation between the pattern of export works quarterly sales in New Zealand, and the New Zealand quarterly total consumption would be a minimum. Scope for variation was much greater with pork for example.

The quarterly consumption of 'bacon and ham' within New Zealand which came from the export meat works was expressed as a proportion of the annual consumption derived from the meat works. This proportional breakup of the year's consumption into quarters was then applied to the New Zealand total annual 'bacon and ham' consumption statistics to obtain estimates of quarterly 'ham and bacon' consumption, i.e.

if  $x$  = the proportion of the export works annual sales of  
'bacon and ham' sold in the first quarter of the year

$y$  = the proportion for the second quarter

$z$  = the proportion for the third quarter

then  $b_1 = xB$

$b_2 = yB$

$b_3 = zB$

$b_4 = 1 - (x + y + z)B$

for each year.

Thus the proportional breakdown of the export works annual sales by quarters was used as an estimate of the true proportional breakdown of annual sales into quarters. By using four of the relationships already available pork consumption could be estimated. These four relationships were:

$$P_i = a_i + b_i, \quad i = 1, 4$$

$$\text{Thus } a_i = P_i - b_i, \quad i = 1, 4$$

Unfortunately the estimates of the proportions were not available for all years between 1953 and 1965, the period for which complete data for the New Zealand model was required. In the years for which the export works seasonal proportions could be obtained (1957 to 1964) the estimates for that year were used. For all other years the average quarterly proportion for the eight years 1957 to 1964 was applied to the annual consumption of bacon and ham.

This method of estimation rests on the assumption that the seasonal pattern of sales from the export works to the New Zealand trade accurately reflects the New Zealand total consumption pattern. In support of this assumption the following table is presented for two typical sample years.

From Table 7.1 it is evident that considerable quantities of baconer carcasses are held over in export works cool stores from peak production periods of the year. Production figures vary greatly between quarters with the seasonal trends in production and consumption being markedly different. As the seasonal production and consumption patterns are different and exports slight it is evident that supplies to the New Zealand market from the export works are determined by internal demand factors, involving stock changes. It is therefore probable that the

New Zealand seasonal consumption pattern, and the seasonal pattern of supply from the export meat works coincide.

TABLE 7.1  
BACONER PRODUCTION AND SUPPLY TO THE NEW ZEALAND  
MARKET FROM EXPORT MEAT WORKS.

<u>Year Ended</u> <u>30th Sept.</u>	<u>Quarter</u> <u>of Year Ended</u> <u>30th Sept.</u>	<u>Production</u> <u>of Baconer</u> <u>Meat (Tons)</u>	<u>Supplies to</u> <u>N.Z. Market</u> <u>(Tons)</u>	<u>Export</u> <u>(Tons)</u>
1957	1	6846	3046	550
	2	7798	4371	817
	3	2198	3218	365
	4	733	3436	56
1962	1	6977	3079	9
	2	7494	5263	33
	3	3174	4070	16
	4	1294	3238	31

Besides the quarterly consumption data required for the New Zealand models, annual consumption data were used in some of the initial simple equations. Apart from pork, and bacon and ham, these data were taken from a series provided by the Department of Agriculture's Biometrics Division. Data from this source were for year ended 30th September, and are for the period 1946 to 1965 inclusive. Statistics for pork and 'bacon and ham', were available from the New Zealand Yearbook only for the period 1950 to 1963 inclusive. Quarterly data are shown in Appendix D.

#### Meat Production

The calculation of the ratios  $A_{B_t}$ ,  $A_{M_t}$ , and  $A_{L_t}$  required statistics of the fresh meat supply available to the New Zealand market. Fresh meat supply available will be equal to quarterly production, hence for the calculation of the availability ratios quarterly production was used.

These data were drawn from the Monthly Abstracts of Statistics for each of the three meats.

For a few observations the availability ratios were slightly greater than unity, indicating that some meat was drawn from frozen stocks to supplement fresh supply available. This problem arose mostly in the winter quarter with mutton and lamb, but even with these meats occurred on only very few occasions. Where this problem did arise, the ratio was restricted to unity under the assumption that all fresh supplies were consumed locally, and that the frozen supplemental supplies were marginal and sold at a discount.

#### Income

The derivation of acceptable income data presented problems because income statistics were published as annual aggregate income. No simple system of linear interpolation could therefore adequately fulfill data requirements for quarterly income. Linear interpolation between annual average price for quarterly price observations, for example, would be relatively simple because price data is presented as annual averages not annual aggregates. The method used here for deriving quarterly income estimates therefore requires explanation.

For this study it was desired that income statistics show only income which the consumer has available as cash to spend on consumption or save. Private income as shown in the Monthly Abstracts or the Official Yearbook therefore required adjustment to satisfy this concept. Private income net of direct taxation and undistributed company profits was the basis of the estimate used. This measure of income is here termed Personal Disposable Income.

The major portion of the series was derived from the New Zealand

Official Yearbook.<sup>1</sup> Figures for 1965 and 1966 were from the August 1966 Monthly Abstracts, and that month's supplement.<sup>2</sup> Undistributed company profits were not available from published statistics for 1945, 1946, 1965 and 1966. Estimates were made based on the percentage of profits distributed in the two preceding years (for 1965 and 1966), and the two following years (for 1945 and 1946).

The method of estimating quarterly personal disposable income from annual personal disposable income was as follows:

$$\begin{array}{llll}
 \text{Let } Y_1 & = & \text{Personal disposable income in Year 1} & \\
 Y_2 & = & \text{Personal disposable income in Year 2} & \\
 y_1 & = & \text{First quarter} & ) \\
 & & & ) \\
 y_2 & = & \text{Second quarter} & ) \\
 & & & ) \\
 y_3 & = & \text{Third quarter} & ) \\
 & & & ) \\
 y_4 & = & \text{Fourth quarter} & )
 \end{array}
 \quad
 \begin{array}{l}
 \\
 \\
 \text{Personal disposable} \\
 \text{income of Year 2} \\
 \\
 \\
 \\
 \end{array}$$

Then assuming a linear rate of growth on decline in income within any one year the following restrictions can be derived:

$$\begin{array}{rcl}
 y_1 + y_2 + y_3 + y_4 & = & Y_2 \\
 y_2 - y_1 & = & y_3 - y_2 \\
 y_2 - y_1 & = & y_4 - y_3 \\
 y_1 & = & \frac{Y_1}{4} + (y_2 - y_1)
 \end{array}$$

Solving for  $y_1$ ,  $y_2$ ,  $y_3$  and  $y_4$

$$\begin{array}{rcl}
 y_1 & = & \frac{1}{10} (Y_2 + \frac{3}{2} Y_1) \\
 y_2 & = & \frac{1}{10} (2 Y_2 + \frac{1}{2} Y_1)
 \end{array}$$

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1. New Zealand Official Yearbook, op. cit., pp. 736, 750, 741 and 751, 1965.  
 2. Data are for year ended 30th March shown.

$$y_3 = \frac{1}{10} (3 Y_2 - \frac{1}{2} Y_1)$$

$$y_4 = \frac{1}{10} (4 Y_2 - \frac{3}{2} Y_1)$$

for the four quarters between annual observations  $Y_1$  and  $Y_2$ . For succeeding observations (i.e. between  $Y_2$  and  $Y_3$ ) a slight modification was made to link the first observations of the new year with the last observation of the old year. The formula for quarterly income in year three then becomes:

Let  $y_{4_t}$  = the income in the fourth quarter of the preceding year (i.e. year two)

$$\text{then } y_1 = \frac{1}{10} (Y_3 + 6 y_{4_t})$$

$$y_2 = \frac{1}{10} (2 Y_3 + 2 y_{4_t})$$

$$y_3 = \frac{1}{10} (3 Y_3 - 2 y_{4_t})$$

$$y_4 = \frac{1}{10} (4 Y_3 - 6 y_{4_t})$$

This method of calculation depends on acceptance of a linear trend in growth (or decline) or personal disposable income within any one year. Income statistics are shown in Appendix D, all calculations were in current terms because each year's aggregate is the sum of the four quarters in current terms. Year one in the above calculation was 1945.

#### Index of Butchers' Wage Costs

An index of butchers' wage costs was constructed from the annual average minimum weekly wage rates, for three classes of butcher employee, published in 'Price Statistics'. The three classes of employee were first shopman, second shopman and butchers' assistant. The average weekly wage rates for each class were reduced to an index

(1955 = 1000) for the years 1945 to 1965 inclusive and weighted according to the proportion of total labour employed in butchers' shops each class forms.<sup>1</sup> The weighted average index was then interpolated between years to give quarterly observations.

This wage cost information was in terms of minimum average weekly wage rates, and hence may not be completely satisfactory. These statistics, however, should indicate the general movement in butchers' wage costs. It was noted that each of the three indices varied little from the other two. Thus while the weightings may not have been completely accurate, the effect on the final index was slight. The quarterly index of butchers' wage costs is shown in Appendix D.

#### New Zealand Population

All New Zealand population statistics used in this work were taken from the Monthly Abstracts of Statistics. For the simple models which used annual data, mean population for each twelve month period was used. Quarterly population was the estimated population at the last day of each quarter, as shown in the Monthly Abstracts. Following the 1951 census there occurred an extensive revision of previous population data. This revision was made only on an annual basis, hence quarterly data were estimated by interpolation between annual figures for the years 1946 to 1950. Population statistics are listed in Appendix D.

#### Consumer Price Index

The consumer price index used was the official quarterly index compiled by the Government statistician and reported in the Monthly

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1. The weights were:	First shopman	0.350
	Second shopman	0.425
	Butcher's assistant	0.225

These weights were derived from employment statistics provided by a large meat retailing organisation.

Abstracts of Statistics. The base for this index was first quarter 1955 = 1000.

### Discussion of the Data

In the remainder of this chapter relationships amongst the data series estimated will be discussed. This will proceed as a discussion of graphical illustrations of the data sets. Tables of statistics calculated will not be discussed, and have been confined to Appendix D.

Graph 7.1 illustrates the annual average retail prices of beef, mutton, and pork from 1926 to 1965 calculated on the average per pound retail price of a whole carcase. The most interesting feature of the graph is the relative stability of prices up to 1947, after which prices increased relatively quickly until the mid 1950's, then levelled out until 1963, after which they rose again quite rapidly.

Of the individual meats pork was, as expected, the highest priced over the whole period. It is of some interest however that up until 1958 mutton was for most years more expensive than beef, when calculated on a 'Total' carcase basis. In the post 1958 period the influence of the improved export prospects for beef with the opening of the United States market lifted the retail price for beef well above that for mutton.

In Graph 7.2 the same annual data are presented as in Graph 7.1, but on a 'saleable cuts' basis, thus giving the price regime as the consumer sees it. As was discussed earlier the main difference between the data used in the two graphs is the proportion of each carcase which is wasted (fat, bones, etc). The relative increase in the price of beef as shown in Graph 7.2 over Graph 7.1 is thus a reflection of the higher proportion of the beef carcase which cannot be sold to the consumer.



In general the same trends in meat prices over time shown in Graph 7.1 are preserved in this second graph, movements in prices have been accentuated however. Beef retail prices on a saleable cuts basis are shown as being similar to mutton retail prices, up to 1948 after which they diverge, beef prices becoming progressively closer to pork price levels. As before, both beef and mutton retail prices reflect general export price movements.

Graph 7.3 presents quarterly average retail prices for the 'Total' series from 1946 to 1965. Some seasonality in price movements is evident, but in general this is small compared to movements caused by other market forces. The trends in these prices are as noted above.

Ham retail prices and bacon retail prices are shown in Graph 7.4 on a quarterly average basis. From this graph it is evident that these two prices move together over time, a point discussed earlier in this chapter. Both sets of prices have remained remarkably free of short-term fluctuations, suggesting that it is quantity which adjusts to a relatively constant price. This in fact is the case, as ham and bacon wholesalers set the retail prices which may be charged. It is also of interest that any major increase in the price of either good has usually occurred during the final quarter of the year, the start of the period of greatest consumption within the year. In an effort to avoid inter-correlation problems these two prices were combined for use in the New Zealand models.

Graphs 7.5 - 7.12 show the relationships between each meat's export, wholesale, and retail (total carcass series) price for the period 1953-1965. These graphs demonstrate the relationship between the price variables. The meats are treated in the order; beef, mutton, lamb, pork, and 'ham and bacon'.

In Graph 7.5 the wholesale and retail prices of beef are graphed. In general the price movements follow one another closely, with greater variation at the wholesale level of the market than at retail. The greater price variation at the wholesale level could be expected where meat retailers practise price levelling.<sup>1</sup>

With all meats the export price used was the United Kingdom whole-wholesale price,<sup>2</sup> and will be denoted as such on the graphs. Graph 7.6 shows United Kingdom and New Zealand wholesale beef prices plotted against time. Evidence of a relationship is shown by this graph, but uncorrelated variation between these variables is evident. This could have occurred because the price series used to calculate United Kingdom price was not ideal, also there was the possibility that the United Kingdom price does not reflect true New Zealand export price.<sup>3</sup> There will of course always be some variation between an export price and wholesale price series due to the influence of other market forces, such as those specified in the wholesale price formation equations.

Graph 7.7 shows the wholesale prices for lamb, hogget, and mutton. It is evident that all sheep meat prices vary in much the same way over time, due probably to the relationships between their export prices. The most striking feature of the graph is however the closeness with which hogget and mutton wholesale prices move together. Apart from a premium for hogget the two price series are virtually identical. Lamb wholesale prices do however show some independent movements. As mutton consumption data includes hogget, the similarity of their price movements did not warrant separating them into separate classes. Hogget was therefore considered as high quality mutton, the difference in price being a quality premium, for the purposes of the New Zealand meat model.

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1. Chapter 1, pp. 12-13.

2. Pp. 159-161.

3. Pp. 159-160.

In Graph 7.8 the New Zealand, and the United Kingdom wholesale prices for mutton are shown. While this graph shows the same general movement in the two series, it is evident that the relationship between these variables is not a simple one, other variables having a direct influence on the formation of the New Zealand wholesale price.

The retail and wholesale mutton prices are shown in Graph 7.9. As with beef the influence of price levelling is evident, although not as pronounced apart from the year 1957. In all the graphs showing wholesale and retail prices the butchers' margin forms the area between the two prices. An indication can therefore be gained of the movement in that margin between successive time periods.

Lamb wholesale price, as could be expected, is indicated in Graph 7.10 as being strongly related to the United Kingdom price. The strong dependence of internal wholesale price upon export prices was expected because of the smaller proportion of annual lamb production consumed within New Zealand. The dependence would therefore be more definite than for the other meats. None the less some divergences between the series is present, occurring mostly in the winter seasons when the availability ratio of lamb tends to unity. There is no wholesale and retail price graph for lamb because retail lamb prices were not available.

Graph 7.11 demonstrates the movement in pork wholesale and retail prices over time. As with the other meats the practice of meat retailers of levelling prices is evident. The wholesale price of pork gives evidence of having a four year cycle associated with it; although regular seasonal price movements tend to mask this cycle. The retailer's margin is indicated as having increased with each down-swing of the wholesale price cycle. This in itself is not especially significant, however, as it could be part of the retailer's pricing

policy to increase his margin to cover increased costs only at times of falling wholesale prices. The consumer has thus not necessarily been harmed by this process which could be expected as part of price levelling.

The most noticeable feature of Graph 7.12 is the relative price stability at both market levels, in contrast to all the other meats. 'Ham and bacon' are marketed in a manner normally confined to manufactured products. Hence the price stability shown in this graph.

