Thesis

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THE DETERMINANTS OF RETAILERS' PRICE MARKUPS IN DAR ES SALAAM, TANZANIA

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"A thesis submitted for the degree of Doctor of Philosophy in the University of Dar es Salaam"

1992

DECLARATION

I, LETTICE KINUNDA RUTASHOBYA, hereby declare that this thesis is the product of my own research work and it has not been presented for award to any other university.

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ABSTRACT

THE DETERMINANTS OF RETAILERS' PRICE MARKUPS IN DAR ES SALAAM, TANZANIA

By

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This research examined the pricing behaviour of retailers in Dar es Salaam, Tanzania. To this end, variability of retail margins and factors that determine margin practices were investigated. A theoretical model relating retail margins to four explanatory variables was developed. Accordingly, the study had the following major objectives:

(1) to investigate markup differences among retailers' product groups (primary).

(2) to determine the effects of merchandise cost, merchandise rate of stock turn, location of retail outlet and population size on retail margins,

(3) to determine whether margin variances of product categories were different from those of individual product items.

On the basis of these objectives and the available literature evidence the following conceptual hypotheses were advanced:

1. Retail margins are not uniform for the various product groups;

2. Markups are inversely related to merchandise cost;

3. Markups are inversely related to merchandise rate of stock turn.

4. Markups are directly related to location of retail outlet, that is the farther the retail outlet is from the city centre the higher the mark-up.

5. Markups are inversely related to population size of a store's market area.

6. Markup differences among product categories are greater than margin differences among product types.

The research design that was used to test these hypotheses involved a cross-sectional survey. Despite its short comings it was the only feasible alternative at the time of the study. After defining the hypotheses operationally,

statistical investigation methods that included the one-way analysis of variance, t-tests and multiple regression analysis were used. To improve the scope of variable relationships mathematical transformations using both linear and non-linear methods were carried out. Following these statistical investigations some contributions and conclusions to the understanding of retail margin variations and its "causal" relationships were made. The findings are both consistent and inconsistent with the existing literature which were undertaken in economically advanced countries. These findings were that:

1. like in past studies done elsewhere, retail margins in Tanzania vary widely among product groups as well as among product items. This finding is consistent with the theoretical bases and expectations that firms will practice price discrimination to maximize profit,

2. the relative effect of the variables on retail margins is different. It appears that in Tanzania retail margins are influenced more by merchandise costs than merchandise rate of stock-turn, location of retail outlet and population size. The effect of turnover rate on margins is less dominant than the literature in economically advanced countries suggests. The main conclusion arising out of this finding is that pricing

strategies and policies are not at any point universally optimal. A retailer seeks to maximize profits by employing a pricing strategy that will suit existing market conditions and product characteristics.

3. Although the factors differently influence retail margins, the findings generally appear to support the theoretical expectations in the sense that the hypothesized directions are generally supported except with respect to the variable "location". This means that some costly and high turnover merchandise carry low markups and some less costly and low turnover merchandise carry high markups. Also, retail outlets in high population market area carry low markups.

4. The relationship between retail margins and the independent variables merchandise cost, merchandise turnover rate, location of retail outlet, and population size is not linear. This implies that studies that do not take into account the various

forms of functional relationships may give misleading findings.

5. The interaction between retail margins and the explanatory variables merchandise cost, merchandise turnover rate, location of retail outlet and population size is not overwhelming in the laundry soap, furniture and grocery categories. This implies that factors other than these should be explored in future research. The relevant factors should take into consideration market conditions and product characteristics.

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CHAPTER 1

INTRODUCTION

The pricing of merchandise is a most difficult task for the retailer because many variables influence the decision. In an investigation of department store pricing, Dalrymple and Thompson (1969) observed that the use of mark-up pricing[1] results in a number of activities that go beyond the simple calculation of retail prices. An elaboration on the above statement has clearly been broughtout by Bolen (1982) who mentions the judgement of appeal of goods by target markets, competition, characteristics of merchandise, merchandise cost, the role of price in retail mix and legal consideration as among the many variables that influence retailers' mark-ups. Given these variables, one does not expect a uniform percentage of mark-up among products carried by retailers. Furthermore, one does not expect a uniform percentage of mark-up among the various categories of retailers.

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[1] ~Mark-up pricing involves adding pre-determined but different mark-ups to various goods the retailer carries.The mark-up (MU) in this case, is defined as the difference between cost of an item and its selling price. It is usually expressed as a percentage of the retail price: MU(%) = MU/R where R is retail price.

The few empirical investigations that have been conducted in different parts of the World have come up with mixed results regarding the influence of some of the above mentioned variables on retail mark-ups. These studies are certainly an indication of the fact that there is need to identify concrete causes for mark-up dispersion among product groups/items and retail categories.

Mark-ups have been shown to vary considerably among different products and categories of retail businesses and organisations. Mark-ups have also been shown to vary between cities and locations.

In the case of US Department Stores in 1962 "some common mark-ups of 20 percent for books, 41 percent for dresses, 46 percent for custom jewelry, and 50 percent for millinery" were observed (Kotler 1971: 340). Kotler further observed that in US retail grocery industry, items like coffee, canned milk and sugar tend to have low average mark-ups, while items like frozen foods, jellies and some canned products have high average mark-ups. For example, Preston (1963: 31) showed that within the category of frozen foods, markups range from a low of 15 percent to a high of 213 percent. Dalrymple and Thompson (1969: 182) observed that frequently purchased items like coffee and [vegetable] shortening carry low mark-ups of between 5 and

10 percent. They further observe that such fast-moving items are actually sometimes sold below cost.

On the other hand, Holdren (1960) found that baby food, flour, sugar, coffee, cornmeal and vegetable shortening were sold at a loss by one or more of eight stores he studied in the United States of America, a conclusion consistent with Dalrymple and Thompson's study which observed generally low mark-ups for grocery products in supermarkets (Dalrymple and Thompson 1969: 183). Holdren observed further that less important items such as spices and cleansers usually carry higher mark-ups of between 30 and 50 percent.

Mark-up differentials have been found also among various categories of retailers between shop types and between cities. Holdren (1960), for example, found a difference of about 10 percent between the lowest priced chain and the highest - priced independent supermarkets in a Midwestern community USA, a finding that has been frequently quoted in marketing. The average differential among the eight stores that he studied was about 2 percent (Dalrymple and Thompson 1969: 181). In Preston's study (1963) a maximum of 12 percent separating indices of advertised prices for eleven supermarkets in Northern California Community were observed. In another study of 25 food stores, Preston

(1966: 27) found a 10 percent difference between the highest and lowest priced stores, with an average price differential of 3 percent.

While the above mark-up differentials have been observed in the United States of America similar observations have been done elsewhere. Trade and Industry records of the United Kingdom (1976), showed that grocers and provision dealers have lower margins (19.9 percent) than confectioners, tobacconists, newsagents (20.4 percent), clothing and footwear shops (36.4 percent), and household goods shops (38.8 percent) (Tucker, 1978: 22). In the Netherlands, Noteboom (1985) observed mark-ups of between 26 and 35 percent for textile items while for the same items, Bode *et al* (1986) observed mark-ups of between 23 and 49 percent. In the same studies, Noteboom observed mark-ups of 19 percent for supermarkets while Bode *et al* observed mark-ups of between 15 and 25 percent for the same kind of retail organisation.

Mark-up differentials appear to exist not only in industrialized countries but also in developing countries. For instance, in Tanzania supermarket mark-ups for sugar and soap products were shown to vary between 6 and 8 percent, 15 and 18 percent for canned foods and 25 to 30 percent for fresh meats and produce (ESAMI, 1986). In

Moshi Urban district retail outlets[2], mark-ups were observed to range between 10 and 15 percent (Lema, 1987). Mwaipopo (1988) observed mark-up dispersions of between 10 and 33 percent for laundry soap, 20 to 61 percent for textiles and 21 to 56 percent for footwear in Mbeya Urban retail outlets. A computation of percentage margins from the National Price Commission price list of 1986 indicated retail markups of 13.3 percent for food and beverages, 15 percent for textile and clothing, 13 percent for household and 17 and 20 percent for domestic appliances and building and electrical supplies respectively (Seif, 1988).

Many hypotheses have been advanced to explain the variation of the mark-ups within selected product groups, and categories of retail business or retail organisations. Three commonly used rules of thumb are that (a) mark-ups should vary inversely with unit cost (b) mark-ups should vary inversely with turnover and (c) mark-ups should be higher and prices lower on retailers' private brands than on manufacturers' brands (Kotler, 1971: 341).

Several studies have empirically tested some of these rules and other variables that may help explain dispersions in retail mark-ups. As noted earlier, these studies have

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[2] A retail outlet is defined as that physical premise called the shop or the store, where the retailer operates.

failed to come up with a common conclusion. The number of independent variables investigated have differed from one researcher to another and often the number and variety of chosen independent variables have been determined by data availability. Several authors have also noted with concern the general lack of data in retailing (Tucker, 1975 and Noteboom, 1985). The result is that many studies have employed intuitive reasoning guided by the data patterns to arrive at their conclusions. Little formal testing of the suggested relationships has been undertaken.

Nevertheless, there are several empirical studies that deserve mention. Jefferys (1938) and Ward (1973) examined the influence of the rate of stock-turn on wholesale and retail gross margins, respectively. On the other hand, Holdren (1960) investigated the relationship between price and size of organisation. Preston (1963) formally tested the impact of the three commonly used rules of thumb on mark-up dispersion. Dalrymple and Thompson (1969) studied the correlation between mark-ups and retail prices. Also, the UK's National Board for Prices and Incomes (1969) investigated the influence of fifteen variables on margins of selected product groups. Another study by Reefs and Young (1975) attempted to determine the relationship between retail prices and wholesale price.

Bowbrick (1975, 1976) has examined the impact of price control on market margins of fresh produce. More recently investigations on mark-up variations have been undertaken by Noteboom (1980, 1982, 1985), and Bode *et al* (1986).

Given the differing results and conclusions regarding factors influencing mark-up variations as provided in the literature, this study found it worthwhile to empirically examine mark-up variations among selected products in Tanzania's retail businesses. The researcher was interested in percentage gross margins of individual product groups sold by retailers in the Dar es Salaam region.

1.1. RESEARCH OBJECTIVES

The primary objective of this study was to study the mark-up variations among selected retailers' product groups in general and to investigate the variables that affect such variation.

To this end, the specific objectives of the study were first to determine and assess the influence of merchandise cost on mark-ups.

The second objective was to examine the influence of merchandise turnover on mark-ups. Of great importance to the pricing policy of a retail outlet is the effect that lower prices will have on sales. In a competitive environment, as selling prices decline, sales rise (Pintel and Diamond, 1983: 245). However, some merchandise is slower moving than others, that is to say, stock turns over fewer times per year. A store or product with a quick turnover can afford a small mark-up and lower prices because it will receive that mark-up many times during the period. This is perhaps another reason for the variation of pricing or markup policies among various categories of merchandise.

The third objective of the study sought to determine the influence of population on mark-ups. Population is a potential demand determinant and hence its anticipated effect on mark-ups.

The fourth objective was to investigate the influence of distance (location) on mark-ups. Distance, say from the location of the store to the City centre may influence variation in mark-ups, given presumably different carrying costs.

The final objective was to examine and compare margin variations between product categories and product types.

1.2. RATIONALE FOR SETTING THE OBJECTIVES

This study was motivated by the gross absence of comprehensive empirical studies to justify or explain the variation of mark-ups or product margins, hence selling prices by retailers in Tanzania. Specifically, this study is justified by the fact that there is no other empirical study that has studied the mark-up disparities in Dar es Salaam.

Elsewhere, there have been differing results and conclusions from empirical studies reported in the literature. Some have been narrow in scope and yet others have been methodologically deficient. Certainly this may partly be responsible for the mixed results and conclusions. Further, some have differed in terms of scope and context. Scopewise, some researchers have investigated and predicted the influence of a single item on mark-up variation. Lack of consideration of the other factors has clearly been brought out by Tucker (1978: 32) who argues that "... given that so little of the variation in gross margins is explained by this simple relationship it can be argued that many others should be taken into account..."