Graph 7.13 shows both the movements in estimated quarterly personal disposable income, in the consumers' price index, and in the index of butchers' wage costs. The vertical axis thus measures current income in £'s per person per quarter, and represents the index scale. The consumers' price index has a base of 100.0 for the first quarter of 1955, the index of butchers' wage costs a base of 1955 average equals 100.0.

The income series shows a steady rise over the twenty year period shown, apart from the post wool-boom period, and the period of partial recession in 1958-1959. These income data are in some ways a reflection of the assumed linearity of growth or decline within any one year. The assumed linearity, along with the linking procedure adopted between years, can result in an 'over-reaction' on the part of the income estimating procedure. It seems more likely, for example, that rapid decline in income in 1951 followed by its rapid rise in 1952 as is shown by the graph, was in fact not as severe as shown. A smoother transition appears more probable, neither reaching the heights or depths of the graphed figures. A similar over-reaction in the 1958-1960 period also probably occurred. Apart from these two periods the linear assumption seems quite reasonable, as there are no other really violent changes in the slope indicated between successive years.

The final three graphs illustrate the levels of quarterly per

person consumption of selected meats in New Zealand. Graph 7.14 shows the consumption of beef and mutton, Graph 7.15 pigmeats, lamb, and veal, and Graph 7.16 pigmeats, pork, and (by difference) 'ham and bacon'. The vertical scale of Graph 7.16 is twice that of the other two.

All the meats shown indicate strong seasonal consumption patterns apart from mutton, where a seasonal trend is noticeable only over part of the time period. The relatively slow change in consumption level of each meat over time is also quite noticeable, considering the general movement in relative prices of the meats which has occurred over the time period shown.<sup>1</sup> A most important conclusion from these graphs can be drawn, the share of the market indicated as possessed by each meat. This share will have an important bearing on the interpretation of some estimated model coefficients.

### General Discussion

In this chapter the sources of data, and the methods used to work the data into suitable form, have been explained. A graphical representation and discussion of the data has also been carried out. The objective has been to make quite clear the strengths and weaknesses inherent in each data set. As always with aggregate statistics, the form in which they are available is never entirely suited to the use to which they will be put. This description has therefore been made to allow an evaluation of the worth of each set of statistics.

It is believed that most of the series are of good quality. However some do have weaknesses, and these weaknesses will influence their performance in the models. This aspect will be discussed further when the estimated models are evaluated.

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1. Graphs 7.1, 7.2, 7.3.

# APPENDIX C

## WEIGHTING METHODS EMPLOYED IN THE ESTIMATION OF RETAIL AND WHOLESALE MEAT PRICES.

### Part A: Calculation of Meat Cut Weights.

Beef Weights - using the Meat Retailers cutting test.

Carcase Side Weight = 337 lb.

<u>Cuts for Which a Price is Quoted by the Govern- ment Statistician</u>	<u>Weight of Cut<sup>1</sup> in Carcase (lb)</u>	<u>Weighting for 'Saleable' Series</u>	<u>Weight for 'Total' Series</u>
(1)	(2)	(3)	(4)
<u>1926 to 1948 Inclusive</u>			
Rolled Sirloin	19.0000	0.0899	0.0564
Prime Ribs	25.2500	0.1194	0.0749
Rump Steak	14.8125	0.0701	0.0440
Topside	25.8750	0.1224	0.0768
Stewing Steak	80.5000	0.3806	0.2388
Corned Round	17.2500	0.0816	0.0512
Corned Brisket	15.7500	0.0745	0.0467
Beef Sausages	13.0000	0.0615	0.0386
Total Saleable	211.4375	1.0000	0.6274
Wastage	125.5625		0.3726
Total	337.0000		1.0000
<u>1949 to 1955 Inclusive</u>			
Rolled Sirloin	19.0000	0.0899	0.0564
Prime Ribs	25.2500	0.1194	0.0749
Rump Steak	36.3750	0.1720	0.1079
Blade Steak	102.0625	0.4827	0.3029
Corned Brisket	15.7500	0.0745	0.0467
Beef Sausages	13.0000	0.0615	0.0386
Total Saleable	211.4375	1.0000	0.6274
Wastage	125.5625		0.3726
Total	337.0000		1.0000

1. Includes other cuts of approximately the same per lb price for which no Price Quotes were available.

(1)	(2)	(3)	(4)
	<u>1956 to 1965 Inclusive</u>		
Rolled Sirloin	19.0000	0.0899	0.0564
Prime Ribs	25.2500	0.1194	0.0749
Rump Steak	14.8125	0.0701	0.0564
Blade Steak	85.6250	0.4049	0.2540
Corned Silverside	43.1250	0.2039	0.1280
Mince	10.6250	0.0503	0.0315
Sausages	13.0000	0.0615	0.0386
Total Saleable	211.4375	1.0000	0.6274
Wastage	125.5625		0.3726
Total	337.0000		1.0000

Beef Weights - using Price Control Division cutting test.  
Whole Carcase Weight = 711.18 lb.

	<u>1926 to 1948 Inclusive</u>		
Rolled Sirloin	60.00	0.1226	0.0844
Prime Ribs	51.37	0.1050	0.0722
Rump Steak	43.04	0.0879	0.0605
Topside	63.55	0.1298	0.0894
Stewing Steak	164.91	0.3370	0.2319
Corned Round	34.37	0.0702	0.0483
Corned Brisket	35.19	0.0719	0.0495
Beef Sausages	37.00	0.0756	0.0520
Total Saleable	489.43	1.0000	0.6882
Wastage	221.75		0.3118
Total	711.18		1.0000

	<u>1949 to 1955 Inclusive</u>		
Rolled Sirloin	60.00	0.1226	0.0844
Prime Ribs	51.37	0.1050	0.0722
Rump Steak	92.00	0.1880	0.1294
Blade Steak	213.87	0.4369	0.3007
Corned Brisket	35.19	0.0719	0.0495
Sausages	37.00	0.0756	0.0520
Total Saleable	489.43	1.0000	0.6882
Wastage	221.75		0.3118
Total	711.18		1.0000

(1)	(2)	(3)	(4)
	<u>1956 to 1965 Inclusive</u>		
Rolled Sirloin	60.00	0.1226	0.0844
Prime Ribs	51.37	0.1050	0.0722
Rump Steak	43.04	0.0879	0.0605
Blade Steak	200.10	0.4088	0.2814
Corned Silverside	97.92	0.2001	0.1377
Mince	(not included in cutting test)	-	-
Sausages	37.00	0.0756	0.0520
Total Saleable	489.43	1.0000	0.6882
Wastage	221.75		0.3118
Total	711.18		1.0000

Mutton Weights - Carcase Side Weight = 30.375 lb.

	<u>1926 to 1948 Inclusive</u>		
Leg	6.1875	0.2506	0.2037
Shoulder	5.5625	0.2253	0.1831
Loin	2.5625	0.1038	0.0843
Neck	5.4375	0.2203	0.1790
Chops	4.9375	0.2000	0.1626
Total Saleable	24.6875	1.0000	0.8127
Wastage	5.6875		0.1873
Total	30.3750		1.0000

	<u>1949 to 1965 Inclusive</u>		
Leg	6.1875	0.2506	0.2037
Forequarter	11.0000	0.4456	0.3621
Midloin Chops	7.5000	0.3038	0.2469
Total Saleable	24.6875	1.0000	0.8127
Wastage	5.6875		0.1873
Total	30.3750		1.0000

Pork Weights<sup>1</sup> - Carcase Side Weight = 46.375 lb.

	<u>1926 to 1948 Inclusive</u>		
Leg	20.7500	0.5123	0.4474
Loin	3.4375	0.0849	0.0741
Belly	11.22125	0.2770	0.2420

1. An allowance has been made for the meat content of a half-head.



(1)	(2)	(3)	(4)
	<u>1926 to 1948 Inclusive (Cont'd)</u>		
Midloin Chops	5.09375	0.1258	0.1099
Total Saleable	40.5025	1.0000	0.8734
Wastage	5.8725		0.1266
Total	46.3750		1.0000

	<u>1949 to 1965 Inclusive</u>		
Leg	22.0650	0.5448	0.4758
Chops (loin)	18.4375	0.4552	0.3976
Total Saleable	40.5025	1.0000	0.8734
Wastage	5.8725		0.1266
Total	46.3750		1.0000

Part B: Calculation of Population Weights.

For the 1926 to 1942 Period Inclusive

Population weights for this period were based on the 1936 Population Census.<sup>1</sup>

	<u>Population</u>	<u>Weight</u>
Auckland	210,393	0.3666
Wellington	149,382	0.2603
Christchurch	132,282	0.2305
Dunedin	81,848	0.1426
Total	<u>573,905</u>	<u>1.0000</u>

For the 1956 to 1959 Period Inclusive

Population weights for this period were based on the 1956 and 1961 Census population in the four main centres.<sup>2</sup>

	<u>Average Weight</u>
Auckland	0.4771
Wellington	0.1666
Christchurch	0.2383
Dunedin	0.1180
Total	<u>1.0000</u>

1. Government of New Zealand, New Zealand Official Yearbook, Wellington, 1938, p. 70.

2. Government of New Zealand, New Zealand Official Yearbook, Wellington, 1963, p. 61.

TIME - SERIES DATA.

Part A: Quarterly Data.<sup>1</sup>

<u>Year and Quarter (Calendar)</u>		<u>SALEABLE CUTS</u>				<u>TOTAL SERIES</u>			
		$P_{B_t}^r$	$P_{B_t}^r$	$P_{M_t}^r$	$P_{P_t}^r$	$P_{B_t}^r$	$P_{B_t}^r$	$P_{M_t}^r$	$P_{P_t}^r$
		<u>Meat</u>	<u>Industries</u>			<u>Meat</u>	<u>Industries</u>		
		<u>Retailers'</u>	<u>and</u>			<u>Retailers'</u>	<u>and</u>		
		<u>Cutting</u>	<u>Commerce</u>			<u>Cutting</u>	<u>Commerce</u>		
		<u>Test</u>	<u>Test</u>			<u>Test</u>	<u>Test</u>		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1946	1	8.39	8.58	8.24	11.85	5.27	5.90	6.70	10.35
	2	8.40	8.59	8.24	11.85	5.27	5.91	6.70	10.35
	3	8.82	8.99	9.04	12.56	5.53	6.19	7.35	10.97
	4	8.84	9.01	9.11	12.64	5.55	6.20	7.41	11.04
1947	1	8.41	8.60	8.29	11.85	5.28	5.92	6.74	10.35
	2	8.42	8.60	8.30	11.86	5.28	5.92	6.75	10.36
	3	8.85	9.03	9.09	12.65	5.55	6.21	7.39	11.05
	4	11.37	11.55	12.03	15.27	7.13	7.95	9.78	13.34
1948	1	10.92	11.10	10.75	14.34	6.85	7.64	8.73	12.52
	2	10.96	11.16	10.78	14.66	6.88	7.68	8.76	12.81
	3	11.43	11.62	11.58	15.35	7.17	8.00	9.41	13.41
	4	11.49	11.69	11.42	15.22	7.21	8.04	9.28	13.30
1949	1	13.08	13.29	12.07	16.52	8.21	9.15	9.81	14.43
	2	13.12	13.32	11.70	16.25	8.23	9.17	9.51	14.20
	3	14.93	15.12	13.89	18.56	9.37	10.40	11.29	16.21
	4	15.04	15.23	13.70	18.60	9.44	10.48	11.14	16.24
1950	1	13.89	14.10	12.65	17.65	8.72	9.71	10.28	15.42
	2	14.42	14.62	12.90	18.32	9.05	10.06	10.49	16.00
	3	15.26	15.44	13.54	19.30	9.58	10.63	11.00	16.86
	4	16.37	16.52	14.21	19.66	10.27	11.37	11.55	17.17
1951	1	16.45	16.61	14.17	20.62	10.32	11.43	11.52	18.01
	2	17.39	17.53	14.98	21.86	10.90	12.07	12.18	19.09
	3	18.90	19.05	16.88	23.31	11.86	13.11	13.72	20.36
	4	20.67	20.81	17.72	24.43	12.97	14.32	14.40	21.34
1952	1	20.88	21.04	17.46	25.04	13.10	14.48	14.19	21.87
	2	21.50	21.65	17.70	25.79	13.49	14.90	14.39	22.52
	3	22.95	23.11	17.97	27.61	14.40	15.91	14.61	24.12
	4	24.50	24.54	18.09	30.42	15.31	16.89	14.70	26.57

1. Where a variable is as defined in the New Zealand Models, symbol notation is used, elsewhere full titles are shown. All values are in 'current' terms with Quantities and Personal Disposable Income per head, and Prices per pound. The symbol notation is defined in: Chapter 5, pp. 105-106.

Indicates that this statistic was either not available, or not calculated.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1953	1	24.57	24.70	18.06	31.98	15.41	17.00	14.68	27.93
	2	24.86	24.99	18.32	32.45	15.60	17.20	14.89	28.34
	3	25.61	25.76	19.28	34.05	16.06	17.73	15.67	29.74
	4	26.59	26.75	20.33	34.50	16.68	18.41	16.53	30.13
1954	1	26.80	26.95	20.37	34.21	16.81	18.55	16.56	29.88
	2	27.01	27.16	20.57	34.52	16.95	18.69	16.72	30.15
	3	27.46	27.61	21.25	35.14	17.23	19.00	17.27	30.69
	4	29.00	29.14	21.78	35.51	18.19	20.05	17.70	31.01
1955	1	29.21	29.37	21.48	33.56	18.33	20.21	17.46	29.31
	2	28.56	28.73	22.44	30.24	17.92	19.77	18.24	26.41
	3	28.72	28.89	23.05	30.98	18.02	19.89	18.73	27.06
	4	29.11	29.29	23.81	33.75	18.26	20.16	19.35	29.48
1956	1	27.33	27.85	23.49	34.13	17.15	19.16	19.09	29.81
	2	26.02	26.51	23.05	34.30	16.33	18.25	18.74	29.95
	3	25.96	26.43	22.91	35.47	16.28	18.19	18.62	30.98
	4	26.39	26.87	22.73	35.19	16.56	18.49	18.48	30.74
1957	1	26.15	26.63	22.61	35.16	16.41	18.33	18.37	30.70
	2	27.17	27.63	23.67	35.97	17.05	19.02	19.24	31.42
	3	28.74	29.21	25.38	36.94	18.03	20.12	20.62	32.26
	4	29.96	30.42	26.58	37.74	18.80	20.94	21.60	32.96
1958	1	29.90	30.36	25.75	36.91	18.76	20.89	20.93	32.23
	2	32.72	33.16	26.09	36.74	20.53	22.82	21.21	32.09
	3	32.09	34.52	26.01	37.18	21.39	23.76	21.14	32.47
	4	36.27	36.69	24.64	36.36	22.76	25.25	20.02	31.76
1959	1	36.99	37.40	24.16	35.68	23.21	25.74	19.64	31.16
	2	35.76	36.19	23.76	35.84	22.44	24.91	19.31	31.30
	3	35.80	36.23	23.88	37.05	22.46	24.93	19.41	32.36
	4	36.60	37.02	23.84	37.57	22.95	25.47	19.38	32.82
1960	1	36.23	36.65	22.36	37.86	22.73	25.22	18.17	33.07
	2	35.94	36.37	20.74	38.26	22.55	25.03	16.86	33.42
	3	36.64	37.07	22.26	40.20	22.99	25.51	18.09	35.11
	4	38.50	38.92	23.70	41.10	24.14	26.79	19.26	35.89
1961	1	36.93	37.35	21.99	40.77	23.17	25.71	17.87	35.61
	2	35.89	36.30	21.66	40.52	22.51	24.98	17.61	35.39
	3	35.11	35.51	22.24	41.89	22.03	24.44	18.08	36.59
	4	36.72	37.14	23.12	42.80	23.04	25.56	18.79	37.38
1962	1	35.83	36.25	22.42	41.38	22.48	24.95	18.22	36.14
	2	35.52	35.95	22.57	40.36	22.29	24.74	18.34	35.25
	3	35.53	35.97	22.54	40.90	22.29	24.75	18.32	35.73
	4	35.93	36.36	22.74	41.02	22.54	25.02	18.48	35.82
1963	1	36.50	36.94	23.07	40.90	22.90	25.42	18.75	35.73
	2	36.69	37.14	23.27	40.07	23.02	25.56	18.91	35.00
	3	38.41	38.85	24.48	41.30	24.10	26.74	19.90	36.07
	4	40.49	40.91	26.09	41.73	25.41	28.18	21.20	36.45
1964	1	39.56	40.05	25.56	41.48	24.82	27.56	20.77	36.23
	2	41.20	40.70	25.43	41.68	25.23	28.01	20.67	36.40
	3	42.38	42.86	27.49	43.49	26.59	29.50	22.34	37.99
	4	43.49	43.97	28.80	45.08	27.28	30.26	23.41	39.37
1965	1	43.95	44.47	29.16	45.62	27.57	30.60	23.70	39.85
	2	44.86	45.34	29.42	46.22	28.14	31.24	23.91	40.37
	3	45.62	46.16	30.18	47.13	28.62	31.77	24.52	41.16
	4	47.53	48.05	30.59	48.14	29.82	33.07	24.86	42.04

<u>Year and</u> <u>Quarter</u> <u>(Calendar)</u>		<u>Retail Price</u> <u>of Ham</u>	<u>Retail Price</u> <u>of Bacon</u>	$W_{P_{B_t}}$	$W_{P_{L_t}}$	<u>Wholesale</u> <u>Price of</u> <u>Hogget</u>	$W_{P_{M_t}}$	$W_{P_{P_t}}$
		(9)	(10)	(11)	(12)	(13)	(14)	(15)
1946	1	*	18.19	*	*	*	*	*
	2	*	18.20	*	*	*	*	*
	3	*	18.21	*	*	*	*	*
	4	*	18.21	*	*	*	*	*
1947	1	*	18.24	*	*	*	*	*
	2	*	18.25	*	*	*	*	*
	3	*	18.36	*	*	*	*	*
	4	*	23.29	*	*	*	*	*
1948	1	*	23.31	*	*	*	*	*
	2	*	23.18	*	*	*	*	*
	3	*	23.19	*	*	*	*	*
	4	*	23.29	*	*	*	*	*
1949	1	39.30	23.65	*	*	*	*	*
	2	39.25	23.61	*	*	*	*	*
	3	39.19	23.76	*	*	*	*	*
	4	41.53	26.22	*	*	*	*	*
1950	1	41.54	26.28	*	*	*	*	*
	2	41.54	26.26	*	*	*	*	*
	3	41.58	26.24	*	*	*	*	*
	4	44.41	28.65	*	*	*	*	*
1951	1	45.05	28.96	*	*	*	*	*
	2	48.94	32.30	*	*	*	*	*
	3	49.11	32.31	*	*	*	*	*
	4	54.36	35.26	*	*	*	*	*
1952	1	57.00	36.77	*	*	*	*	*
	2	57.00	37.02	*	*	*	*	*
	3	57.00	36.69	*	*	*	*	*
	4	66.11	42.11	12.60	17.00	*	9.30	21.47
1953	1	66.30	42.34	12.85	15.72	11.53	9.85	22.90
	2	66.30	42.15	12.61	16.02	12.52	11.02	23.36
	3	66.30	42.38	13.57	17.78	15.44	13.95	25.19
	4	66.75	42.46	14.45	18.31	16.03	13.96	23.81
1954	1	69.43	44.29	13.76	17.82	13.54	11.47	23.44
	2	70.68	45.20	13.80	18.35	14.37	12.44	23.74
	3	70.78	45.22	14.40	19.66	16.19	14.34	25.20
	4	70.99	45.16	15.57	25.12	15.82	13.76	24.26
1955	1	69.07	43.13	15.02	22.27	15.72	13.59	19.24
	2	68.98	42.99	13.23	21.32	15.54	13.48	18.36
	3	69.07	42.98	13.77	22.16	17.02	15.06	22.69
	4	75.38	45.05	13.91	24.49	17.50	15.29	24.25

		(9)	(10)	(11)	(12)	(13)	(14)	(15)
1956	1	75.99	45.21	11.87	20.88	15.93	13.76	22.12
	2	76.04	45.23	10.76	19.94	16.18	13.50	25.43
	3	78.47	46.03	10.90	18.19	16.15	13.12	27.08
	4	80.73	46.94	10.79	20.07	16.69	13.88	28.08
1957	1	81.94	47.93	10.56	20.27	16.08	14.29	27.16
	2	83.07	48.79	12.10	23.29	20.46	17.54	28.67
	3	84.43	49.90	14.33	24.19	21.20	18.12	29.21
	4	84.58	49.78	14.58	24.75	20.93	18.13	27.98
1958	1	84.60	49.78	13.58	19.37	17.48	15.84	26.61
	2	84.77	49.79	15.96	18.44	17.15	15.07	25.06
	3	85.04	49.84	17.73	18.87	16.30	13.77	26.93
	4	82.90	48.07	18.83	19.41	15.70	11.99	24.68
1959	1	81.56	47.12	17.91	18.25	14.99	11.94	22.84
	2	81.54	47.03	15.78	16.81	13.29	10.36	23.90
	3	81.34	46.89	17.43	17.61	14.83	12.02	26.81
	4	86.02	49.51	18.33	17.71	13.87	10.81	25.78
1960	1	92.79	54.24	17.33	16.44	12.35	9.58	25.75
	2	92.70	54.34	17.34	17.39	13.51	10.43	26.52
	3	92.67	54.19	18.51	20.12	16.42	12.98	29.26
	4	93.94	55.10	19.00	23.20	17.55	13.81	28.95
1961	1	95.07	56.04	17.50	16.77	15.48	11.97	27.94
	2	96.87	57.22	16.91	16.58	15.51	11.91	28.43
	3	97.35	58.23	17.42	18.04	17.28	13.78	30.42
	4	97.38	58.94	16.94	17.95	15.24	12.19	28.85
1962	1	97.74	59.36	15.59	14.78	13.07	10.46	26.75
	2	97.76	59.37	15.40	15.63	13.37	10.63	26.07
	3	97.68	59.43	15.91	18.74	13.96	11.17	27.51
	4	97.68	59.40	16.40	18.62	14.56	11.41	26.88
1963	1	97.51	59.03	16.66	16.80	14.70	11.64	25.01
	2	97.29	58.51	16.57	16.55	14.73	11.90	24.07
	3	97.32	58.45	18.90	20.49	17.04	13.91	26.54
	4	97.31	58.36	20.11	19.71	17.18	14.20	25.72
1964	1	97.52	58.60	17.44	16.83	15.14	12.64	24.98
	2	98.23	59.22	18.35	18.69	15.65	13.13	26.14
	3	98.25	59.29	20.26	22.30	19.79	16.92	29.27
	4	104.34	62.37	20.93	23.55	19.55	16.48	30.80
1965	1	106.43	63.99	20.22	22.37	19.16	15.81	30.41
	2	106.74	65.56	19.66	23.18	19.48	16.23	29.45
	3	106.87	65.72	20.80	24.34	19.88	16.48	31.40
	4	109.15	65.73	21.36	22.62	19.44	15.93	31.78

<u>Year and Quarter</u> (Calendar)		<u>Wholesale Price of Ham</u>	<u>Wholesale Price of Bacon</u>	$M_{B_t}$	$M_{M_t}$	$M_{P_t}$	<u>Wholesale- to-Retail Margin for Ham</u>	<u>Wholesale- to-Retail Margin for Bacon</u>
		(16)	(17)	(18)	(19)	(20)	(21)	(22)
1946	1	14.53	13.74	*	*	*	*	*
	2	14.58	13.91	*	*	*	*	*
	3	14.63	14.25	*	*	*	*	*
	4	14.63	14.25	*	*	*	*	*
1947	1	14.61	14.02	*	*	*	*	*
	2	16.25	13.70	*	*	*	*	*
	3	17.54	13.88	*	*	*	*	*
	4	18.25	18.14	*	*	*	*	*
1948	1	18.72	18.17	*	*	*	*	*
	2	18.88	18.49	*	*	*	*	*
	3	18.88	18.48	*	*	*	*	*
	4	19.10	18.46	*	*	*	*	*
1949	1	19.13	17.98	*	*	*	*	*
	2	19.13	18.00	*	*	*	*	*
	3	19.13	18.00	*	*	*	*	*
	4	20.31	19.96	*	*	*	*	*
1950	1	20.51	19.99	*	*	*	*	*
	2	20.71	19.94	*	*	*	*	*
	3	20.29	20.16	*	*	*	*	*
	4	22.48	22.13	*	*	*	*	*
1951	1	22.86	22.26	*	*	*	*	*
	2	24.16	23.73	*	*	*	*	*
	3	24.50	24.05	*	*	*	*	*
	4	26.86	26.81	*	*	*	*	*
1952	1	28.50	29.39	*	*	*	*	*
	2	28.50	30.13	*	*	*	*	*
	3	28.75	30.32	*	*	*	*	*
	4	33.00	34.46	*	*	*	*	*
1953	1	33.00	34.38	2.56	4.83	5.03	33.30	7.96
	2	33.00	34.88	2.99	3.87	4.98	33.30	7.27
	3	33.00	34.88	2.49	1.72	4.55	33.30	7.50
	4	33.08	34.96	2.23	2.57	6.32	33.67	7.50
1954	1	33.75	35.56	3.05	5.09	6.44	35.68	8.73
	2	34.38	36.21	3.15	4.28	6.41	36.30	8.99
	3	34.38	36.21	2.83	2.93	5.49	36.40	9.01
	4	34.38	36.17	2.62	3.94	6.75	36.61	8.99
1955	1	32.89	33.96	3.31	3.87	10.07	36.18	9.17
	2	32.81	33.96	4.69	4.76	8.05	36.17	9.03
	3	32.81	33.64	4.25	3.67	4.37	36.26	9.34
	4	36.38	35.63	4.35	4.06	5.23	39.00	9.42

		(16)	(17)	(18)	(19)	(20)	(21)	(22)
1956	1	36.38	35.63	5.28	5.33	7.69	39.61	9.58
	2	36.38	35.71	5.57	5.24	4.52	39.66	9.52
	3	37.79	36.34	5.38	5.50	3.90	40.68	9.69
	4	38.50	36.63	5.77	4.60	2.66	42.23	10.31
1957	1	38.92	37.07	5.85	4.08	3.54	43.02	10.86
	2	39.54	37.97	4.95	1.70	2.75	43.53	10.82
	3	40.25	38.40	3.70	2.50	3.05	44.18	11.50
	4	40.42	38.50	4.22	3.47	4.98	44.16	11.28
1958	1	40.75	38.67	5.18	5.09	5.62	43.85	11.11
	2	40.83	38.67	4.57	6.14	7.03	43.94	11.12
	3	41.00	38.67	3.66	7.37	5.54	44.04	11.17
	4	39.17	36.97	3.93	8.03	7.08	43.73	11.10
1959	1	37.75	35.75	5.30	7.70	8.32	43.81	11.37
	2	37.75	35.75	6.66	8.95	7.40	43.79	11.28
	3	37.75	35.75	5.03	7.39	5.55	43.59	11.14
	4	41.50	39.75	4.62	8.57	7.04	44.52	9.76
1960	1	44.50	42.75	5.40	8.59	7.32	48.29	11.49
	2	44.50	42.75	5.21	6.43	6.90	48.20	11.59
	3	44.50	42.75	4.48	5.11	5.85	48.17	11.44
	4	45.25	43.75	5.14	5.45	6.94	48.69	11.35
1961	1	45.25	43.88	5.67	5.90	7.67	49.82	12.16
	2	47.50	45.75	5.60	5.70	6.96	49.37	11.47
	3	47.50	45.75	4.61	4.30	6.17	49.85	12.48
	4	47.50	47.13	6.10	6.60	8.53	49.88	11.81
1962	1	47.25	47.13	6.89	7.76	9.39	50.49	12.23
	2	47.25	47.13	6.89	7.71	9.18	50.51	12.24
	3	47.25	47.13	6.38	7.15	8.22	50.43	12.30
	4	47.25	46.50	6.14	7.07	8.94	50.43	12.90
1963	1	46.25	44.75	6.24	7.11	10.72	51.26	14.28
	2	46.25	44.75	6.45	7.01	10.93	51.04	13.76
	3	46.25	44.75	5.20	5.99	9.53	51.07	13.70
	4	46.25	44.75	5.30	7.00	10.73	51.06	13.61
1964	1	46.25	44.75	7.38	8.13	11.25	51.27	13.85
	2	47.25	43.88	6.88	7.54	10.26	50.98	15.34
	3	47.25	43.88	6.33	5.42	8.72	51.00	15.41
	4	50.75	50.38	6.35	6.93	8.57	53.59	11.99
1965	1	50.13		7.35	7.89	9.44	34.08	
	2	50.13		8.48	7.68	10.92	35.02	
	3	50.13		7.82	8.04	9.76	35.17	
	4	52.46		8.46	8.93	10.26	34.98	

<u>Year and</u> <u>Quarter</u> <u>(Calendar)</u>		$E_{PB_t}$	$E_{PL_t}$	$E_{PM_t}$	$Q_{DB_t}$	$Q_{DL_t}$	$Q_{DM_t}$	$Q_{DP_t}$	$Q_{DH_t}$
		(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
1946	1	*	*	*	*	*	*	*	*
	2	*	*	*	*	*	*	*	*
	3	*	*	*	*	*	*	*	*
	4	*	*	*	*	*	*	*	*
1947	1	*	*	*	*	*	*	*	*
	2	*	*	*	*	*	*	*	*
	3	*	*	*	*	*	*	*	*
	4	*	*	*	*	*	*	*	*
1948	1	*	*	*	*	*	*	*	*
	2	*	*	*	*	*	*	*	*
	3	*	*	*	*	*	*	*	*
	4	*	*	*	*	*	*	*	*
1949	1	*	*	*	*	*	*	*	*
	2	*	*	*	*	*	*	*	*
	3	*	*	*	*	*	*	*	*
	4	*	*	*	*	*	*	*	*
1950	1	*	*	*	*	*	*	*	*
	2	*	*	*	*	*	*	*	*
	3	*	*	*	*	*	*	*	*
	4	*	*	*	27.42	3.14	16.50	3.86	4.62
1951	1	*	*	*	26.93	2.89	15.49	2.07	6.14
	2	*	*	*	30.02	2.76	16.10	2.90	5.15
	3	*	*	*	29.21	2.29	15.81	2.49	4.50
	4	*	*	*	27.74	3.41	16.37	3.61	3.89
1952	1	*	*	*	26.52	2.82	15.91	2.19	5.15
	2	*	*	*	28.41	2.47	16.51	2.30	4.32
	3	*	*	*	26.78	1.79	17.18	2.15	3.76
	4	*	*	*	23.90	2.88	16.82	2.79	3.19
1953	1	16.81	20.27	9.70	25.18	2.42	15.17	1.82	4.23
	2	16.81	20.27	9.70	26.26	2.30	16.96	1.82	3.54
	3	16.81	20.27	9.70	26.63	2.07	16.85	1.80	3.09
	4	17.50	21.47	9.75	23.64	3.02	16.07	3.18	3.62
1954	1	17.50	21.47	9.75	24.46	2.15	16.42	3.04	4.80
	2	17.50	21.47	9.75	27.40	1.93	17.55	2.49	4.04
	3	17.50	21.47	9.75	26.85	1.49	16.51	2.44	3.53
	4	17.75	27.14	9.39	23.79	2.85	16.71	3.72	4.21
1955	1	17.90	27.02	9.59	24.07	2.52	18.19	3.35	5.58
	2	15.60	24.65	10.60	25.59	2.41	17.93	2.96	4.70
	3	17.70	27.63	12.10	26.39	1.36	17.94	2.99	4.10
	4	16.90	27.09	13.67	24.73	2.90	18.00	4.70	4.51