As far as methods of analysis are concerned, different researchers have used different analytical techniques. Some have used correlation analysis in which case "causality" is not taken into consideration. Yet others have used simple regression analysis, and the result is that many other factors have been excluded. Tucker (1978) has already criticized this approach. Corr (1974) has also argued that merchandise cost alone cannot determine mark-ups. Preston (1963) has concluded that the three commonly used rules of thumb, alone, cannot also explain mark-up dispersions. Further, Kotler (1971) has argued that mark-up variation among retailers and among product groups are sometimes the result of erratic decisions, random factors and better adaptation to the current market than can be provided for by the rules of thumb.

Contextwise, some studies have concentrated on investigating mark-up dispersions among retail types, retail organisation and between cities, and yet others have investigated mark-up variation among product groups.

The current study overcomes the shortcomings of previous studies by considering mark-up variation among product groups. The consideration of mark-up differences among various retail organisations in Tanzania may not be meaningful, because the retail business is still not

modernized. In Tanzania retail business has been and still is dominated by the small retailer. There are, therefore, only a handful of supermarkets even in Dar es Salaam, the commercial heart of the country. Investigating mark-up variation among types of retailer may also not bring out meaningful results because the classification on the basis of whether one is a general or specialty (exclusive) retailer is not very distinctive. For instance, textile stores will generally be selling a lot of other items like food and miscellaneous articles. Further, a study on mark-up variation along the above lines will entail the collection of data on operating expenses which is hard to collect in a country where retail business is dominated by the small and individual retailer. These individual retailers rarely keep formal records.

A more practical approach of studying mark-up variation in Tanzania could be based on classification of retail outlets by ownership. However, a similar problem to the one observed above is encountered because the individual small owner dominates. Attempts to introduce the socialization[3] of trade since independence (1961) saw the emergence of consumer cooperative retail outlets. Nevertheless, currently cooperative shops represent a very

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[3]-See Appendix 1-1 for meaning and discussion on this terminology.

small number of retail outlets when compared with the total retail outlets. For instance, in the Dar es Salaam region the proportion is only about three percent[4]. Moreover, given that the cooperative by-laws (Cooperative Act, 1982) stipulate the use of uniform mark-ups (usually 10 pecent), makes this kind of approach impractical.

Partnerships and corporate shops are even fewer. This leaves the researcher only with the alternative of investigating mark-up variation among product groups. By using multiple regression analysis and adding more variables like location and population and comparing mark-up variation between product groups and product types this study hoped that some of the problems cited above will be overcome.

The study, therefore, investigated the factors that influence mark-up variation among product groups at retail level in Dar es Salaam and consequently tried to determine the retailers' pricing behaviour.

Accordingly, a number of hypotheses guided the study. An overall hypothesis sought to investigate the variability

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[4]This percentage is obtained from the available information since there were 366 consumers cooperative shops in Dar es Salaam in 1988, compared to 11,977 licenced shops at the same period (information obtained from Dar es Salaam Regional Cooperative and Regional Trade Offices).

of retail margins among product categories and product types, while specific hypotheses investigated the relationships between margins and four predictor variables, namely; cost, turnover, location of retail outlet and population.

1.3. THE RESEARCH SETTING

This study was conducted in Dar es Salaam Region, a region situated on the east coast of Tanzania, also formerly the GOVERNMENT'S ADMINISTRATIVE HEADQUARTERS in the country.

Dar es Salaam has been and continues to be the commercial capital of Tanzania despite the fact that the government administration has gradually been moving to the official capital city of Dodoma in central Tanzania. It is this reason that has made Dar es Salaam the best location for this kind of research. The 1988 trade licence records show that there were 11,977 retail outlets in Dar es Salaam region alone, the highest in the country. In addition, the Dar es Salaam Region occupies a unique position because unlike other regions in the country it is mainly urban. Ninety percent of its total population live in urban areas. Further, the fact that Dar es Salaam has the highest retail business population is not unusual given its population density. The large population density, the highest in the

country, (Appendix 1-2) has to be supported by a correspondingly large number of retail outlets. This is because the retail business provides an indispensable service to the people, by linking them to the producer, and thus providing them with the much needed convenience. Population density for Dar es Salaam was 256 per sq. km. in 1967, six hundred and five in 1978 and 977 in 1988. Moreover, its annual average intercensal population growth rate was 7.8, between 1967 and 1978 and 4.8 between 1978 and 1988 (1988 Population Census, United Republic of Tanzania), the highest in the country when compared to that of the other regions (Appendix 1-3). In short, this justifies the existence of a large number of retailing businesses in Dar es Salaam.

Retailing in Tanzania can be traced back to the pre-colonial times when people traded goods for goods (i.e. barter system). The invasion of the east coast of Africa by Arabs and Asians in the 12th Century culminated in their domination of the import-export trade in the country. In 1963 there were already an estimated 5,000 to 6,000 Asians in Zanzibar and on the East African mainland (Hawkins, 1965). The growth of retail trade obviously depended, to a great extent, on the development of such foreign dominated wholesale trade.

The colonial period saw the growth of modern trading with money as the medium of exchange. With the coming of Germans and the British the import-export trade came under the control of Europeans who had contacts with their European markets. Asians and, to a less extent, the Arabs bought their supplies from these Europeans for distribution. Also, during this colonial period new multinational merchandising companies with main offices in Nairobi than in Dar es Salaam dominated the import-export and distributive trade of crops and manufactured articles. Such firms included Tancot Ltd., Brooke Bond, Liebig Extract of Meat Company, Mitchell Cotts, Intrata, Smith Mackenzie, Wigglesworth and Dalgety.

The availability of consumer goods and the expansion of the distributive trade in the market was seriously affected by the two World Wars. First, the aftermath of the First World War in 1920's included shortages of consumer goods, high prices, and the expansion of retail business (Kimble, 1977). Secondly, the Second World War (1939-1945) was also characterized by shortages of consumer goods due to disruption of production in agriculture, industry and in trade in general. It is mainly because of these events that the history and literature on pricing in Tanzania has been dominated by price control.

In 1920, the colonial government established the price control ordinance under Cap 209 of the Laws of Tanganyika, establishing legal powers to bring down to some extent the rising prices of essential goods. For the same reasons, the aftermath of the Second World War also saw the establishment of defence regulations in 1943. These regulations fixed a percentage margin which could legally be added to the cost of goods at various stages of distribution system.[5] Price regulations were mainly applicable to essential products like foodstuffs, baby milk and food and other selected products. In 1951, for instance, only 32 classes of goods were subject to fixed percentage of margins.

After Independence in 1961, the government still recognized the importance of regulating not only prices at all levels of distribution but also the production itself. Tanzania also saw the need to control its distributive trade in order to enhance price control among many other objectives. Since Indepencence, therefore, Tanzania has worked to mould the distributive trade to serve her goals of social and economic development.

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[5] The percentage margins were as follows:
1st seller - margin from 7.5 to 30 percent
2nd seller - margin from 2.5 to 10 percent
3rd seller - margin from 10 to 25 percent

Attempts to "socialize" retail business started way back in the early sixties when consumer co-operatives were not only encouraged to develop but were also established by the state. However, many problems faced these cooperatives, among them lack of reliable sources of supplies at reasonable prices. Early attempts to solve this problem culminated in organising the Co-operative Supply Association of Tanganyika (COSATA) in 1962, as a wholesale supplier to the Cooperative Movement. Nevertheless, COSATA failed in 1967 for a number of reasons which included, under capitalization, overly rapid establishment of retail branches, poor management and insufficiency of trained personnel (United Republic of Tanzania, Presidential Report, 1966: 44).

A more encompassing socialization and control of the distributive trade took place with the introduction of the Arusha Declaration in 1967. With the Arusha Declaration, came a change in the whole political and economic climate. The result was the nationalization of a number of firms, including COSATA, and the setting up of the State Trading Corporation (STC) in the same year. The establishment of the State Trading Corporation in 1967 in turn provided the framework within which the public sector could gain control of the distribution of sugar and khangas (textile), for example, by negotiating direct contracts with

manufacturers and wholesalers instead of imposing maximum prices from outside. The whole process led to the replacement of private wholesalers and retailers by government controlled parastatal organisations and/or cooperative bodies. Kimble (1970) observes that:

> Tanzania's many interesting new experiments with state trading and import agencies and with co-operative systems of production, marketing and retailing, have widened the public sector and increased the powers of the state to intervene effectively in price formation; they have also coincidentally, helped to encourage the belief that price control will work in almost any circumstances.

However, the State Trading Corporation did not last long. The failure of STC, culminated in the establishment of the Board of Internal Trade in 1973. Among the many reasons that led to the failure of STC included poor management and poor financial control because of lack of adequately trained personnel. Other reasons were undercapitalization and large volume of business.

Therefore, in 1973 the government formed six National Trading Companies (NTCs) and eight Regional Trading Companies (RTCs) which directly came under the control and management of the Board of Internal Trade (BIT).

The story has been different with regard to the socialization of retail business. Owing to a large

number of retailers, socialization has so far met with less success in the field of retail distribution. The government's stand on retail trade vis a vis the Board of Internal Trade or non-citizens, particularly Asians, has been influenced by the understanding that, among the many functions of retailing, is the provision of service to the community and as such no useful purpose would be served in formally institutionalizing it or replacing a non-citizen in the field by a black Tanzanian. This line of action has been taken in recognition of the fact that to run a business in urban and rural areas is a very intricate undertaking. In these areas or places, retailing has a special role of satisfying local needs which retail organisations like cooperatives with their attendant bureaucracy can hardly meet. It is noted that cooperative shops got all the support and protection from both the party and the government to the extent that the government in the late seventies went as far as announcing the closure of private shops in some locations to give way to co-operative retail outlets. This campaign and operation, however, met with little success.

In the above context, the government decided to restrict the aggressive socialisation of internal trade policy to the wholesale level. The retail trade therefore, is and will remain for a long time to come, in private hands. At

Independence, for example, there were already two and a half times as many licensed African middlemen as non-African middlemen (Hawkins 1965; 11-12).

The control of the distributive trade in general was complemented by government control policy and Price Control Act of 1973 that led to the establishment of the National Price Commission[6] in the same year (Regulation of Prices Act, 1973). The National Price Commission is empowered to set percentage margins at the level of production and distribution to be added to the cost of goods. However, given its limited staff, the control of prices at retail level has been very ineffective (Rice, 1976 and Whitworth 1978, 1980).

The price control policy of 1973 was brought about by many reasons including the general shortages of essential commodities. For almost a decade, the Tanzanian economy was a "shortage" economy. Shortages of essential commodities in particular, were dominant because of the 1973 oil crisis and the 1973/74 drought which led to the general shortage of foreign exchange. With the oil price

[6] ~See Appendix 1-4 for further elaboration on the subject.

increases during that period, Tanzania spent almost a half of its foreign exchange reserve on the importation of oil.[7]

Therefore, the foreign exchange available was used to import oil and food. The shortage of essential commodities was further compounded by the collapse of the East African Community (EAC) in 1977 and the war against dictator Iddi Amin of Uganda in 1978/79. The break-up of the EAC, particularly, left the country with few essential commodities on the market, because Tanzania had hitherto imported a lot of commodities from Kenya. This was not unusual since many industries were located in Nairobi and were meant for the entire East African market.

Coupled with internal problems such as economic mismanagement and inefficiencies (Maliyamkono and Bagachwa 1990: 7), the events cited above led to the economic crisis of the early 1980's particularly the period 1980 - 1983. A sharp decline in foreign exchange resulting from such events led to a strict restriction on the level of imports. As a consequence, inadequate imports of industrial inputs resulted in sharp decline in the production outputs. Coupled with other problems such as water shortage, power cuts, transport problems and the like, under-capacity

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[7] United Republic of Tanzania, Economic Survey 1984, Dar es Salaam, Government Printer, 1985, p. 3.

utilization and hence shortages were rampant throughout the country. These events called for a distribution policy, and an Internal Trade Policy was announced in 1980 as a result. The policy brought in the confinement of certain essential goods to authorised manufacturers and dealers and to Regional Trading Companies (RTCs). The distribution of thirty two selected most essential commodities were then supervised by an Allocation Committee set up at national, regional, district, and Ward levels. Further, these committees worked out quota allocations at their respective levels. Also, price controls became more stringent. Nevertheless, this distribution system did not work because it only encouraged increased smuggling and black markets. Consequently in 1983, the government declared a war against these illegal activities, generally referring to such activities as "economic sabotage".[8] This was also in response to increased public outcries for essential commodities. Some businessmen were arrested as a result. Notwithstanding the Government move against the so called "economic sabotage" essential goods continued to be scarce.