		(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
1956	1	14.80	24.86	12.02	24.40	2.47	17.92	2.66	5.99
	2	13.80	23.16	9.30	27.46	1.85	18.10	2.77	5.05
	3	15.60	26.07	8.70	27.40	1.43	17.28	2.65	4.41
	4	13.70	25.94	9.40	24.64	2.84	17.44	4.44	4.08
1957	1	14.20	27.93	12.00	25.82	2.02	17.75	2.84	5.83
	2	15.90	28.27	13.18	27.93	1.91	16.88	2.55	4.28
	3	12.80	27.54	8.84	27.85	1.20	16.07	1.96	4.53
	4	12.20	26.29	10.11	26.43	2.67	15.34	4.22	4.20
1958	1	15.90	24.12	12.42	26.58	2.56	16.64	2.81	6.05
	2	20.90	23.44	11.42	27.00	2.65	17.28	2.70	5.15
	3	20.10	24.57	11.61	25.94	1.85	16.97	2.67	2.40
	4	20.20	27.00	11.72	21.76	3.87	18.18	5.75	2.28
1959	1	20.80	23.67	10.29	22.53	2.60	18.87	3.75	5.02
	2	21.20	21.23	8.60	25.18	3.27	21.04	4.00	5.42
	3	22.20	18.87	8.81	23.04	2.20	18.64	3.26	4.39
	4	20.20	19.67	8.38	21.55	4.65	20.03	4.45	5.61
1960	1	22.60	25.25	9.63	21.92	3.59	21.17	3.87	5.02
	2	22.60	24.81	11.36	24.18	3.21	20.31	4.15	3.32
	3	21.40	26.24	10.10	23.58	2.72	19.73	3.69	3.35
	4	21.00	23.36	11.56	19.48	3.82	19.66	4.31	4.45
1961	1	19.80	21.43	11.53	21.06	3.71	20.50	3.44	5.56
	2	19.20	20.04	11.83	24.34	3.70	19.53	3.49	4.93
	3	19.40	18.05	9.34	24.86	3.21	18.81	2.66	4.04
	4	19.90	20.59	10.27	22.55	5.00	18.55	5.31	3.69
1962	1	20.60	21.23	11.07	24.05	5.06	20.25	3.06	6.26
	2	20.70	23.61	11.45	25.14	4.06	19.74	3.01	4.83
	3	21.90	24.77	11.94	25.73	3.77	19.55	2.90	3.82
	4	19.46	23.07	11.23	24.53	4.53	16.62	5.65	3.86
1963	1	17.71	22.32	11.16	24.31	4.86	22.37	3.27	4.95
	2	20.44	22.32	13.04	27.01	4.41	18.80	3.10	4.40
	3	20.94	24.97	13.14	27.46	3.68	20.09	3.45	4.62
	4	21.89	24.19	12.13	22.97	4.79	20.10	4.55	4.93
1964	1	24.39	23.07	13.67	23.52	5.45	20.40	4.22	5.12
	2	26.89	26.43	14.65	24.87	4.23	18.65	3.86	4.43
	3	26.56	28.97	15.85	26.04	3.52	17.36	3.45	5.05
	4	24.06	29.02	15.21	22.76	4.43	18.76	5.10	3.85
1965	1	24.89	27.74	15.48	23.33	4.75	18.75	4.05	5.12
	2	26.47	28.14	14.30	26.98	3.99	17.90	2.98	4.32
	3	28.71	28.19	11.39	27.83	3.04	17.12	3.07	3.76
	4	25.46	26.66	10.96	22.17	4.43	15.98	4.74	3.54

<u>Year and Quarter (Calendar)</u>		$A_{B_t}$	$A_{L_t}$	$A_{M_t}$	$Y_t$	$I_t$	<u>New Zealand Population</u>	<u>New Zealand Consumers' Price Index</u>
		(31)	(32)	(33)	(34)	(35)	(36)	(37)
1946	1	*	*	*	39.12	583	1,741,166	624
	2	*	*	*	40.58	587	1,754,516	623
	3	*	*	*	42.02	590	1,767,865	623
	4	*	*	*	43.44	594	1,781,214	623
1947	1	*	*	*	44.94	597	1,790,274	627
	2	*	*	*	46.20	609	1,799,334	635
	3	*	*	*	47.45	622	1,808,393	638
	4	*	*	*	48.69	634	1,817,453	670
1948	1	*	*	*	49.91	646	1,826,541	693
	2	*	*	*	49.50	646	1,835,630	697
	3	*	*	*	49.10	647	1,844,718	690
	4	*	*	*	48.70	647	1,853,806	695
1949	1	*	*	*	48.29	647	1,863,365	699
	2	*	*	*	50.74	661	1,872,924	701
	3	*	*	*	53.17	675	1,882,483	709
	4	*	*	*	55.57	689	1,892,042	712
1950	1	*	*	*	57.98	703	1,900,939	713
	2	*	*	*	61.87	733	1,909,836	736
	3	*	*	*	65.72	763	1,918,733	760
	4	*	*	*	69.54	793	1,927,629	773
1951	1	*	*	*	73.27	823	1,938,032	784
	2	*	*	*	69.84	827	1,947,438	817
	3	*	*	*	66.49	830	1,955,623	844
	4	*	*	*	62.94	834	1,970,522	865
1952	1	*	*	*	59.48	837	1,984,730	876
	2	*	*	*	62.84	847	1,994,704	888
	3	*	*	*	66.09	857	2,007,508	898
	4	*	*	*	69.14	867	2,024,556	905
1953	1	0.5872	0.0209	0.1906	72.29	877	2,037,553	914
	2	0.3524	0.0341	0.3985	72.64	900	2,047,405	924
	3	0.8390	0.8261	1.0000	72.88	923	2,060,680	935
	4	0.7526	0.0821	0.7641	73.08	946	2,074,781	955
1954	1	0.4471	0.0180	0.2280	73.32	969	2,087,740	963
	2	0.3932	0.0354	0.5857	75.26	977	2,092,819	979
	3	0.7660	0.6667	1.0000	77.02	985	2,102,532	980
	4	0.5474	0.0475	0.5524	78.53	992	2,118,434	978
1955	1	0.4164	0.0227	0.2808	80.15	1000	2,130,937	992
	2	0.3506	0.0516	0.5361	80.83	1004	2,136,193	1001
	3	0.6951	1.0000	1.0000	81.29	1008	2,147,113	1003
	4	0.5718	0.0442	0.6374	81.49	1012	2,164,734	1003

		(31)	(32)	(33)	(34)	(35)	(36)	(37)
1956	1	0.4003	0.0229	0.2775	81.95	1016	2,175,373	1013
	2	0.3423	0.0435	0.4958	83.00	1031	2,177,937	1027
	3	0.5839	1.0000	1.0000	83.65	1046	2,190,741	1049
	4	0.6106	0.0528	0.7167	84.08	1060	2,209,132	1049
1957	1	0.3832	0.0183	0.2973	84.74	1075	2,221,169	1041
	2	0.3068	0.0417	0.6199	86.67	1078	2,229,437	1056
	3	0.6534	0.8000	1.0000	88.34	1082	2,243,867	1063
	4	0.6544	0.0462	0.8857	89.81	1085	2,262,814	1068
1958	1	0.3724	0.0243	0.2991	91.50	1088	2,275,515	1069
	2	0.2910	0.0434	0.5906	88.93	1090	2,281,538	1080
	3	0.7189	0.5429	0.9943	86.01	1091	2,297,002	1130
	4	0.5488	0.0616	0.6963	83.01	1093	2,315,900	1137
1959	1	0.4561	0.0247	0.2606	80.35	1094	2,326,129	1139
	2	0.3172	0.0440	0.4611	85.74	1111	2,331,126	1142
	3	0.6260	0.5750	1.0000	90.81	1127	2,343,392	1154
	4	0.5791	0.0728	0.9548	95.67	1144	2,359,746	1150
1960	1	0.4028	0.0268	0.2738	100.71	1160	2,370,106	1145
	2	0.3176	0.0573	0.4674	99.40	1168	2,371,760	1147
	3	0.7090	0.9063	1.0000	97.62	1176	2,384,469	1157
	4	0.5822	0.0486	0.7962	95.60	1184	2,403,567	1168
1961	1	0.4120	0.0325	0.2634	93.95	1192	2,414,296	1163
	2	0.3338	0.0568	0.5538	95.81	1196	2,420,292	1163
	3	0.6422	1.0000	1.0000	97.05	1200	2,441,414	1181
	4	0.5391	0.0527	0.7338	98.23	1203	2,463,241	1193
1962	1	0.4196	0.0462	0.2464	99.71	1207	2,477,297	1197
	2	0.3222	0.0788	0.6152	101.91	1217	2,485,466	1201
	3	0.5071	0.6462	1.0000	103.89	1227	2,498,427	1210
	4	0.5349	0.0501	0.6875	105.46	1237	2,520,670	1218
1963	1	0.3716	0.0458	0.3059	107.41	1247	2,533,419	1219
	2	0.3161	0.0796	0.5772	109.57	1253	2,538,033	1224
	3	0.7146	0.8936	1.0000	111.25	1260	2,553,573	1233
	4	0.5828	0.0520	0.8493	112.67	1266	2,574,588	1245
1964	1	0.3977	0.0469	0.2676	114.27	1272	2,590,787	1250
	2	0.2871	0.0824	0.5192	115.57	1291	2,594,420	1261
	3	0.6763	0.9762	1.0000	116.50	1310	2,606,719	1280
	4	0.6124	0.0477	0.7407	117.02	1329	2,627,483	1301
1965	1	0.4472	0.0474	0.2503	117.92	1348	2,640,117	1304
	2	0.3601	0.0736	0.6720	120.38	1367	2,640,379	1306
	3	0.6191	0.4675	1.0000	122.13	1386	2,656,289	1323
	4	0.5995	0.0531	0.7764	123.62	1405	2,677,198	1332

## APPENDIX D

D(b) 1

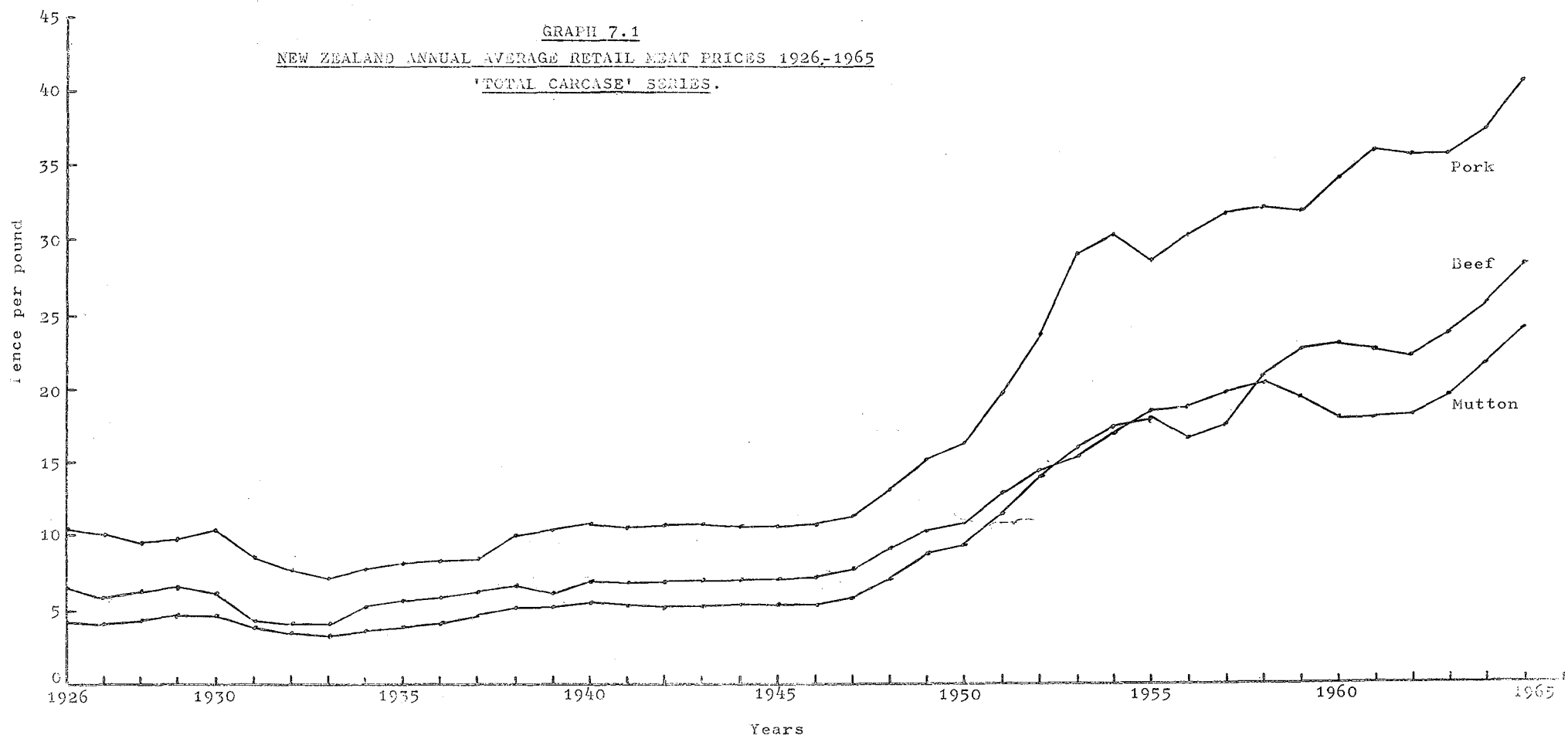
## TIME-SERIES DATA

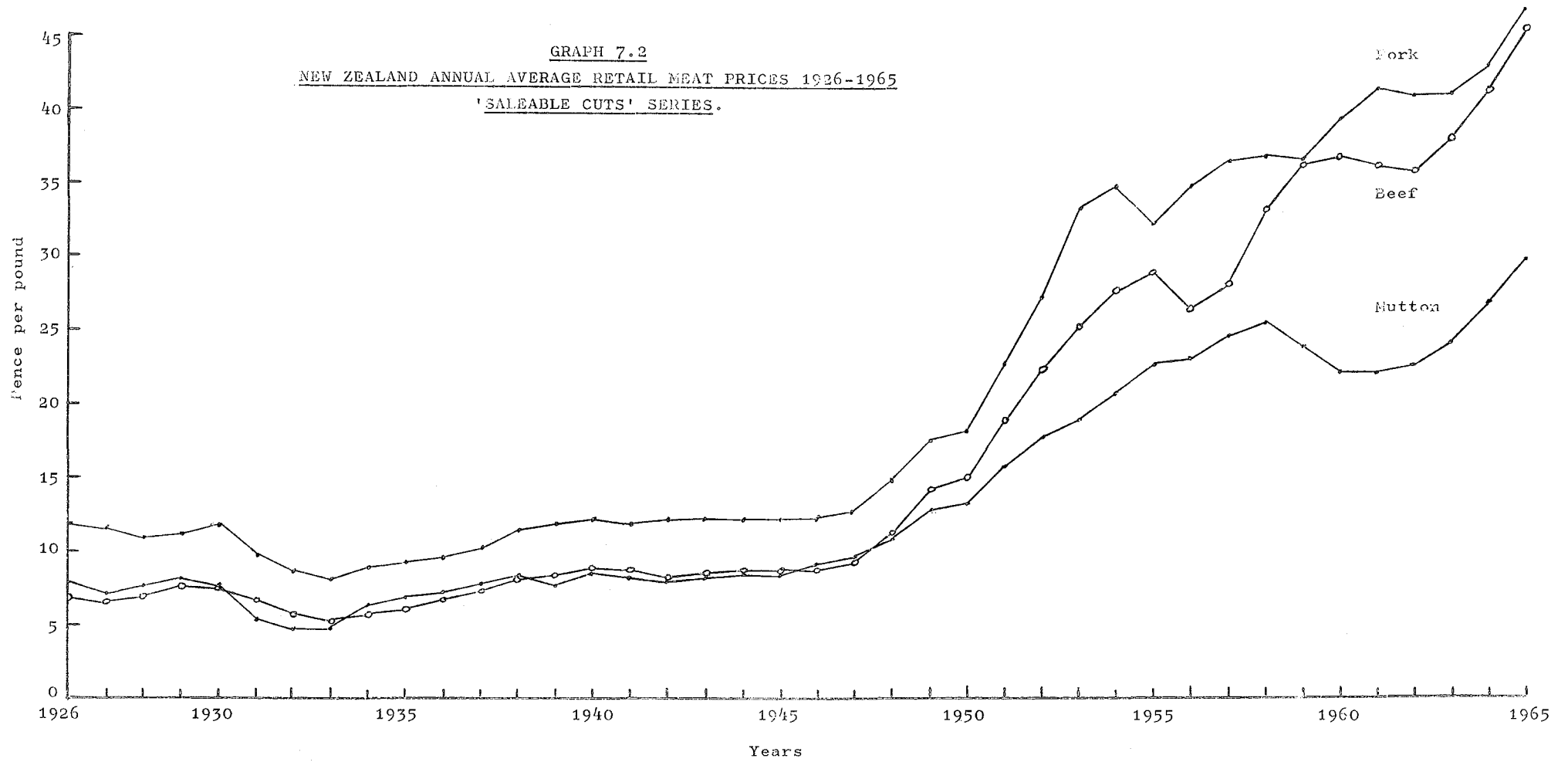
Part B: Annual Data.<sup>1</sup>

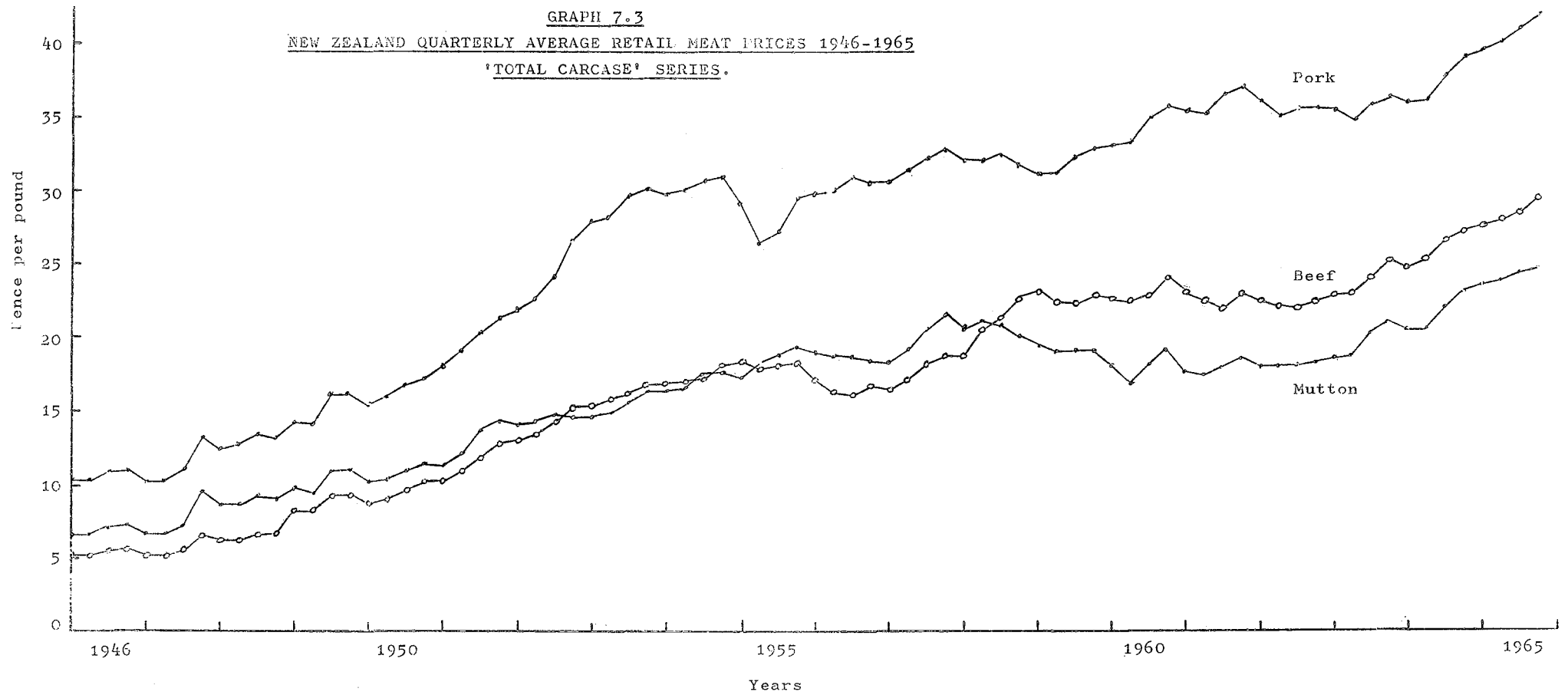
Calendar Year	SALEABLE CUTS				TOTAL SERIES				Retail Price of Ham	Retail Price of Bacon
	P <sup>r</sup> <sub>Bt</sub>	P <sup>r</sup> <sub>Bt</sub>	P <sup>r</sup> <sub>Mt</sub>	P <sup>r</sup> <sub>Pt</sub>	P <sup>r</sup> <sub>Bt</sub>	P <sup>r</sup> <sub>Bt</sub>	P <sup>r</sup> <sub>Mt</sub>	P <sup>r</sup> <sub>Pt</sub>		
	Meat Retailers' Cutting Test	Industries and Commerce Cutting Test			Meat Retailers' Cutting Test	Industries and Commerce Cutting Test				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1926	6.95	7.11	7.97	11.83	4.36	4.90	6.48	10.34	*	16.72
1927	6.51	6.68	7.24	11.54	4.08	4.60	5.89	10.08	*	15.78
1928	6.89	7.06	7.68	10.91	4.33	4.86	6.24	9.53	*	15.29
1929	7.61	7.78	8.12	11.28	4.78	5.35	6.60	9.85	*	15.48
1930	7.51	7.67	7.50	11.88	4.71	5.28	6.10	10.38	*	16.09
1931	6.32	6.48	5.35	9.88	3.97	4.46	4.35	8.63	*	13.45
1932	5.57	5.71	4.94	8.69	3.50	3.93	4.02	7.59	*	11.85
1933	5.27	5.40	4.95	8.28	3.31	3.72	4.03	7.23	*	11.67
1934	5.69	5.82	6.33	8.96	3.60	4.01	5.14	7.83	*	12.72
1935	6.03	6.18	6.78	9.32	3.78	4.26	5.51	8.14	*	14.45
1936	6.58	6.73	7.13	9.55	4.13	4.63	5.80	8.34	*	14.29
1937	7.22	7.38	7.72	10.17	4.53	5.08	6.28	8.88	*	16.35
1938	8.04	8.20	8.10	11.45	5.04	5.64	6.58	10.00	*	17.22
1939	8.33	8.49	7.61	11.81	5.23	5.84	6.19	10.32	*	17.56
1940	8.80	8.94	8.56	12.19	5.52	6.16	6.95	10.65	*	17.98
1941	8.56	8.72	8.26	11.98	5.37	6.00	6.71	10.47	*	18.17
1942	8.33	8.50	8.32	12.05	5.23	5.85	6.76	10.52	*	17.93
1943	8.51	8.68	8.39	12.16	5.34	5.98	6.82	10.62	*	18.00
1944	8.62	8.79	8.53	12.12	5.41	6.05	6.93	10.59	*	18.00
1945	8.65	8.82	8.62	12.12	5.43	6.07	7.00	10.59	*	18.00
1946	8.61	8.79	8.66	12.22	5.40	6.05	7.04	10.68	*	18.20
1947	9.26	9.44	9.43	12.91	5.81	6.50	7.66	11.27	*	19.53
1948	11.20	11.39	11.13	14.89	7.02	7.84	9.05	13.01	*	23.24
1949	14.04	14.24	12.84	17.48	8.81	9.80	10.44	15.27	39.82	24.31
1950	14.99	15.17	13.33	18.73	9.40	10.44	10.83	16.36	42.27	26.86
1951	18.35	18.50	15.94	22.56	11.51	12.73	12.95	19.70	49.37	32.21
1952	22.43	22.58	17.80	27.22	14.07	15.54	14.47	23.77	59.28	38.15
1953	25.41	25.55	19.00	33.25	15.94	17.58	15.44	29.04	66.41	42.33
1954	27.57	27.72	20.99	34.84	17.30	19.07	17.06	30.43	70.47	44.98
1955	28.90	29.07	22.69	32.13	18.13	20.01	18.44	28.06	70.62	43.54
1956	26.42	26.91	23.05	34.77	16.58	18.52	18.73	30.37	77.81	45.85
1957	28.00	28.48	24.56	36.45	17.57	19.60	19.96	31.84	83.50	49.10
1958	33.25	33.68	25.62	36.79	20.86	23.18	20.83	32.14	84.33	49.39
1959	36.28	36.71	23.91	36.54	22.76	25.16	19.43	31.19	82.61	47.66
1960	36.82	37.25	23.27	39.36	23.10	25.64	18.10	34.37	93.03	54.47
1961	36.16	36.56	22.26	41.50	22.69	25.17	18.09	36.24	96.67	57.61
1962	35.70	36.13	22.57	40.91	22.40	24.97	18.34	35.73	97.72	59.39
1963	38.02	38.47	24.23	41.00	23.86	26.48	19.69	35.81	97.36	58.59
1964	41.41	41.90	26.82	42.93	25.98	28.13	21.80	37.50	99.59	59.87
1965	45.49	46.01	29.84	46.78	28.54	31.67	24.25	40.86	107.30	65.25

1. See footnote 1 for Appendix D, Part A.

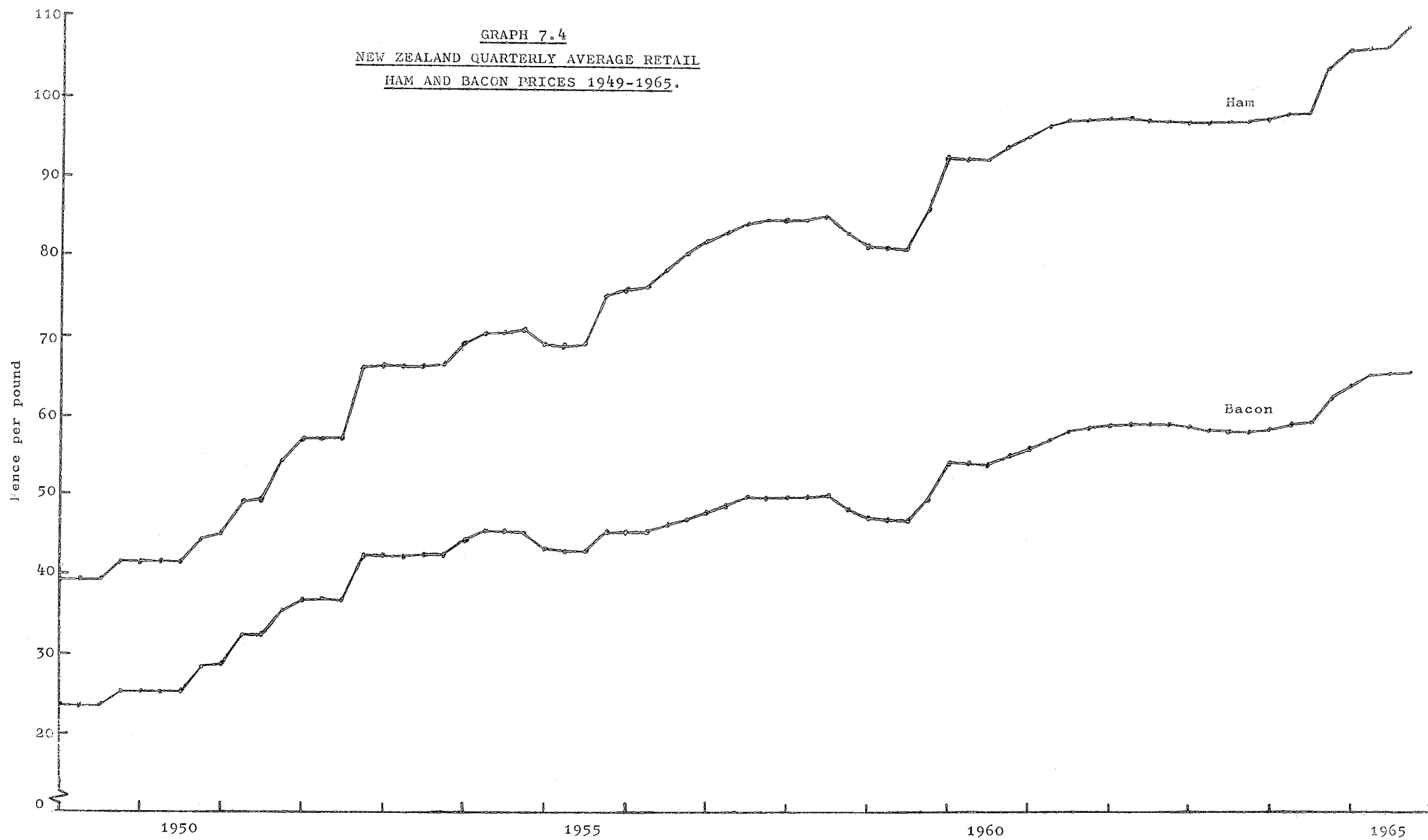
\* Indicates that this statistic was either not available, or not calculated.