[8] A crackdown was launched by the Government on 23rd March 1983 and according to Maliyamkono and Bagachwa (1990: ix), it was clearly intended to administer a sharp and salutary shock to the ailing economy.

Another wave of change in the political and economic scene of Tanzania came in 1984, with the introduction of the Trade Liberalization Policy. Under the Trade Liberalization Policy, which became operational in 1985, businessmen and individuals with foreign currencies were allowed to import commodities that were included in the commodity import list. The list included a range of consumer, intermediate, and capital goods.

The economic reforms that led to the trade liberalization policy came about as a result of lack of foreign exchange with which to import consumer and industrial goods, inputs and raw materials. Further, trade liberalization in the context of the internal trade meant dramatic change in the sense that private traders and manufacturers assumed an increasing role in import, wholesale and retail trade vis-a-vis state participation, distribution control, price control, and protection of local industries hitherto in force.

The spirit of the country's Economic Recovery Programme (ERP) on the trade sector is to move towards a multi-channel distribution system by further decontrolling it.

Although todate, the trade liberalization policy has been partial[9], to many Tanzanians this policy was a big relief. There was life again in shops that were once virtually dead or were close to death. The retail outlets were flooded again with a wide assortment of goods. Many new retail outlets also emerged. Now individuals are heard of complaining against unfair prices. Further, commodities were price decontrolled, leaving only twelve basic categories of products on the price commissioners list from the original list of 2,000 products.[10] It is this setting that makes the pricing and retailing study of this nature particularly timely and feasible. Again, although distributive trade is of vital importance in the Tanzanian economy, contributing an average of about thirteen percent of the Gross Domestic Product (GDP) over the past thirteen years (Planning Commission, United Republic of Tanzania, 1989: 13) very little is known about the sector.

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[9] See a discussion on this issue by Maliyamkono and Bagachwa (1990: 13-15).

[10] In 1973 the number of price controlled products was 1000. It rose to 3000 in 1978. Since then the number of products and individual items under price control has declined to 235 items in 1984, and in 1988-89 budget to 12 commodities (Maliyamkono and Bagachwa, 1990: 85). In the 1991 budget price controlled items were further reduced to contain 3 items namely sugar, chemical fertilizer, and petroleum fuels.

1.4. EXPECTED CONTRIBUTIONS OF THE STUDY

The contribution of this study to knowledge, practical and policy issues is indisputable. Theoretically, the study will hopefully, first be able to explore the reasons for mark-up differences among product groups and items. This is obtained through a model developed in the study, which empirically estimates the intensities of the various effects. Through the model, important information can be projected. For example, determining the impact of changes in merchandise turnover on price mark-ups and the sort of relationship that exists. This according to the current researcher is an important contribution to knowledge.

Second, the findings of the study will add to the little knowledge available on mark-up variation in a developing economy. Most of the literature on the topic is based on research conducted in developed countries, particularly the United States of America. Given that business environments and conditions are different in developing nations it is unfair to generalize the research findings of developed countries to the less developed countries. The results of this research are, therefore, of significant contribution to knowledge.

Practically, it is hoped that the findings of this study will furnish information on the pricing behaviour of

retailers. This kind of information will be useful to the government and the manufacturers; hence its contribution to practical and policy issues. At the time of this research, twelve products were still price-controlled. The findings of this study thus serve to provide crucial information to the government to decide whether or not to revisit the price control Act of 1973. This will enable the government to think again on whether percentage gross mark-ups should be enforced at retail level or not. As far as manufacturers are concerned, their main objective is normally to be able to sell what they produce. Information on the pricing behaviour of retailers is of practical importance to them given that retailers provide the final link to the consumer.

1.5. ORGANISATION OF SUBSEQUENT MATERIALS

An outline of the remainder of the material in this study is presented below.

Chapter 2 contains the literature review and conceptual framework. The chapter is divided into five sections. Section one briefly outlines issues on retail margin research. Review of empirical studies on mark-up variation at retail level is covered in section two and section three presents the theoretical bases of mark-up pricing. In section four the conceptual model of the

study is presented while the conceptual hypotheses are given in section five.

The main objective of chapter three is to present the research design and methodology employed in the study. The chapter is divided into six sections. Section one discusses the overall research design while the sample selection procedure is presented in section two. The research instrument and data gathering methods are discussed in section three. In sections four and five the relevant variables are operationally defined. Analytical tools and operational hypotheses are presented in section six and seven, respectively.

A report of the investigation on mark-up pricing strategy by retailers in Dar es Salaam is done in Chapter 4. Consequently, the chapter contains two major sections. Section one discusses mark-up practices of retailers in Dar es Salaam, while further statistical results on the pricing behaviour of retailers are presented in section two. Section two is further divided into four subsections. Subsection one analyzes differences in the scores of the two major independent variables (unit cost and rate of stock-turn). In subsection two retail margins of different locations and population sizes are compared. The third subsection carries out further statistical

investigations to assess the influence of merchandise unit cost, merchandise rate of stock-turn, location and population size on retail margins. Finally, the null hypotheses are tested in subsection four.

Chapter five presents the summary, conclusions, and implications of the study on public policy, business and marketing, and future research direction.

CHAPTER 2

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.0. INTRODUCTION

This chapter reviews at length the literature on mark-up variation at the retail level and the variables influencing such mark-ups. It also presents the conceptual hypotheses and the model to be tested in the study. In short, therefore, section one primarily presents the review of empirical studies. The theoretical bases of mark-up pricing are given in section two, while the model and the conceptual hypotheses are presented in sections three and four respectively.

2.1. RETAIL MARGIN RESEARCH: AN OVERVIEW

There have been varied results and conclusions as to the factors which influence mark-up variation at retail level. Some of these results and conclusions have been confirmed by empirical investigations. However, the majority remain mere personal observations and theories which are not supported by empirical studies.

Noteboom (1985) generally notes that an explanation of differences in retail margins between different types of trade and different countries, and of the development of

margins in time, forms an important and relatively neglected topic of research. He further argues that "... the literature on retailing yields many useful concepts and insights, but not in the form of a coherent, formal theory that offers the basis for an explanatory mathematical model of margins" (Noteboom, 1985: 649). It is somewhat surprising that despite the market linkage effects[1] that retailing provides to the economy and society at large, there did not emerge a more comprehensive theoretical framework depicting the economic behaviour of retail firms until the late sixties. An elaboration on the market linkage effect of retailers is brought out by Tucker (1978: 42) who observes that "... despite the implicit assumption of many theories of the firm and consumer behaviour, manufacturers do not sell goods directly to consumers. Retail markets determine the prices and quantities of goods that are transmitted between production and consumption phases."

[1] This market linkage effect is brought out by virtue of the retailer being in the last stage of the distributional channel (within the marketing system). Because he is linking the manufacturer/wholesaler to the final consumer he is an important source of market information (a necessary input, for the marketing system) from the consumer/potential consumer to the manufacturer. Apart from providing feedback, the retailer offers a convenient product assortment in convenient sizes and at a convenient place. Furthermore, he takes over the storage function from the manufacturer and assumes risk.

Nevertheless, various empirical investigations on mark-up variation have been undertaken. Most of these studies as reported in Chapter 1, have been carried in developed countries, particularly the United States of America. Further, it is noted that a lot of the theory on pricing is based on economic analysis.

2.2. REVIEW OF EMPIRICAL STUDIES

Following the reported variations in retail mark-ups, various studies from different parts of the world have attempted to investigate empirically the factors that may help explain such variations. They have consequently attempted to investigate the pricing behaviour of retailers in different trades, different product groups and different retail organisations. In this connection, a number of approaches to such studies are noted and distinguished. First, there are those studies that have examined the variation of mark-ups between product groups. Studies by Jefferys (1938), Holdren (1960), Preston (1963), Nelson and Preston (1966), Dalrymple and Thompson (1969), the UK's National Board for Prices and Incomes (1969), Ward (1973), Reefs and Young (1975), Bowbrick (1975) fall into this category. Second, other studies have investigated the variation of mark-ups between different categories of retail trade/business and retail organisations. These have been found to dwell on the pricing behaviour of either

exclusive retailers or retail organisations like supermarkets, chain stores, departmental stores and the like. Examples of such studies are by Hall and Knapp (1950), Hughes and Pollard (1950), Holdren (1960), Tucker (1985) and Bode *et al.* (1986).

On the other hand, there have been a few studies on markdown variations. One example is a study by Jung (1965) on retail price patterns for carpets. As observed in Chapter 1, markdowns are the reverse of mark-ups. It is not the intention of this study to review the literature on markdown variation because it lies outside the scope of this study. A review of the studies on mark-up variation cited above is presented next.

Some investigations on distribution of consumer goods have highlighted some of the most significant features that may help explain mark-up variation. For example, Jefferys using data for the United Kingdom in 1938, remarked that "the figures confirm the generally accepted axiom that the relative rate of stock-turn or in other words the holding cost, is the strongest factor in determining the relative wholesale and retail gross margins earned on different commodities, but at the same time the exceptions make it clear that this is not the only factor operating" (Tucker 1978: 29). On the other hand, Holdren (1960) carried out

a number of studies, one of them being an investigation on mark-up variation among items. Using the correlation analysis technique Holdren found a significant negative correlation between mark-up and price (r= -.50) suggesting that high-priced items carried lower mark-ups.

However, a more encompassing and empirical study was later undertaken by Preston (1963) to examine how much of the mark-up dispersion within common grocery product groups could be explained by the three commonly used rules of thumb. That "mark-ups should vary inversely with unit cost, mark-ups should vary inversely with turnover and mark-ups should be higher and prices lower on reseller's (private) brands than on manufacturer's brands". Preston evaluated the three decision rules using data from twenty grocery product groups from one supermarket. Using a multiple regression analysis with five percent levels of significance he concluded that "some of the rules of thumb were followed to some extent in some of the product groups" (Preston 1963: 39). His analysis revealed a significant markup-cost relationship in only six instances, significant markup-turnover relationship and markup-brand relationship in five and eight instances respectively. In addition, in one product group a single rule helped explain 61 percent of the variance in percentage markups, and in

two groups a combination of two rules helped explain over 60 percent of the variation. His study generally showed that the three rules of thumb typically did not account for a significant portion of the variation observed in mark-ups. It thus appears that these findings understate the importance of the three decision rules in supermarket pricing. As far as the first rule is concerned the results were inconsistent with Holdren's study, which observed a significant negative correlation between mark-up and price.

In yet another study, Nelson and Preston (1966), investigated changes in retail food prices as a function of changes in wholesale prices (retailers' buying prices) during the preceding six-week period.

Using data from seven grocery and produce items from seventeen stores Nelson and Preston performed regression analyses to relate these changes in wholesale prices to changes in retail prices. The findings revealed that out of 114 possible relationships, only 27 were found to be statistically significant. The results suggest that a rather limited relationship exists between wholesale and retail price changes. However, given the problem of obtaining wholesale cost data for all the stores, actual cost figures were obtained from the United States

Department of Agriculture. Noting this shortfall, Nelson and Preston attempted a second analysis using wholesale price changes reported by eight of the grocery and fresh produce stores. The results of this study were consistent with the results of the previous one. However, the proportion of the retail price changes explained by wholesale price changes was not particularly large, ranging from 9 to 35 percent.

Not satisfied with the results, Nelson and Preston further compared the total number of wholesale price changes for thirty-eight grocery items with the total number of retail price changes, by performing rank correlation coefficients. A rank correlation coefficient of 0.35 was obtained. This low coefficient could be due to the fact that the data was gathered from only one store.

After reviewing their series of analysis of price-cost data Nelson and Preston described the cost-price relationship as a weak one.