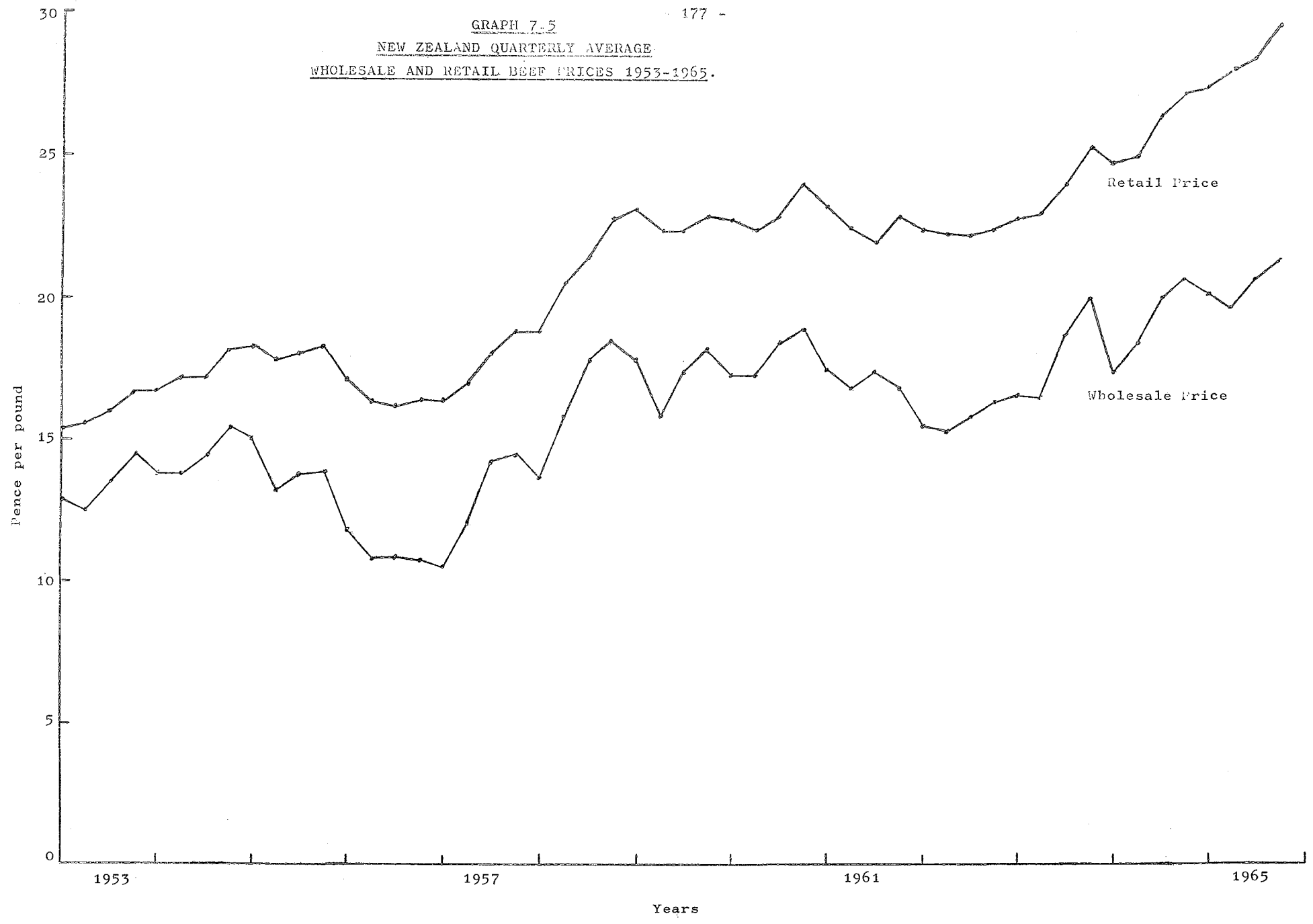


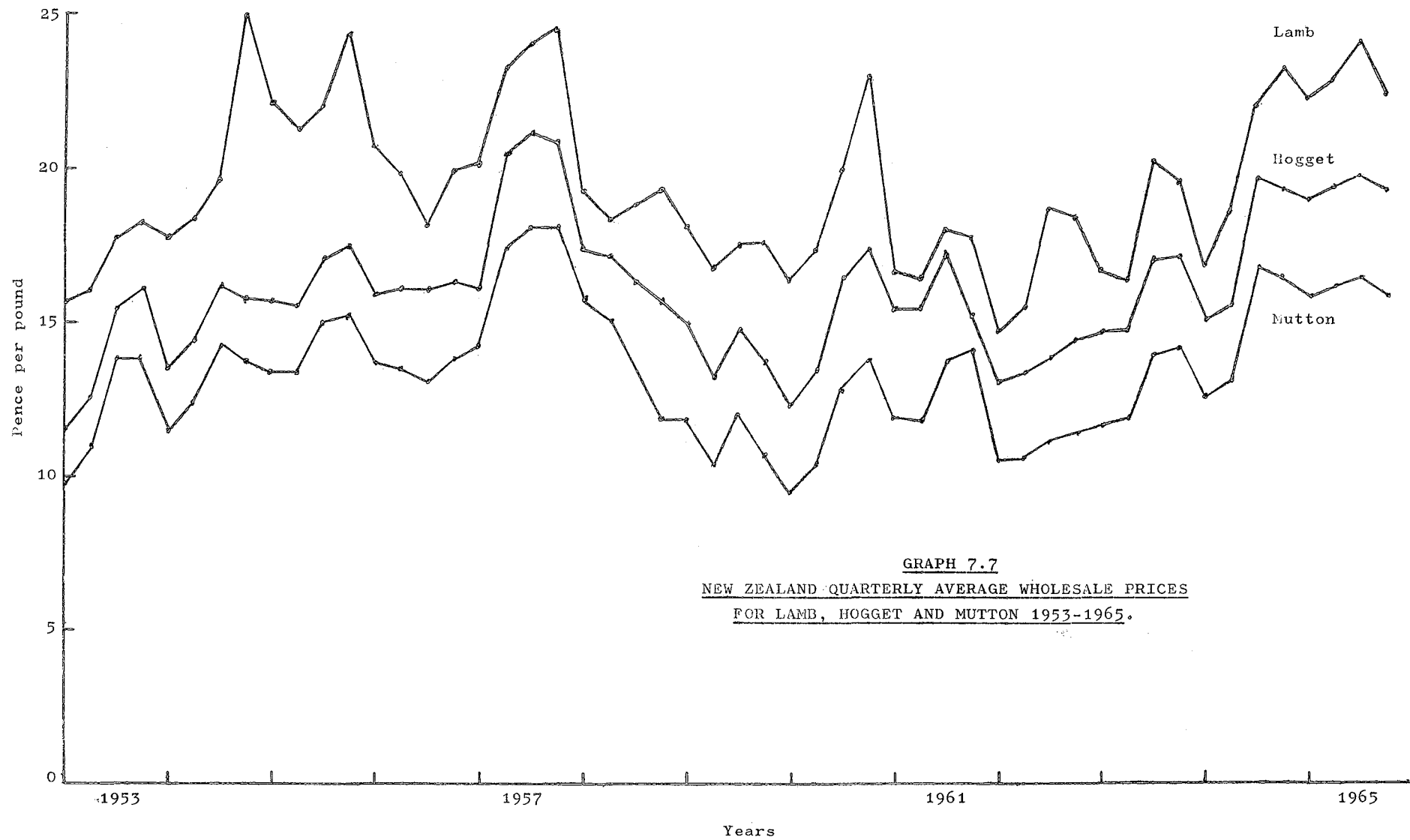
GRAPH 7.4  
NEW ZEALAND QUARTERLY AVERAGE RETAIL  
HAM AND BACON PRICES 1949-1965.



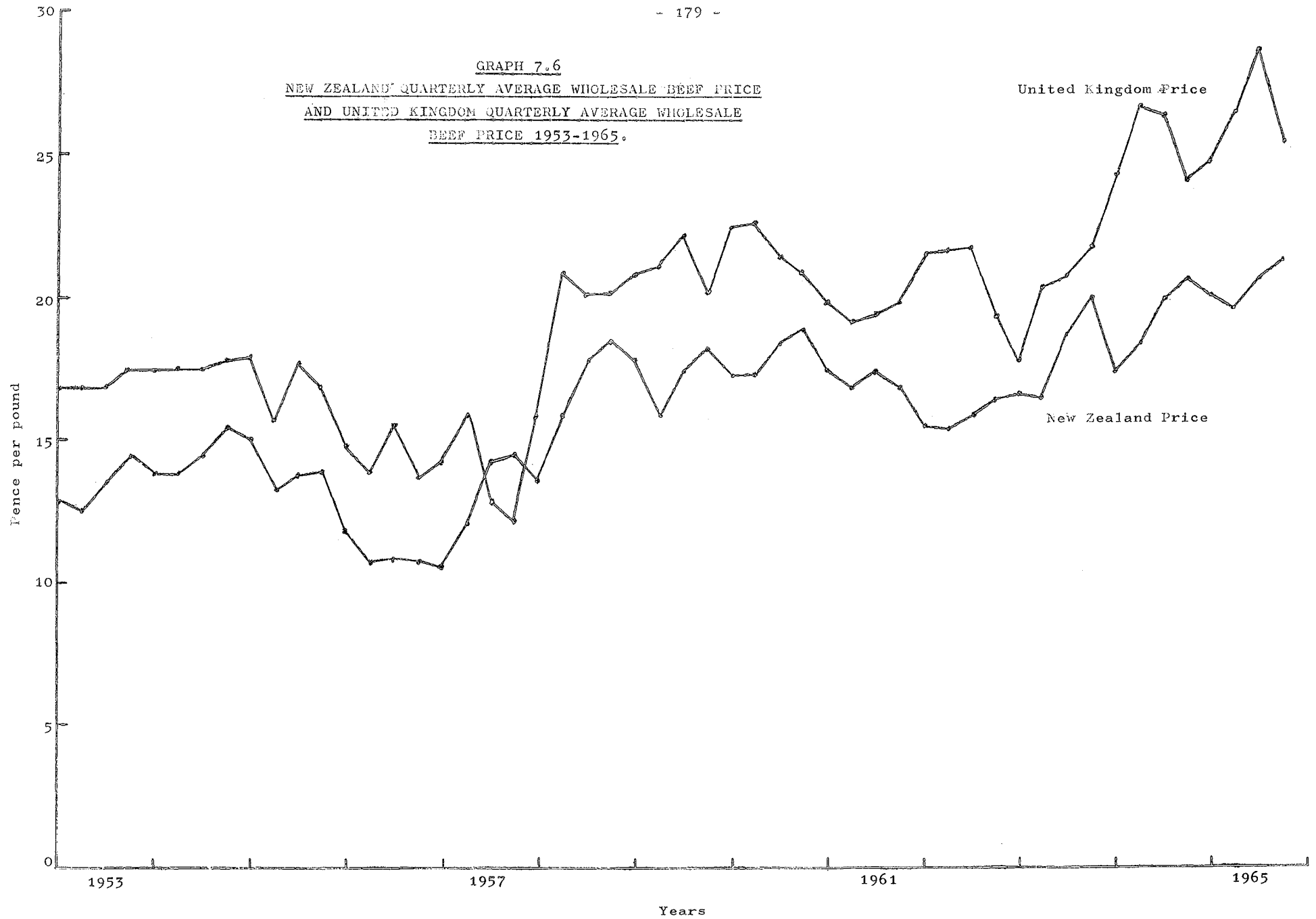


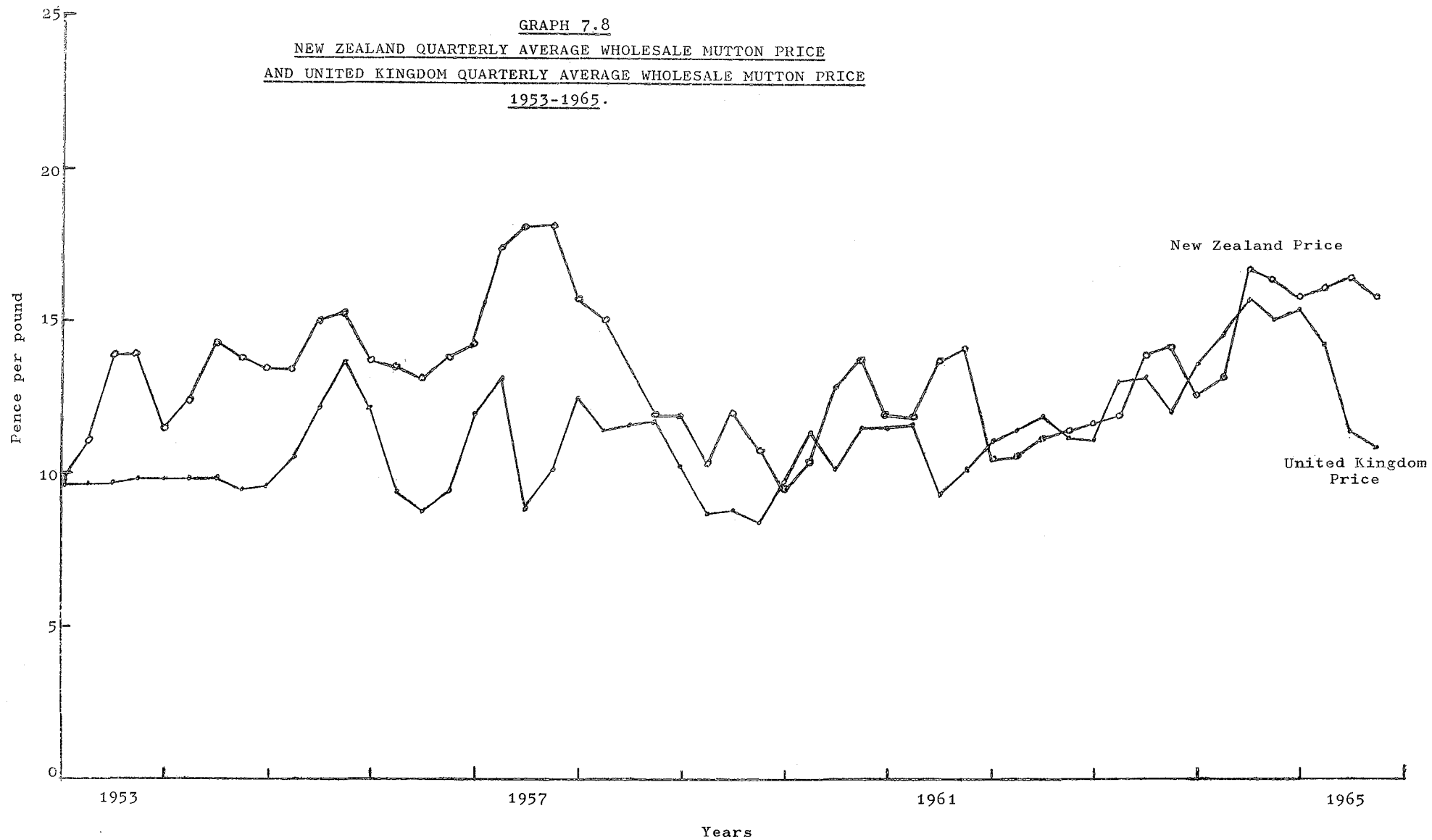
GRAPH 7.5  
NEW ZEALAND QUARTERLY AVERAGE  
WHOLESALE AND RETAIL BEEF PRICES 1953-1965.

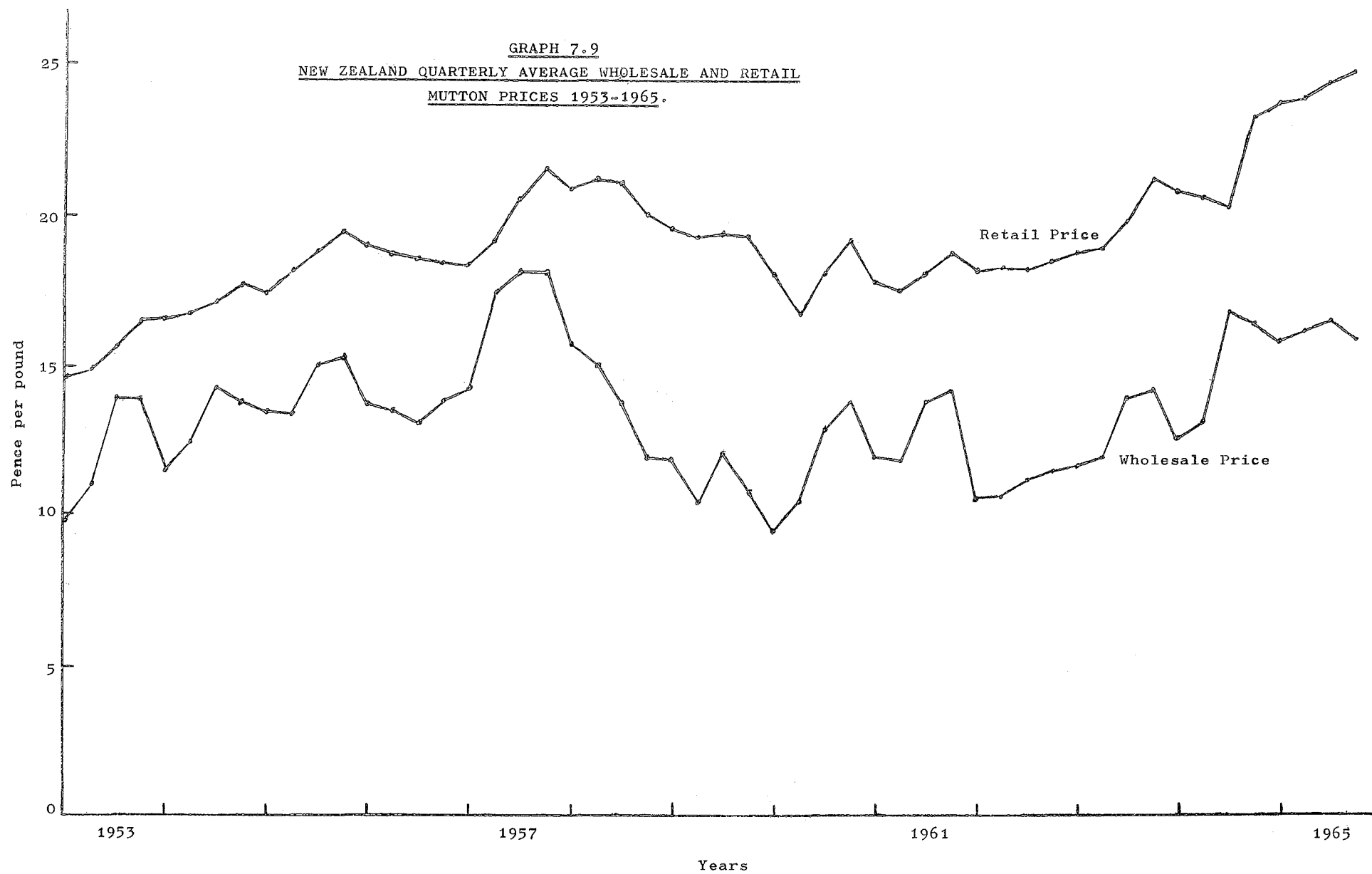


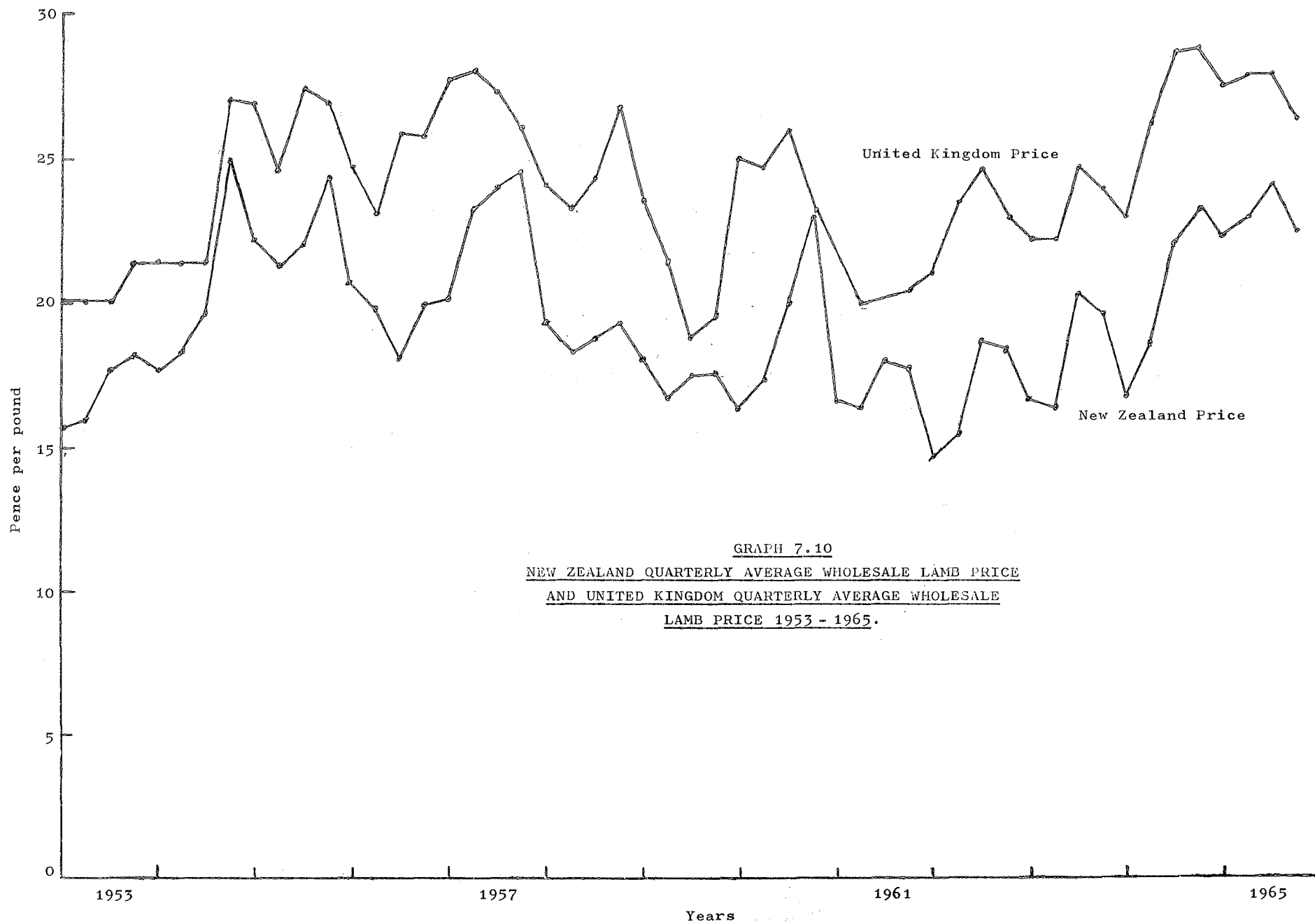


GRAPH 7.6  
NEW ZEALAND QUARTERLY AVERAGE WHOLESALE BEEF PRICE  
AND UNITED KINGDOM QUARTERLY AVERAGE WHOLESALE  
BEEF PRICE 1953-1965.

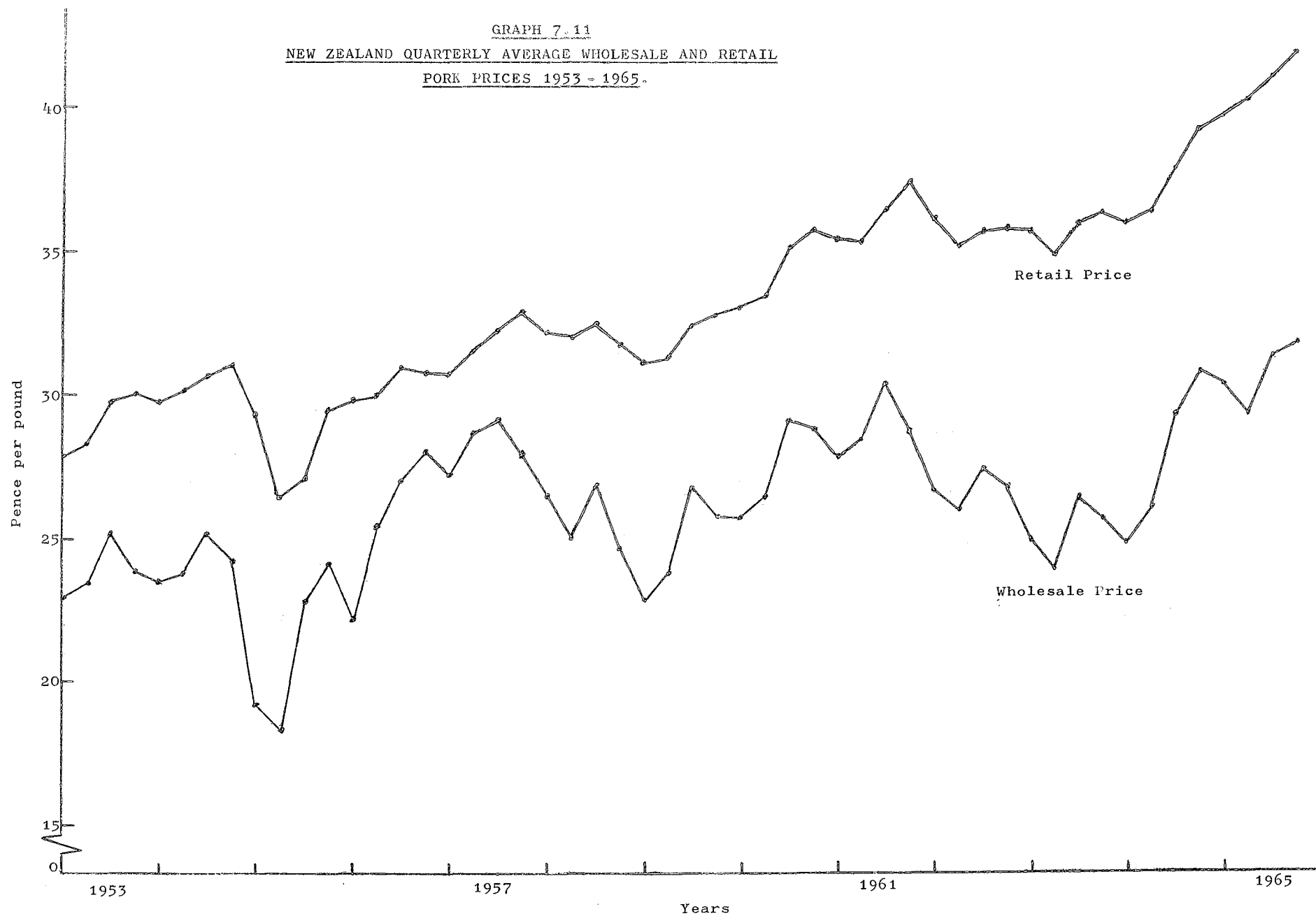


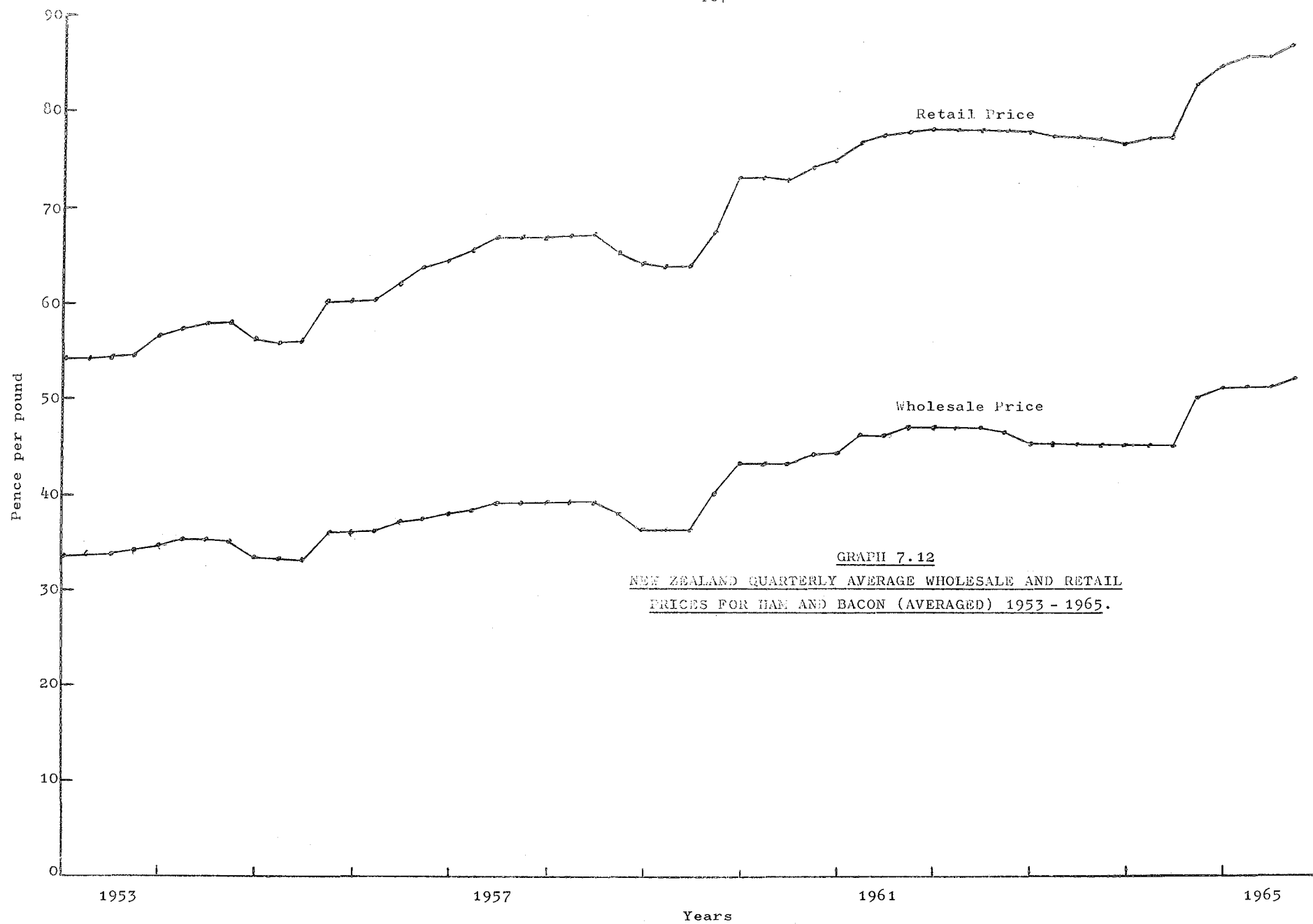






GRAPH 7.11  
NEW ZEALAND QUARTERLY AVERAGE WHOLESALE AND RETAIL  
PORK PRICES 1953 - 1965.