Furthermore, Dalrymple and Thompson (1969), examined 290 items in a women's clothing department. Using correlation analysis, they observed a [significant] positive correlation ($r = +0.33$) between mark-ups and retail prices. In conclusion, Dalrymple and Thompson argue: "... while

the degree of association is not overpowering, it does imply that some higher-priced merchandise carried higher mark-ups in an apparent attempt to take advantage of differences in elasticities" (p. 176). This finding, however, contradicts Holdren's study reviewed earlier in this chapter.

Apart from the above study the two authors did some further analytical work on both Preston's, and Nelson and Preston's studies and came up with different conclusions. While Preston's study found no concrete relationship between mark-up and the three rules of thumb, in his other study with Nelson a weak relationship between price changes and wholesale price changes was found.

Against this background, Dalrymple and Thompson (1969: 186) observed that Preston's conclusions were based on the number of "significant" relationships found between mark-up and the other variables in the twenty product groups, and the number of relationships evaluated as significant was clearly a function of error the researcher was willing to accept. They argue that, the use of a 5 percent level in the study is entirely arbitrary and raises the question as to how many of the relationships were border-line in terms of statistical significance. These contributors argue further that the commonly accepted .01

and .05 standards of statistical significance represent extremely restrictive decision rules when used as the basis for hypothesis testing. They add that, in a business area characterized by uncertainty, findings of lesser statistical significance may support decisions, especially when there is a high penalty attached to doing nothing. Statistical criteria of the above magnitudes lead overwhelmingly in the direction of accepting the null hypothesis (p. 186). They suggest that, a slight relaxation to 8 or 10 percent level of significance could have undoubtedly increased the number of meaningful relationships.

In addition, Dalrymple and Thompson observed with concern the negative correlation between the number of observations and the proportions of the variation in mark-ups explained. They also point out that Preston's samples varied very widely in size among product groups.

They observe further that the results showed a clear relationship between the "significance" of a product group and the size of the sample. In view of this, Dalrymple and Thompson argue that it is somewhat questionable to compare the significance of separate product groups, which was demonstrated by the fact that the non-significant groups were those with the smallest number of items. Further

re-evaluating the data, they suggested that four out of twenty product groups could be eliminated in the investigation. Three of the product groups could be eliminated on grounds of insufficient observations and yet another product group could be eliminated by the argument that the study used a probability error of one in 20, and thus one group could be expected to be lacking in significance as a result of random error. The writers also criticized Preston's study for not being able to discuss how the three commonly used rules of thumb performed as a group or set. For the same reasons advanced above, they suggested that four of the product groups could be left out.

The two suggestions resulted into the strengthening of the finding by Preston's study. By considering the three rules as a set and also eliminating four of the product groups, Dalrymple and Thompson found that the rules explained a significant portion of the variation in mark-up in 15 out of 16 product groups left. They concluded that "... the cost, volume and brand decision rules as a set appear to be frequently followed on many products. This finding is considerably stronger than the conclusion contained in the original study" (p. 187).

Dalrymple and Thompson (1969) further criticized the second set of study undertaken by Nelson and Preston. In this study, the authors had found no significant relationship between retail price changes and changes in wholesale price. Dalrymple and Thompson performed fresh rank correlation coefficient on fifteen items and found that the coefficient increased sharply and became statistically significant. The results were obtained by dropping those items that had only a few or no price change or wholesale price change. Using the remaining fifteen items therefore a rank correlation coefficient of +0.68 was obtained which was higher than the value of 0.35 obtained by Nelson and Preston.

Whereas all of the above studies were conducted in the United States of America, in 1969 the UK's National Board for Prices and Incomes investigated distributors' costs and margins of furniture, domestic electrical appliances and footwear. The study employed fifteen variables. Using multivariate analysis (the first multivariate consideration in the UK of gross margins for specialist retailers in the United Kingdom) and by estimating separate equations for multiples and independents, they concluded that the gross margin is variously influenced by the structure of sales and the rate of stock-turn and where appropriate by whether the transaction is on cash or credit basis. However, they

suggested that a closer investigation from both a theoretical and empirical standpoint be undertaken. This is, so far, the only study that has considered such a wide variety of variables, in an attempt to investigate factors that may help explain MU dispersions among product groups. Other factors considered important in the study were margins per head, sales per head, margins per square foot and location of the shop. However, Tucker (1975: 32) argues that it must be questioned whether the manner of entering some of these composite variables merely lowered the unexplained variance by reason of an implicit identity relationship.

A similar type of investigation of distributive margins was undertaken by Ward (1973), for six selected commodity groups, namely tobacco, confectionery, domestic electrical appliances, carpets and pharmaceutical preparations. In introducing these case studies, Ward proposed that "... the difference in the level of distributive margins between products is related in some degree to three factors: the rate of stock-turn, the amount of brand advertising undertaken by manufacturers and unit price" (p. 171).

Ward did not, however, explore the role of differences in unit cost or the role of brand advertising by manufacturers, but he did investigate the role of the rate

of stock-turn. By using averages for thirteen kinds of business, Ward estimated the single regression equation of gross margins as a function of end-of-year stock levels.

He concluded that much of the variation in the level of margin between product groups can, in fact be ascribed to differences in the importance of cost of inventory system relative to turnover. However, Ward has been criticized for using this simple relationship of gross margin dispersion since many other factors should have been taken into account (Tucker 1975: 32).

Reefs and Young (1975), attempted, among other aims to determine the existence of mark-up pricing practices, the type of mark-up used and the extent to which variations in retail prices can be adequately explained by changes in prices at wholesale level. This was almost a replicate of Nelson and Preston's study (1966). However, Reefs and Young's study centred on the problem of trying to identify variables that could help explain why the level of retail price varied considerably across the European Economic Community (EEC). Using aggregate data on wholesale price, retail price and wage rate for France, Reefs and Young performed regressions equations to provide short-term forecasts of food margins at retail level. Given that their hypothesis was not supported by the facts, they could

only conclude that, there was need for an analysis of retailer's cost structures, analysis of farmer-consumer price spreads, collection of data and a review of the literature on market-margin analysis. However, as noted by Bowbrick (1976), the above findings and results, and the study as a whole are questionable due to the shortcomings in the approach used and the fact that the hypothesis was not based on appropriate studies (qualitative or quantitative) on the topic. In addition, Bowbrick remarks that the use of aggregate data rather than the use of retail surveys was perhaps more prompted by data availability on the variables investigated than there was a problem to be solved. He wrote that "most of the 600 papers I know of on market margins appear to have been written, not because there was a problem to be solved, but because the researchers came across a data series for wholesale and retail prices, which suggested market margin analysis to them" (p. 168).

Hence, it is further observed here that, although Reefs and Young (1975) and Nelson and Preston (1966) attempted to study similar aspects, their approach to the problem was different. While Nelson and Preston used retailer surveys data, Reefs and Young used aggregate data and they all came up with the result that changes in wholesale prices was not strong enough a factor in influencing retailers' prices.

Bowbrick (1976), presenting an analytical framework on the problems of market-margin investigations and price controls on fresh fruit and vegetables noted that it is often not possible to get the appropriate data, so that conclusions reached by many studies of this kind are quite inaccurate. He further points out that commodities like fresh produce are perishable and face seasonal demand, so that their margins undergo high fluctuations. He suggested that investigations of these commodities should, therefore, consider seasonality aspect, and it is appropriate to use weighted averages of prices and mark-ups. Bowbrick's (1973/74, 1975 and 1976) analytical and theoretical contributions on retail mark-ups have mainly been based on fresh produce like fruit and vegetables sales in Ireland and Britain, a study which diverts from the other studies reviewed above, except for Reefs and Young's (1975) study.

Kotler (1980: 341) expanding on Preston's (1963) results which concluded that some of the rules of thumb were followed to some extent in some of the product groups tested, argued that "a large amount of variation ... unexplained, was probably due to erratic decisions, random factors, and frequently better adaptations to the current market than could be provided for by the rules".

There are also various studies that have attempted to examine the variation of mark-ups between different trades or retail business and between retail organisations.

Hall and Knapp (1950), using the first United Kingdom Census of Distribution Data of 1950, examined variations in gross margins across retail firms grouped in different size intervals. They suggested that the experience of independent shops and multiples may differ and that variations in the rate of stock-turn may partly explain variations in gross margins. On investigation they found that "... in thirty-one out of forty-six trades in which margins decline with increasing size of independents, over at least the smaller size groups of the independents, the rate of stock turn increases as percentage gross margins decline".

Hughes and Pollard (1950) using the same kind of data, as Hall and Knapp, investigated both the gross margins and their components. The two components were defined as wage costs, and a residual made up of all other costs (that is, rent, lighting, heating, equipment, loan service charges, insurance and advertising expenses) and net profits. They noted wide variations in gross margins among different size groups within kinds of business and between different kinds of business and suggested two major explanatory

variables. These were the extent of monopoly power and variations in the goods/service output-mix. They asserted that variation in the goods/service output-mix could be attributable to the degree of product diversification, advertising outlays, the quality of goods and range of services associated with goods and stock turnover rate.

The two studies cited above, however, employed intuitive reasoning guided by data patterns to arrive at their conclusions. No formal quantitative testing of the suggested relationships was undertaken.

Holdren (1960) investigated price differentials among retail organisations. In his study, he found an inverse relationship between prices and the size of the organisation. This was from his observation that chain prices were lower than those of independents, a finding which has frequently been reported in the marketing literature.

Tucker (1978: 21), using the UK's trade and industry data concluded that "among kinds of business the variation in stock-turn is substantial, with other food retailer showing the quickest turnover and other non-food shops the slowest. Not surprisingly, the gross margins are generally higher for kinds of business with slower stock-turns".

In addition, he attributes the differences in gross margins also to differences in the levels or range of services provided, credit facilities and hire purchase arrangements for durable consumer goods. He remarks that business offering the most comprehensive credit facilities have higher than average gross margins.

More recently investigations on mark-up variation in retailing have been undertaken by Noteboom (1980, 1982, 1985) and Bode *et al* (1986). These studies have investigated mark-up variations by shop types and shop size.

Noteboom (1980), for instance, showed that within a shop type there was no relation to be found between percentage gross margin and shop size. To the extent that within a shop-type a larger sales size per shop yields a lower price of buying, this advantage is passed on to the consumer, whereby percentage gross margin is not affected.

Studies of operating costs versus MV again by Noteboom (1982), showed that there were economies of scale, by which percentage operating costs were lower for larger rather than for smaller shops, within a shop-type. He further observed that competition in retailing was sufficiently intense as to preclude a higher percentage gross margin

for smaller shops within a given shop-type as a possible compensation for higher costs.

Noteboom (1985) undertook a more comprehensive investigation of a mark-up model of retail margins by shop type in the Netherlands. The model explains differences in percentage gross margins between different shop types as well as the development in time per type of shop. Using both cross-sectional and time-series studies, Noteboom investigated four variables, namely, the scale-effect, shop-type effect life-cycle effect, and the business cycle effect. He concluded that:

1. A large scale, in the sense of a larger average sales volume per shop, yields a lower percentage gross margin (scale effect).

2. A shop type yields a relatively high profit during penetration phase of its life cycle (rising market share) and a relatively low profit during the phase of decline (falling market share). Thus successful innovation of retail formulas is more profitable than entry into a long established shop-type in its phase of stabilization or decline (life cycle effect).

3. A decline in consumer spending yields a lower profit margin due to increased price competition. This decline of consumer spending has a two-fold effect on aggregate profit income per type of shop: due to a decline of aggregate sales, and due to a decline of profit mark-up as a percentage of sales (business cycle effect).

He further concluded that overall, productivity growth which is less than the price rise of production factors yields an upward pressure on the margin per type of shop (mark-up effect) (Noteboom 1985: 662).

At about the same period Bode *et al* (1986) replicated Noteboom's study and investigated storekeepers pricing behaviour in the Netherlands. Using multiple regression equations for individual stores, they tested the influence of four variables: operating costs, reward for shopkeepers labour, sales growth and population size on the storekeepers percentage gross margin. From a number of hypotheses, they were able to make the following conclusions:

> "First, it appears that storekeepers are able to pass on the out of pocket operating cost but the remaining operating costs are not always passed on completely into the percentage gross margin. Secondly, the percentage gross margin is inversely related to sales size. Third, there seems to be a time lag with respect to the effect of sales growth on the percentage gross margin. Lastly, it appears that the percentage gross margin is, in general higher for stores located in high population areas" (Bode et al 1986: 104-105).

The inverse relationship between percentage gross margin and sales size in the second hypothesis was attributed to the fact that a higher sales size requires a lower percentage of sales to achieve a given basic reward for

storekeepers' labour, and also that the percentage gross margin is affected by the competitive strength of a store. This influence is approximated by a store's sales growth. It is noted also that Bode *et al*'s results or findings in this hypothesis are consistent with Noteboom's findings.

Bode *et al's* conclusion in the first hypothesis is also attributed to the existence of heavy competition and to the fact that the storekeepers may not be very careful about passing on the type of cost to customers.

The review of the above literature has shown mixed results regarding factors influencing mark-up variation. Except for Preston's study, many researchers supported the influence of volume or turnover on mark-ups. Unfortunately, some of the studies that supported the influence of turnover on mark-ups were not backed by comprehensive empirical studies. Also, many comprehensive studies that supported its influence were based on mark-up variation among shop-types. Further, it has been shown in the literature review that results of research on the impact of wholesale price on retail price has varied from one author to another. These mixed results have probably been brought about partly by the approaches used. The approaches in data collection varied widely. Whereas the majority used census data very few employed retail surveys

data. Furthermore, the analytical methods mainly tested for simple and linear relationships.

For some studies that seek to explain mark-up variations among product categories, the relationships may be weak because of a possibility of choosing a limited sample of closely related products which may suggest similarity in elasticities of demand.

In this study, one, retail survey is used to examine empirically the effect of unit cost, merchandise turnover, location and population on mark-ups. Use of survey data is often regarded to be superior to use of census data in the sense that they are collected to fulfil a specific research objective/research problem at hand. Census data, however, are collected for many purposes. On the other hand, the method used to collect census data may not suit the problem being investigated. Two, this investigation is based on product categories, and finally, the study is undertaken in a developing African country and consequently within a developing retailing environment.

2.3. THEORETICAL BASES OF MARK-UP PRICING

Most of the theory on pricing is based on economic analysis. The main interest of economists in pricing is

the development of a model that will maximize profits, either in the short run or in the long run. Consequently, the topic of price has always stood at the centre of economic discussion.

It is worthy noting that early economic theories of price were directed toward a definition of value (what an item is worth), and value in relation to money may be expressed in terms of price. However, for general purposes the two terms are used interchangeably (Fitzpatrick, 1964: 10).

A more comprehensive theory of price stems from Marshallian Economics, which established the "neo-classical" economic school. In 1890, Marshall advocated that the value of a good or its price is determined by an equilibrium between the forces of supply and demand. Perhaps one of the notable contributions Marshall made to the theory of pricing was his explanation of elasticity. Price elasticity[2] which is defined as the percentage change in quantity sold resulting from a percentage change in price is a concept that is shown to be very important in the current study, as it is equally important in contemporary pricing theories.

Against this background, another question that economic

[2] See Appendix 2-1 for an elaboration on the concept.

theory has tried to answer is: Why should prices or mark-ups vary between products, locations or over time? A brief review of this conventional theory predicts that the size of the mark-up is in the long run determined by cost and demand factors (Koch, 1980: 365). In particular price elasticity of demand is an important determinant of the size of the mark-up utilized.

2.3.1. Price Discrimination: A Theoretical Analysis

The setting of this study therefore, embraces the concept of differential mark-ups and hence price discrimination among products, between locations and also over time. Koch (1980: 366) argues that with differential price elasticities (demand) and differential cost (supply) factors, price discrimination is inevitable. Further, Kotler (1984: 517) adds that a rigid customary mark-up over cost may not make any logical sense. This follows from the fact that "any model that ignores current demand elasticity in setting prices is not likely to lead, except by chance, to the achievement of maximum profits, either in the long run or the short run. As demand elasticity changes, as it is likely to do seasonally, cyclically, or over the product life cycle, the optimum mark-up should also change" (Kotler, 1971: 341). If the mark-up remains a rigid percentage of cost, then under ordinary conditions it would not lead to maximum profits.

Kotler (1971: 341) expands on this issues by stating that:

> "... only under special conditions that is, when average (unit) costs are fairly constant over the range of likely outputs and price elasticity fairly constant for different points on the demand curve and over time, will a rigid mark-up at the right level lead to optimum profits".[3]

The basic economic assumption is that a firm will maximize profits by varying its mark-ups and therefore prices, following the different price elasticities and costs of the various products, markets, or periods. Koch (1980: 62) demonstrates this theory by starting with a well-known equation that relates marginal revenue (MR), price (P) and price elasticity (e). That is:

$$MR = (1-1/e)\ P \qquad (1)$$

---

[3] Kotler (1971) and Preston (1963: 6, 8) give a mathematical proof supporting the continued use of uniform mark-up pricing. They both begin with the simply proven economic proposition that marginal revenue is equal to price plus the ratio of price to elasticity i.e. $MR = P(1 + 1/e)$. Since price elasticity is generally negative, the term is written as $MR = P(1 - 1/e)$. Under conditions of profit maximization, marginal revenue is equal to marginal cost, therefore, $MC = P(1 - 1/e)$. Marginal cost is in turn equal to average cost when the unit cost of the item being priced is constant... Thus, $AC = P(1 - 1/e)$, which is then mathematically arranged so that

$$\text{mark-up on cost} = \frac{P-AC}{AC} = \frac{1}{1-e}.$$

The expression suggest that as long as there are no changes in elasticity, the profit-maximizing mark-up remains constant. This formula also suggest that the profit maximizing mark-up is inversely related to elasticity.

Following that profits are maximized when marginal revenue is equated to marginal cost (MR = MC)

then:

$$MC = (1-1/e)\ P \qquad (2)$$

Dividing both sides by (1-1/e)

$$\frac{MC}{(1 - 1)/e} = P \qquad (3)$$

e is a common denominator in equation (3) and the equation can be rewritten:

$$\frac{MC}{(e - 1)/e} = P \qquad (4)$$

inverting $\frac{e-1}{e}$

$$\frac{MC\{e\}}{e-1} = P \qquad (5)$$

$$\frac{LRAC(e)}{e-1} = P \qquad (6)$$

In the long run given constant costs

$$MC = LRAC$$

Equation (6) indicates that price is determined by the joint interaction of the supply (cost) factor and the demand (price elasticity) factor. That is to say, price is longrun average costs of merchandise multiplied by a mark-up factor based upon price elasticity of demand.

It can further be shown below that the optimal mark-up is inversely related to price elasticity. Starting with a similar relationship as shown above, that MC = (1-1/e) P, and assuming that average costs are constant then:

$$AC = (1 - 1/e)\ P \qquad (1)$$

Arranging algebraically

$$\frac{P}{AC} = \frac{1}{1-1/e} = \frac{e}{e-1} \qquad (2)$$

Subtracting AC/AC from both sides of equation (2)

$$\frac{P-AC}{AC} = \frac{1}{e-1} - 1 \qquad (3)$$

$$\frac{P-AC}{AC} = \frac{1}{e-1} \text{ where } \frac{P-AC}{AC} \text{ is MU based on cost}$$

$$\therefore \text{ mark-up (MU)} = \frac{1}{e-1}$$

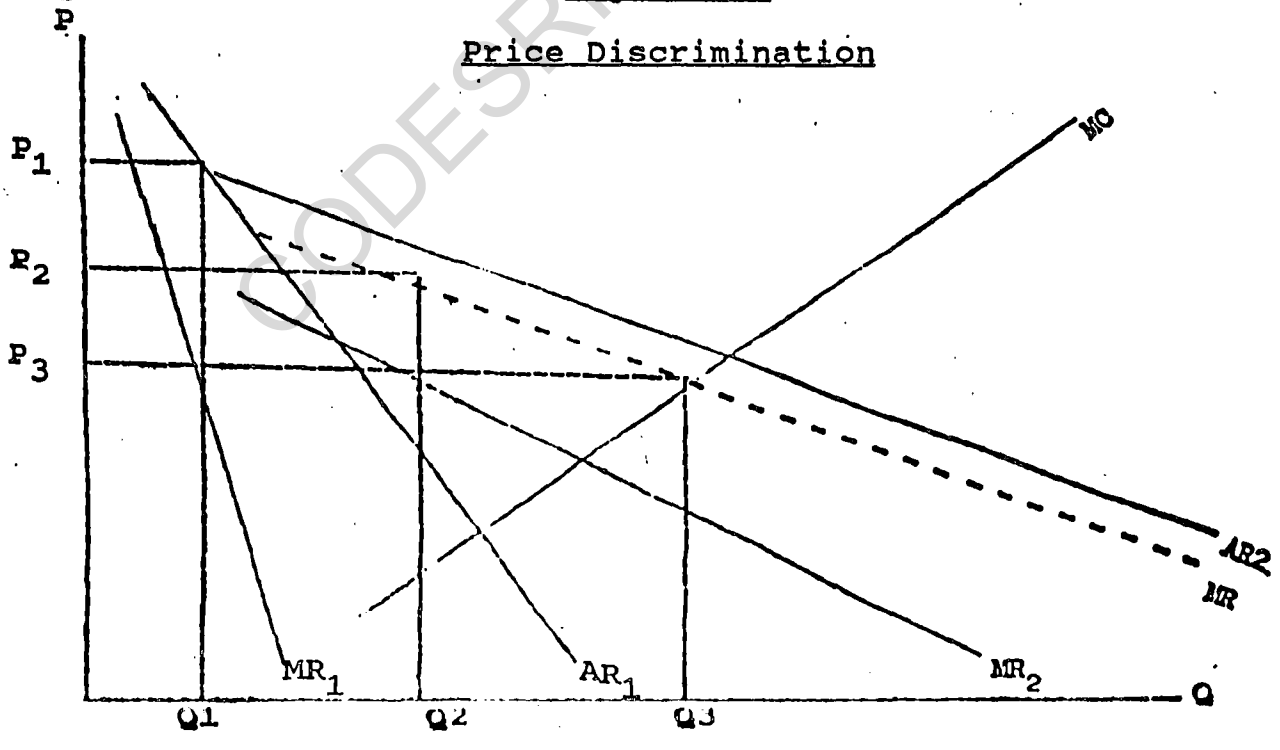
The mark-up is therefore inversely related to price elasticity. The higher the price elasticity the lower the mark-up, and the lower the price elasticity the higher the mark-up.

With the above mathematical formulation it has further been shown theoretically that as long as price elasticity differs between markets, products, or over time, price discrimination will maximize profits.

Kotler (1971: 398) and Reekie and Crook (1982: 208) demonstrate further the theory of price discrimination by presenting an example of a firm selling a single commodity in two markets with different demand functions. They also demonstrate that in so far as price elasticities differ in the two markets, the firm will maximize price by practising price discrimination. Consequently prices will be lower in price elastic markets and prices higher in price inlastic markets. Figure 2-1 shows how this can be done:

Figure 2-1

Price Discrimination



AR_1, MR_1, AR_2 and MR_2 are, respectively, the demand and marginal revenue curves for markets 1 and 2. MR is the aggregate marginal revenue curve obtained by summing MR_1 and MR_2 horizontally. MC is the firm's marginal cost curve, drawn on the assumption that the firm is producing and selling only one product in one location.

Following the profit maximizing rules, Reekie and Crook proceed to recommend the following steps:

1. Set MR = MC to obtain the point of most profitable output i.e. Q3.

2. Subdivide Q3 between the two segments, by equating marginal revenues in each segment with the marginal revenue indicated by the intersection of MC with MR (if this is not done then it would pay the firm to transfer output from the segment where MR is lower to that segment where it is higher until equality was obtained, at a given fixed total output).

3. This results in different, discriminatory prices, P_1 P_2 , being charged in the two segments. It can further be predicted which segment will pay the higher price algebraically. Given that MR = P(1-1/e) then if MR_1 is to equal MR_2 the higher the

value of e (price elasticity) the lower will be the price.