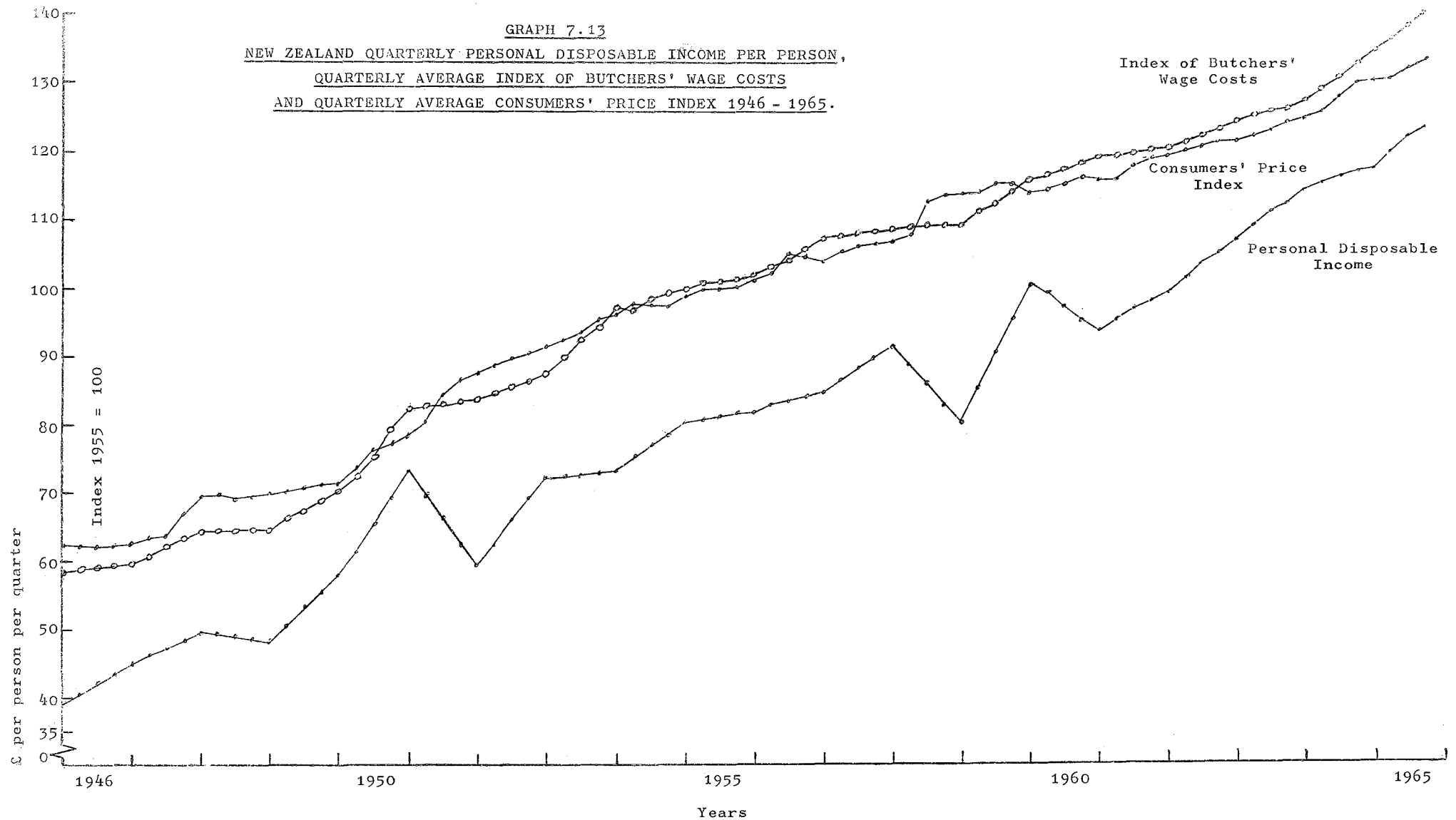
GRAPH 7.12

NEW ZEALAND QUARTERLY AVERAGE WHOLESALE AND RETAIL  
PRICES FOR HAM AND BACON (AVERAGED) 1953 - 1965.

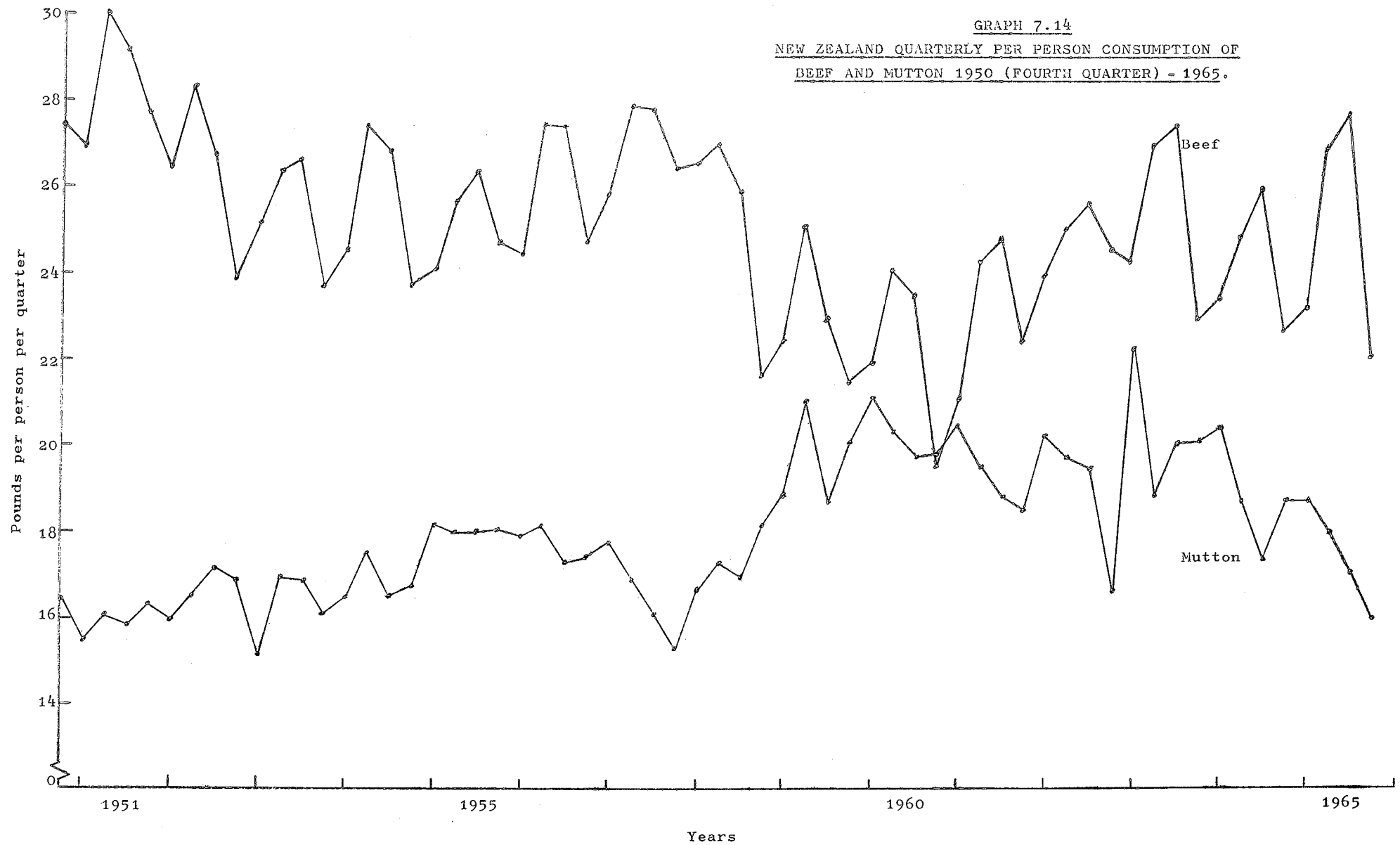


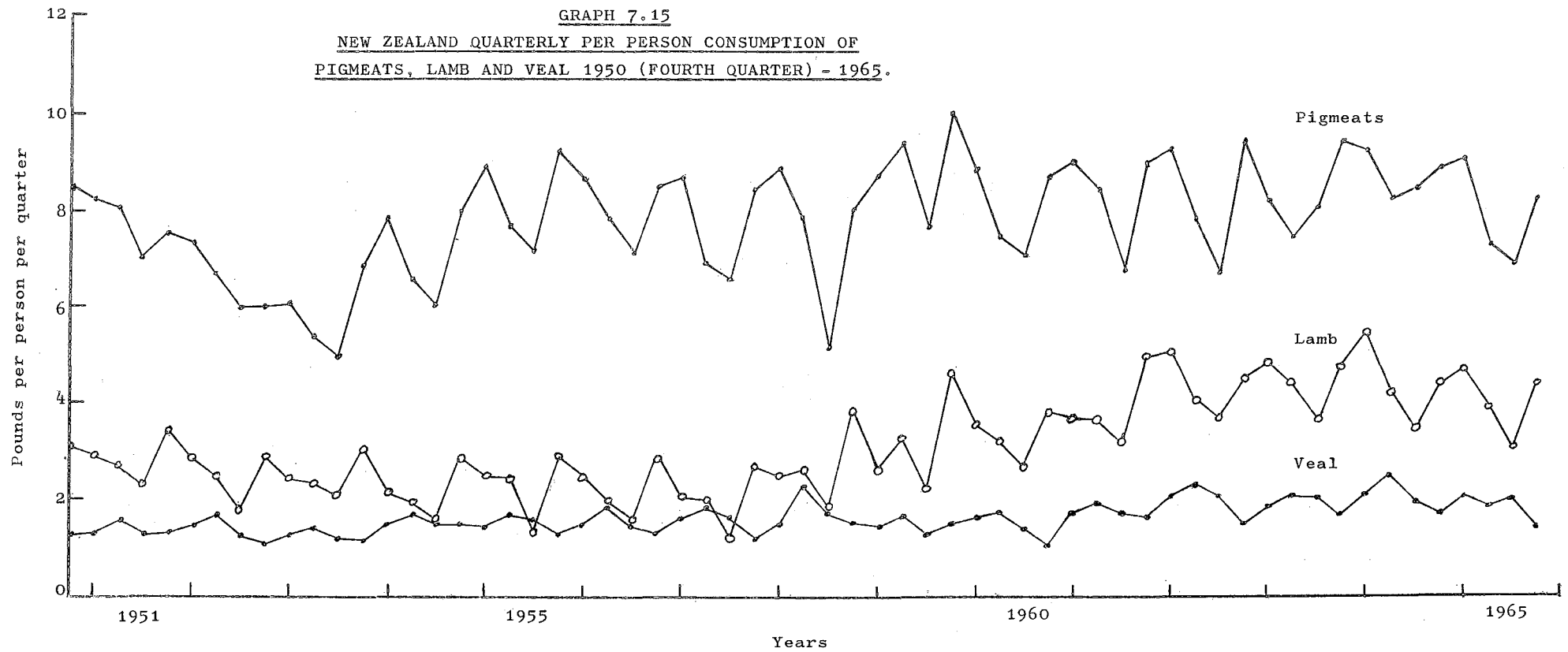
GRAPH 7.13

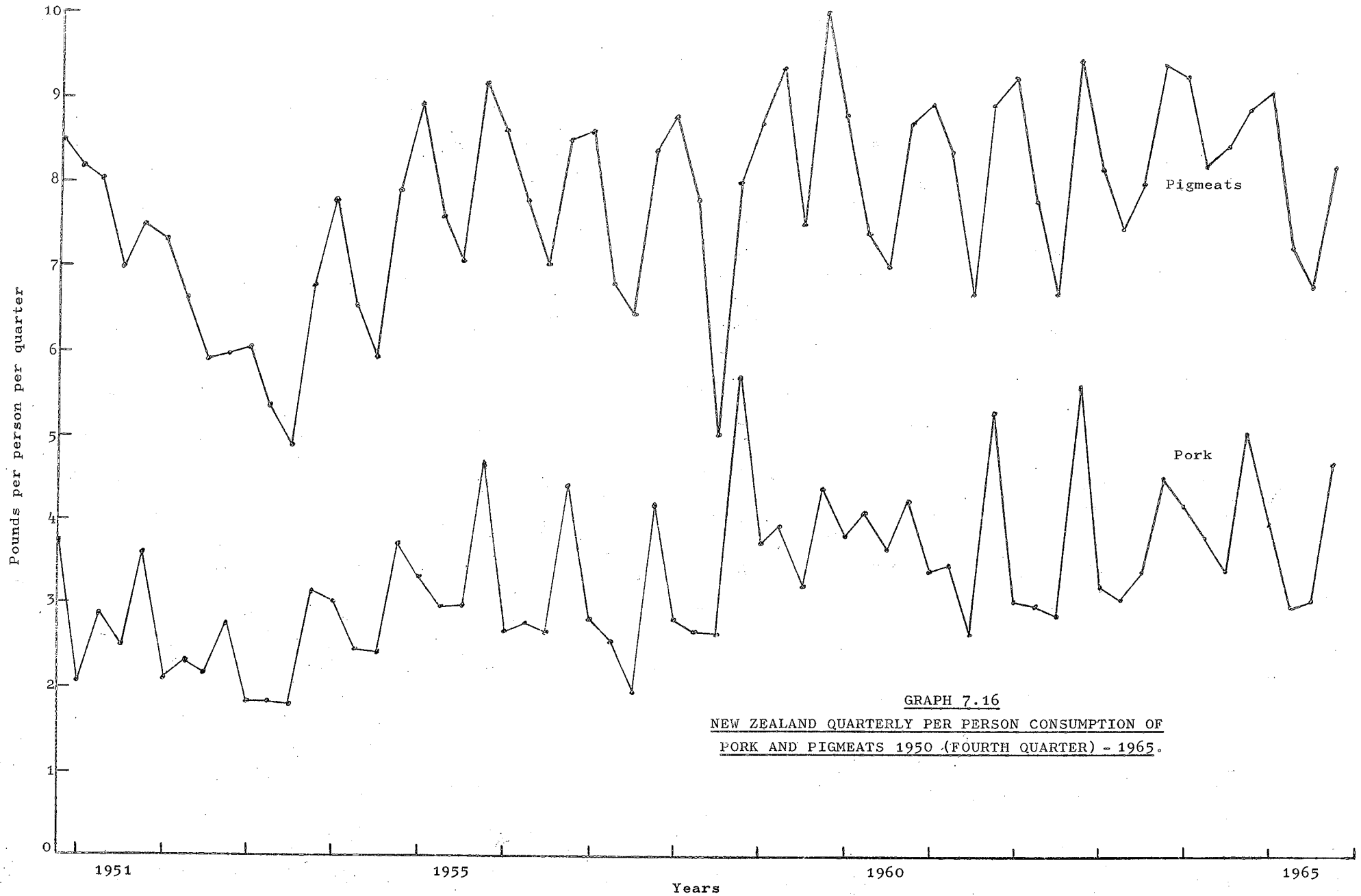
NEW ZEALAND QUARTERLY PERSONAL DISPOSABLE INCOME PER PERSON,  
 QUARTERLY AVERAGE INDEX OF BUTCHERS' WAGE COSTS  
 AND QUARTERLY AVERAGE CONSUMERS' PRICE INDEX 1946 - 1965.



GRAPH 7.14  
NEW ZEALAND QUARTERLY PER PERSON CONSUMPTION OF  
BEEF AND MUTTON 1950 (FOURTH QUARTER) - 1965.







GRAPH 7.16  
NEW ZEALAND QUARTERLY PER PERSON CONSUMPTION OF  
PORK AND PIGMEATS 1950 (FOURTH QUARTER) - 1965.