However, information leakage must be minimal or customers in market 2 will buy at price P_2 and resell to customers in market 1 at a price between P_1 and P_2.

4. The product must be homogeneous to obtain a single MC curve.
5. Any cost involved in preventing leakage must be less than the extra revenue which can be obtained by practising price discrimination.

There have been several recent papers on the subject of price discrimination in retail markets. Shilony (1977), Rosenthal (1980), and Varian (1980) present models in which identical competing sellers of a homogeneous good select strategies in price to discriminate between two classes of customer with different elasticities of demand. In their analysis, the unique symmetric equilibrium was a mixed-strategy equilibrium. This was interpreted as a model of sales or discounts (Hirshleifer, 1984: 366).

To conclude this section it is observed that the economic models presented above have actually demonstrated the importance of price mark-ups. It is further observed from the theoretical discussion that the two rules of thumb (decision rules) introduced in Chapter 1 are restatements of the relationship between mark-ups or prices and elasticity. The two decision rules were stated as: mark-ups should vary inversely with unit cost and also that mark-ups should vary inversely with turnover. The consideration of the influence of additional factors like population and location examined in the present study reflects similar relationships.

2.3.2. Factors Influencing Mark-ups

In the previous sections empirical studies and theoretical bases of factors influencing mark-up variation have been reviewed. This section describes in general terms these variables and many others that are assumed to influence mark-ups. Bolen (1982: 241) mentions the judgement of appeal of goods by target markets, competition, merchandise characteristics, turnover, cost, role of price in retail mix and legal consideration as among the many variables that influence retail mark-ups.

In retail trades, pricing has a major effect on consumer patronage, on how well retailers fare against competition,

and ultimately on whether a retailer makes a profit or loss. Pricing decisions are also closely related to the other major marketing decision areas of merchandise planning, promotion and physical distribution. Elaborating on mark-up (cost-plus) pricing, Malumo (1986: 199) mentions several factors that determine a reasonable margin. These are legal limitations standard practice, the ease with which the product can be sold, its novelty, pressure from competition, anticipated or known consumer reaction, corporate and marketing objectives. Also, defining a "reasonable" gross profit margin for certain goods, Kimble (1968: 12) observes that:

> the normal percentage margin varies according to type of goods sold; in Tanzania, fast-moving lines, such as staple foodstuffs, cigarettes, cheap shirts etc., carry much lower margin's than slow-moving goods (expensive tinned foods, stationery or consumer durables). Many traders cover what might otherwise be losses on the fast-moving lines, whose prices are kept as low as possible by the profits they make on the higher-priced slow moving lines.

On examining the impact of the market on mark-ups, it is observed that the market has a very big role to play in the pricing policy of a business. Coarse has asserted that "... what the typical businessman believes to be "reasonable" mark-up is in fact what he thinks the market will bear most profitably" (Stigler, 1960: 392).

Writing on the same topic, Bolen (1982: 241) observes that the judgement of appeal of goods by target market, by examining the sensitivity of the market to price changes or price differences does influence the size of the mark-up. For example, what price will the market accept? What influence, if any, will low or high price have on the market? Will low or high price connote low or high quality respectively? These are some of the questions that must be answered by the retailer.

Another variable that has impact on the size of the mark-up charged is competition. Explaining mark-up differentials in Tanzania ESAMI (1986: 3) writes that "... these different mark-ups for different products definitely reflect competitive considerations and differences in risk/return factors on each product".

The influence of competition on prices in any competitive environment cannot be underestimated because the retailer has to consider pricing policies of competing outlets. In retail markets, sellers frequently offer to match any other advertised price. Such offers have been noticed in major department stores, a renter of furniture and several electronics goods store (Hirshleifer, 1984: 365). Nevertheless, the retailer has to always make decisions as to whether to set up prices above, below or at par with

those of competitors. In each case there are particular factors that favour the choice of each approach. Such factors are quality offered by competitors, sensitivity of the market, differential advantages of the retailer in terms of customer service, location, quality and the like.

Retail mark-ups are further influenced by the type of merchandise and their characteristics. The merchandise can be distinguished in terms of fashion, seasonal and perishable goods. For example, a fashionable style may fetch a higher mark-up. Seasonal goods may have higher mark-ups during the particular season, and face price cutting at the end of the season. Also perishable goods may face price cutting at the end of the day. These two types of merchandise are classified as high risk goods because after being stocked for sometime they certainly suffer mark-downs. Their initial mark-ups must be sufficient to cover such eventualities (Pintel and Diamond, 1983: 246). Furthermore, some goods like men's shoes traditionally fetch a higher mark-up. This is true despite the fact that they may be less risky, perishable, or seasonal. In addition, merchandise of extreme bulk or high value like furniture and jewelry, fetch higher mark-ups, as a provision for unusually high overhead costs, so that normal profit will remain after the additional

expense is paid. For example, bulky goods like furniture and carpeting require a large amount of floor space and consequently rent expense. Also jewelry requires additional expenses such as vaults for night storage and sometimes highly paid salespersons who are knowledgeable in the trade.

Perhaps one of the important elements influencing mark-ups is volume, or "turnover". Merchandise turnover or stock turnover is normally measured in terms of turnover rate. Pintel and Diamond (1983: 246) define the stock turnover rate as that rate that indicates for a specific period of time (usually one year), the number of times the inventory has been completely sold out and repurchased. Kibera and Waruingi (1988: 138) also define stockturn rate[4] (stock turnover rate) as the number of times an average inventory is sold in a year. Expanding on the concept they argue that:

> Some traders think that high mark-ups mean high profits from their shops. But this is not often the case. You cannot earn much if you do not sell much. The key to profits is turnover. A retailer

[4] The stockturn rate is normally defined in two ways:

$$(i)\ \textit{Stock turnover rate} = \frac{\textit{Sales}}{\textit{Average Inventory}}$$

$$(ii)\ \textit{Stock turnover rate} = \frac{\textit{Cost of goods sold}}{\textit{Average inventory at cost}}$$

can reduce mark-up in order to increase the turnover and profits.

In general, low stock-turn increases costs by tying up working capital. A store with a quick turnover can afford a small mark-up because it will receive that mark-up many times during the year. Kibera and Waruingi (1988: 139) argue further that stock turnover is a measure of sales effectiveness, and hence its consideration is an important pricing tool.

Yet another factor that determines mark-ups is merchandise cost. High cost merchandise may fetch low mark-ups and low-cost merchandise may fetch higher mark-ups. This is somewhat also related to turnover, in the sense that high value or high cost merchandise face low demand, hence low turnover. That is to say, only few people in the high income bracket can afford such a commodity. Many researchers have attempted to optionalize this by equating it to wholesale price and investigating its impact on mark-ups.

The role of price in retailing mix is another variable that influences mark-ups. The retailing mix according to Bolen consists of five P's (Product, place, promotion, personality and price). Thus price should be coordinated with other variables. Some pricing tactics

to be mentioned later in this chapter are a reflection of a means of coordinating price with these other variables.

Mark-ups are also regulated by the social and political systems in which the retailer operates. For example, socialist governments tend to be more restrictive by imposing price controls over most items which they regard as necessities. In quite a number of cases, governments impose price limits for certain goods considered strategic or to particular situations to avoid unrestricted profiteering. Again in a few cases manufacturers have set price ceilings for their products at wholesale and retail levels. In Tanzania, for example, the Tanzania Tea Blenders Company is at the time of writing doing just that. Price control, in theory is supposed to stabilize the prices of the relevant goods. However, in practice it has not done so in several countries. In some cases, it has been found to set a barrier to competition. Since they are not in favour of price controls, economists have argued that prices can be more effectively reduced by seeking to improve, rather than interfere with the competitive system (Kimble, 1968: 10). Bowbrick (1975: 2) observes that attempts by some retailers to stabilize prices of fresh produce like vegetables and fruits can lead to market

instability which will eventually result in high fluctuations in prices and consequently the mark-ups.

Apart from the factors mentioned above that influence mark-ups, the actual mark-up and price, is also influenced by other pricing strategies and tactics. Roosenbloom (1981: 269) examines the pricing tactics as specialized pricing strategies. Among these specialized pricing strategies or tactics are price lining, loss leader, psychological pricing like odd-number and prestige pricing, psychological discounting and private brand pricing.

Under price-lining strategy, the retailer develops some price lines for the merchandise he carries say TShs. 399.95, TShs. 599.95 and TShs. 889.95. The buyer will hopefully associate these prices with value or quality.

Another pricing tactic is called leader pricing (sometimes called loss leader pricing). Here items are sold at very low prices, usually below cost, to attract customers into the retail outlet. The retailer expects that the customer will not only buy the loss-leader but will purchase other more profitable items while in the store.

Odd number pricing is displaying and selling items at retail prices whose last digit is an odd, rather than even numbered. Here the consumer hopefully thinks he is getting a bargain, and he will perceive Shs. 399.90, for example, as Shs. 390, instead of 400. Under prestige pricing tactic the retailer charges very high prices to connote superior quality or status.

Retailers also sometimes prefer using private brands to manufacturer's brand in their merchandising activities. The use of private brands provides the retailer with a means to be price competitive while still maintaining adequate gross margins. The tactic precludes direct price comparisons by consumers going from one store to another.

In the retail business there are a lot of other promotional pricing tactics. For example, sellers use special event pricing in conjuction with sales seasons (e.g. Christmas, Idd, etc.). They also employ psychological discounting. Retailers occasionally set an artificially high price on a product and offers it at great savings, for example, was 1000/=, now 850/=. The customers may think that they are really getting a bargain. Overall, many of the promotional pricing tactics examined above are used as traffic builders, particularly when sales are showing a declining trend.

It is not the intention of this study to go deeper into these various retailer's tactics, since they remain optional to the retailer, while mark-up pricing is inevitable. Moreover, under maintained mark-ups, these tactics are subsumed in the retail mark-ups.

2.4. THE CONCEPTUAL MODEL OF THE STUDY

The review of literature on empirical investigations has shown contradictory results regarding factors influencing mark-up variation. Some of the findings were consistent with the theories explained in the previous section, but others did not support the theories.

By using insights drawn from the empirical and theoretical materials reviewed hereabove the current study empirically examined mark-up variation among selected product groups in Tanzania's retail business. The researcher was interested in percentage gross margins of individual product groups sold by retailers in the Dar es Salaam Region. The main question was: Are mark-up differentials in Tanzania's retail business arbitrary or can they be explained by objectively identifiable factors such as merchandise cost, merchandise turnover, population and location? Specific questions on the influence of these variables were then translated into a model which served to subject the

various assumptions to empirical test and finally estimated the intensities of the various effects. The following probabilistic model was then developed.

$$M_{ij} = -\alpha_1 C_{ij} - \alpha_2 S_{ij} + \epsilon$$

where,

i = product category (1, 2, ... n)

j = product type (1, 2, ... n)

M = percentage of gross margin or mark-up

C = unit cost of product

S = turnover rate

ϵ = other variables causing disturbance. In an attempt to reduce this error term, location of retail outlets and population variables are considered.

α_1 and α_2 = coefficients to be estimated.

In short, this model is an expanded version of the previously reviewed economic model that relates mark-up to price elasticity and the formulation that price is determined by the joint interaction of the supply (cost) factor and the demand (price elasticity) factor. As mentioned earlier in this text, the rules of thumb reviewed in Chapter 1 are restatements of these

relationships. Similarly the variables investigated in this study, namely, turnover, population and shop location reflect the demand factor on the one hand. On the other hand, cost of merchandise and again shop location reflect the supply (cost) factors.

2.5. CONCEPTUAL HYPOTHESES

On the basis of the research objectives set in Chapter 1 and the literature on both empirical and theoretical discussions reviewed in the preceding sections of this chapter the following hypothesis can be advanced:

Percentage mark-ups are not uniform for all types of goods in Tanzania's retail outlets. The conceptual hypotheses emanating from this thesis are:

1. Mark-ups are inversely related to unit cost; that is, the higher the product's unit cost the lower the mark-up and conversely the lower the product's unit cost the higher the mark-up.

2. Mark-ups vary inversely with turnover. That is to say, the merchandise which have high rates of turnover have lower mark-up rates than slow moving ones.

3. Mark-ups differ from one location to another. That is, the farther the retail outlet is from the city centre the higher the mark-up.

4. The mark-ups are inversely related to the population size of a store's market area. The larger the population the lower the mark-up.

5. Mark-up variation in product types are not different from those in product categories.

CHAPTER 3

THE RESEARCH DESIGN

3.0. INTRODUCTION

In Chapter 2, the literature on both empirical studies and theoretical contributions was reviewed. Finally, the model and the conceptual hypotheses were presented. This chapter contains a comprehensive research design that was employed in the study, including the operational definitions of both the independent and dependent variables. The chapter is divided into six sections. Section one describes the research design in general terms. The sampling procedure used is outlined in section two. Section three deals with the research instrument while the operational variables are defined in section four. Finally sections five and six present the analytical tools and operational hypotheses.

3.1. OVERALL RESEARCH DESIGN

It was observed from the literature reviewed in the previous chapter that many of the earlier investigations employed census data. Such data was in most cases used as proxies for the variables under study. This research departed from the norm by using own survey data of retail outlets in Dar es Salaam Region. The survey was undertaken during the end of 1988 and beginning of 1989.

A survey approach was guided by a descriptive[1] type of research design. Given the difficulty in collecting data for a time series study in Tanzania's retail business, the research involved only cross-sectional designs, by picking and measuring a sample of elements from the population of interest at a single point in time.

A time series study was practically not possible basically because of the historical background of retail trade described in the setting of this study in Chapter 1. First, the country has undergone a lot of changes economically, with rampant shortages of commodities in the late seventies and early eighties. Secondly, because of the foregoing, comprehensive data on retailing and prices at national level is almost nonexistent. Thirdly, retailers themselves do not keep pertinent records probably due to the fact that many of them are individual owners or family business operating on a small scale. Fourth, because of the changes in trade policies, with 1984 marking the launching of the Trade Liberalization Policy (which seemed to attract business) there are many new retail outlets which did not exist before 1986. These events and reasons preclude the use of time series designs

[1] A descriptive study is typically concerned with determining the frequency with which something occurs or the relationship between two variables. The study is typically guided by an initial hypothesis which may statistically be tested. For further discussion on this topic see Churchill (1979: 47).

in this particular kind of study. A cross-sectional design was thus the only feasible alternative. By using such a research design it should be noted that time was not an issue in the analytical methods subsequently reported in this study. As such the use of test statistics, such as the Durbin - Watson, which are related to time (Johnston, 1984:314-8, Gujarati, 1978: 234-6, Heathfield 1976: 18-9) were not necessary. Even if they were, mathematical transformations undertaken in the study preempted their use (Frank, 1966:248).

3.2. THE SAMPLING PROCEDURE

As already justified in the setting, the research was restricted to retailers in Dar es Salaam. One major reason was that Dar es Salaam is the commercial heart of the country.

The population from which the sample was drawn included the total number of official retail outlets in the Dar es Salaam Region. Initially, a list of all licensed retailers in the region was compiled from the three district (Ilala, Kinondoni and Temeke) trade offices. In the absence of centralized and systematic data on retail organisations at both regional and national levels this information had to be obtained through summaries of business license records of the three districts. The distribution of these retail outlets by district and product classification as at April 1988 is presented in Table 3-1.

Table 3-1

Classification of Retail Business By District in Dar es Salaam Region: 1987/88

TYPE OF RETAIL BUSINESS	DISTRICT			
	Ilala	Kinondoni	Temeke	Total
1. Hotel, Soft drinks kiosks, restaurants and canteens	801	478	182	1461 (12.2%)
2. Textile and food	1444	2569	373	4386 (36.6%)
3. Food and miscellaneous	1183	575	96	1854 (15.5%)
4. Timber and furniture	205	128	16	349 (2.9%)
5. Hardware, building materials & electrical goods	800	364	23	1187 (9.9%)
6. Printing and binding	145	19	4	168 (1.4%)
7. Stationery	250	32	3	285 (2.4%)
8. Pharmaceuticals	80	36	2	118 (1%)
9. Tailoring, textile and miscellaneous items	1127	299	59	1485 (23.4%)
10. Fish, vegetables and fruits	249	415	20	684 (5.7%)
Total number of retail outlets	6284 52.5%	4915 41%	778 6.5%	11977 100%

Note: The percentages represent proportions to total figure in each category.

According to the 1987/88 business license summary records, Dar es Salaam Region had a total number of 11,977 retail outlets; comprising 6,284 in Ilala district, 4,915 in Kinondoni, and 778 in Temeke district. Retailers are, further, shown to be classified, by category of business, into ten groups as shown in Table 3-1.

Out of the total number of retail outlets in the region, 902 (7.5) constituted the sample of this study. An initial sample target of 10 percent could not be achieved because of time and cost constraints. This is mainly because retail outlets are usually scattered throughout the region including residential areas. Locating them was a big problem.

The method used to select the 902 retail outlets involved a multistage cluster sampling. Cluster sampling was used because, it was impractical to compile an exhaustive list of potential interviewees (retailers) for each chosen location in the region. The main reason here, as explained above, is the scattered nature of retail outlets. A brief discussion of the method used is as follows: Administratively, Dar es Salaam Region is divided into three districts, Ilala, Kinondoni and Temeke. The districts are each divided into Wards or branches which are further classified into urban, mixed and rural categories.

The first sampling stage entailed listing all urban Wards. This was based on the 1988 Tanzania Population Census classification.[2] The main reason for choosing only the urban Wards is that there are more commercial activities here than are found in the rural and mixed Wards. The rural Wards are basically agricultural - based, activity-wise. This procedure yielded 32 urban Wards. The second sampling stage involved the classification of these Wards into strata by district. These strata are presented in Table 3-2.

Table 3-2

Classification of Wards By District

District	No. of Urban Wards
Ilala	14
Kinondoni	13
Temeke	5
Total	32

The classification of the Wards by district ensured the representation of each district in the final sample. From these strata, seventeen Wards were then chosen by employing systematic sampling procedure similar to the one described

[2] See "1988 Population Census: Preliminary Report" (United Republic of Tanzania), pp. 79-81.

by Babbie, and Lapin.[3] Initially, a single Ward was randomly chosen from each stratum and the rest were picked by selecting every second Ward. This yielded seven in the first stratum, seven in the second, and three in the third as shown in Table 3-3.

Table 3-3

Seventeen Selected Wards By District

District	Name of Wards
Ilala	Ilala, Vingunguti, Kipawa, Buguruni, Kariakoo, Gerezani, Mchafukoge.
Kinondoni	Magomeni, Tandale, Msasani, Kinondoni, Manzese, Ubungo, Kawe.
Temeke	Temeke 14, Keko, Mtoni.

After selecting the seventeen areas or clusters, retail outlets were chosen in all major shopping areas by using systematic sampling. Interviewers visited every second shop in a given cluster of retail outlets. On the whole this kind of cluster sampling was employed because it was not easy to get the names of retailers in every Ward.

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[3] Earl Babbie, "The Practice of Social Research" 5(ed.) Wadsworth, Inc., 1989, pp. 184-187.

Lawrence L. Lapin "Statistics for Modern Business Decisions", (Harcourt Brace Jovanovich, Inc., 1973), pp. 197-198.

Furthermore, even if one had the list, locating them would be practically impossible because of the absence of numbered or named streets, and numbered business premises. Nevertheless, it is felt that the sampling procedure used in this study met the requirements of probability sampling and that the sample was representative enough for the purposes of the current study.

Again nine product categories,[4] namely textile, locally made beverages, pharmaceuticals, bar soap (laundry), detergents, groceries, furniture, sanitaries and imported beverages were initially chosen for the study. However, the final number of product groups was brought down to six. These included textiles, pharmaceuticals, beverages (local), groceries, bar soap and furniture. The other three groups were eliminated for lack of satisfactory response from some retailers, and also non replicability of observations in some locations. The choice of the product groups was, therefore, mainly influenced by their availability[5] of retail outlets.

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[4] Product categories are defined as product groups or product classes within which many items can be observed. In this study the three terms will be used interchangeably.

[5] Although many products were now available because of the trade liberalization policy of 1984, by 1988, the time of this research, some products were still not available on a large scale.

On the other hand, the number of product types surveyed ranged between seven and nineteen. This number was also determined by the availability of the item in many stores. Likewise, the number of observations for a particular item or product group depended on its availability or frequency of the particular observation in every retail outlet sampled. The total number and type of items in product category chosen are shown in Table 3-4.

Table 3-4

Items Chosen From Each Product Group

Product Group	Product Items	Total Observation
Textile	Khanga (China), Khanga (Kenya) Khanga (Pakistan), Khanga (India), Khanga (Indonesia), Kitenge (China), Khanga (Urafiki), Kitenge (Urafiki), Khanga (Sungura), Kitenge (Sungura), Kitenge (Malawi), Kitenge (India), Khanga (Morogoro), Kitenge (Pakistan), Kitenge (Japan), Kitenge (Indonesia), Kitenge (Zaire), Imported Napkins, Locally made Napkins.	359
Pharmaceuticals	Chloroquine tablets, Chloroquine Syrup, Panadol tablets, Koflyn Syrup, Salimia Liniment Sloans, Asprin tablets, Magnesium Tricillicate tablets.	216
Beverages	Kilimanjaro tea, Green Label tea 50 gms, 250 gms, 500 gms, sifting tea 50 gms, 100 gms, 150 gms, Top Cup coffee 50 gms, 250 gms, African Pride tea, Instant Coffee 100 gms, 250 gms.	860

Table 3-4 Cont.

Groceries	Life pineapple jam, Tanzafoods Macaroni (spagheti), Tomato sauce (Tangold), Marie Biscuits, Baked Beans in Tomato sauce, Nice Biscuits, Mixed Fruit Jam, Tomato juice, Orange juice, Jersey Creams biscuits, Betta pineapple juice, Tanzfoods Vermicelli Tambi, Club Master, Mango juice (Tangold), Leenox Corned beef, Sunvita Orange Squash, Sunvita Black Current, Tomato sauce (Dabaga), Tomato Paste (Tangold)	692
Bar Soap	Mbuni, Kisura, Hisoap, Fair Soap 200 gms, Perfect Soap, Punda, Rani bar Soap	289
Furniture	Sofa set (small), sofa set (large), Beds - single (3.5' x 6'), Beds - single (4' x 6'), Double bed (6'x6'), Dining chairs - wooden top, Dining chairs - sponge top, Dining table (large size), Book shelf, Kitchen shelf)	597

3.3. THE RESEARCH INSTRUMENT AND DATA GATHERING

The research mainly required primary data. To this end, a questionnaire was designed. The questionnaire[6] was divided into four parts as follows depending on the nature of the data to be collected.

[6] See Appendix 3-1.

Part I: Demographic Data:

This part of the questionnaire elicited profile data on the retailer. This type of data included name of the retailer, location (Ward), distance from City Centre in kilometres, year of establishment of the business, number of employees, annual operating expenses, kind of business among the ten classifications of retail business, type of retailer, and ownership. This data was used mainly to classify the retailer by location and also by type of activity or business. Classification by type of business basically provided data for the six treatment groups while classification by location was very crucial because it constituted an independent variable hypothesized in the study. Confirmation on type of ownership (question no. 9) was important because research assistants had instructions not to interview cooperative or parastatal retail outlets because of their apparent uniform mark-up policy.

Part II: "Merchandise Cost" Variable

The second part of the questionnaire sought to collect information pertaining to the independent variable merchandise cost. It included questions on wholesale (buying) price and source of supply. Source of supply was important because wholesale prices were also collected from

wholesale centres for comparison purposes, or in the case where retailers appeared reluctant to provide researchers with true prices.

Part III: Merchandise Rate of Stockturn:

This part of the questionnaire elicited information pertaining to the independent variable merchandise rate of stock-turn. Four types of information constituted data on this variable. These were numbers of units of merchandise the retailer buys each time, duration of selling the above average order, seasonality in merchandise sales and reorder points.

Part IV: Markup Variable

The fourth part of the questionnaire collected pertinent data on the dependent variable mark-up. This constituted the question on selling prices and factors that determine their pricing decision. Given the sensitive nature of price research, these two questions were asked last and similarly information on mark-ups was disguised. As can be seen from the questionnaire, once the two types of information (selling prices and wholesale prices) are obtained, mark-ups can easily be calculated. The question on factors that influence retailers' pricing decisions was brought foward with the intention of judging the independence of a single product pricing policy,

particularly pricing of one product in relation to the other. That is, does the pricing decision on one item depend on the behaviour of another item? This question basically elicited information on whether the samples were independent or not.

To simplify data collection a special form was designed for each retail outlet so that answers to questions 10-21 for all observations in a retail outlet were entered in the form. (See Appendix 3-1).

The questionnaire was administered through personal interviews. The major advantage of personal interviews is found in the depth and detail of information that can be secured. As Emory (1985: 160) observes, "the depth and detail of information that can be gathered from personal interviews exceeds that from telephone and mail surveys". Another advantage of personal interviews is the flexibility that they provide. More information can be collected by probing with additional questions as well as through direct observation.

Furthermore, the response rate in personal interviews is generally higher than in any other survey method. Howard and Sharp (1983: 138), however, argue that large questionnaire data can be obtained through mail

surveys but not personal interviews. Indeed, it is difficult to administer long questionnaires through personal interviewing. For this reason, the questionnaire in this study was made appropriately short. The use of a shorter questionnaire was, on the other hand, necessitated by the fact that research assistants visited the retailers during working hours when they had also to attend to their customers.

A major disadvantage of the personal interview method is that it is time consuming. In this study research assistants were able to accomplish only four interviews in a day because the questionnaire had to be supplemented by open-ended discussions. Howard and Sharp (1983: 140) argue that "it is generally not desirable to schedule more than two or three interviews in a day". Although the response rate in personal interviews is higher than in other survey methods, non-response is not ruled out. In this study shop attendants encountered included children who knew nothing about the operations of the shop. It was observed that most shop owners engaged their children while they themselves were busy looking for supplies, etc. Where this happened, appointments to meet the shop owner were made. Nevertheless, in the absence of retailers with telephones, and the generally poor communication system in the City, personal interviews remained the only feasible method for this study.

Several research assistants were engaged. They were, each, given a location (Ward) or two to survey. Two Wards or branches were the maximum for the main reason that shopping centres were really scattered.

The questionnaires were written in English. Indeed, the issue of language requires attention when doing research in developing countries. In Tanzania, for example, there are more than 120 ethnic groups each of which has its own language or dialect. Nevertheless, Tanzania is a bit unique when compared to other African countries because Swahili, the national language, is widely spoken. On the other hand, although English is not widely spoken, it is nevertheless the business language in big cities such as Dar es Salaam. In Dar es Salaam, a fairly large number of retail outlets are owned by Asians who mainly speak English. It is in view of the above reasons that the questionnaire was written in the English language so that the research assistants could easily adapt themselves to the environment by asking the questions in Swahili, the national language, where necessary and maintaining the language on the questionnaire where relevant. To do this effectively, all research assistants were chosen from the University; they were all students at the Faculty of Commerce. Their training background in commerce was an advantage to the study because it was easy for them to

grasp the business language employed in the questionnaire. Another factor that ensured effectiveness with the English questionnaire was training. Research assistants were trained through orientation meetings and through pre-testing of the questionnaire in order to clear out some doubts on the wording as well as translation where necessary. Pertinent changes were incorporated in the final questionnaire. The survey proceeded well and often the principal researcher went out for interviewing with one research assistant everyday in turn. Therefore, it is felt that language was not a serious problem in the study.

3.3.1. Other Data Collection Methods

Even where questionnaires are used some of the data may still be collected by observation method given the sensitive nature of some of the questions. Where possible, therefore information on prices was observed from price tags. The major problem here, however, was that many of the retailers did not maintain price tags, despite the fact that the Price Control Act of 1973 requires them to do so. Research assistants also employed the observation method to determine the type of retailer so that exclusive retailers were those who dealt with only one line of commodity (e.g. textile only). On the other hand, a general store carries a variety of items. By Tanzanian definition, these included, textile and food, food and miscellaneous items,

hardware, building and electrical goods, and tailoring and other items (see Table 3-1).

3.4. OPERATIONALIZATION OF INDEPENDENT VARIABLES

Several variables have been hypothesized to influence retail mark-ups. Some of these are merchandise unit cost and merchandise rate of stock-turn. In the Tanzania setting, two more variables, location of retail outlet and population size were considered as probable explanatory variables for the differences in retail margins. This section explains how these were measured in the current study.

3.4.1. Merchandise Cost

The measurement of this variable did not pose much problems. Wholesale prices were obtained to represent the cost or value of the merchandise. To avoid cheating and changes in prices, these prices were also collected from the wholesalers. However, such comparison was only possible in the case of textiles, grocery items, beverages and laundry soap where the sources of supply were almost the same. For furniture and pharmaceuticals, this data was obtained solely from the retailers themselves. In the case of pharmaceuticals, for example, sources of supply were observed to range from hawkers (peddlers) to registered wholesale organisations.

The major problem encountered in the collection of this type of data was frequent changes in prices in Tanzania. It was, for example, found that in some retail outlets some of the stocks which had been obtained at previous wholesale prices were actually being sold at the current selling price. This implies that the percentage gross margins would be overstated. To avoid this distortion such wholesale prices were ignored and current ones were collected wherever feasible. Where not feasible, the particular observation was ignored during data compilation and analysis.

3.4.2. Merchandise Turnover Rate

As discussed in Chapter 2, merchandise turnover rate can be measured in two ways:

(i) Turnover as a ratio of sales volume to average inventory, and

(ii) Turnover as a ratio of cost of goods sold to cost of average inventory.

For the purposes of this research the first version was used. The first version was used because it was easy to collect the data on the variables concerned. These variables are sales volume and average inventory.

Sales were defined as total quantity sold during the year; and in this study a sale is defined as the amount of merchandise that is already paid for. This was measured by taking the average order quantity (Q) and the average period (t) time taken to sell out stock (Q). An annual sales estimate was then derived. Such measurement method, however, made the following assumptions:

(a) that there were no stockouts. Given the period (trade liberalization period) during which the field work was conducted possibilities of stockouts were minimal

(b) that there was no seasonality effect in the product groups studied. Care was taken to choose a sample of products that did not succumb to such effect.

Average inventory, was, on the other hand, defined as the average order quantity (Q) divided by 2 (i.e. Q/2). The concept of average inventory can be derived from a graphic saw-tooth representation (Figure 3-1) of classical inventory model as shown by Buffa (1972: 230).[7]

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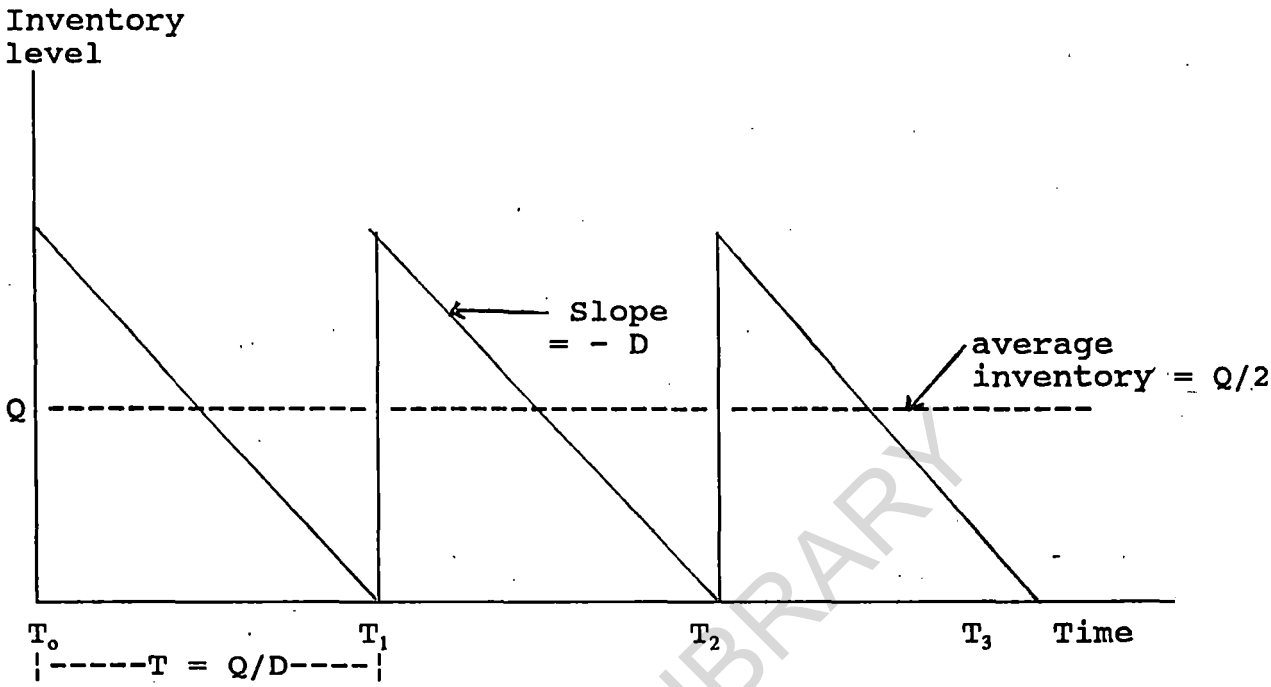
[7] Buffa defines average inventory by using the average inventory function. Thus, Average Inventory =

$$\frac{1}{T} x \left[\int_0^T I(t) x \, dt \right] \text{ units, where}$$

I(t) represents the saw-tooth inventory function. An integral over one cycle only is necessary because the saw-tooth repeats

Figure 3-1

Sawtooth Representation of Classical Inventory Model



According to Fearon *et al* (1983: 144) an assumption of uniform stock usage reduces the average inventory to Q/2. Other assumptions included presence of average order quantities and absence of buffer stocks. In the latter, new replenishment quantity should arrive at exactly time t_o. In this study, the fact that goods were now plenty in

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itself indefinitely. Letting the origin of the function occur at the receipt of an order, and letting "T = Q/D", the above equation can be rewritten:

$$\textit{Average Inventory} = D/Q \times \left[\int_{o}^{Q/D} (Q - D \times t) \times dt\right] = \frac{Q}{2}.$$

Average inventory reduces to Q divided by 2.

the market, possibilities of stockouts were presumably minimized.

3.4.3. Physical Location of Retail Outlet

The physical location of a store was measured in terms of the distance from the City centre, the major commercial area. As earlier explained, the whole of Dar es Salaam Region is divided into Wards or Branches. For the purpose of this study, a location was considered to be constituted by a Ward or branch where the store was found. It is further noted that the Dar es Salaam Area constitutes the smallest physical region in the country. Therefore, the location varied from 0 to 40 kilometres only.

3.4.4. Population

Population figures were obtained from the latest published census data of 1988. In this study, a Ward or branch was taken to be a sufficient measure of a market size of a retail outlet. The Wards and their population figures are given in Appendix 3-2 to 3-4.

3.5. OPERATIONALIZATION OF THE DEPENDENT VARIABLE

3.5.1. Price Mark-up or Margin[8]

The price mark-up was earlier defined as the difference between retail selling price and the cost of the

[8] In this study markup and margin will be used interchangeably.

product. Percentage gross mark-up (MV) was also defined as the difference between retail selling price and cost of the product divided by retail selling price multiplied by 100

$$i.e. \quad \frac{Selling\ price - cost}{Selling\ price} \times 100$$

In this study, the above formula was employed to calculate retail margins for all the observations. Such information could not be directly obtained from the interviews because retailers were generally unwilling to disclose the margins they charged for a product. Researchers were easily mistaken for income tax officials. For this reason the question had to be disguised. The two sets of data collected to determine the mark-up were selling (retail) prices and wholesale prices.

3.6. ANALYTICAL METHODS

The study involved the collection of data that measure the strength and functional relationship between one dependent variable (MV) and four independent variables, namely; merchandise cost, merchandise rate of stock-turn, location of retail outlet, and population size. This involved the derivation of equations that related mark-ups, as criterion variable, to the four predictor (independent)

variables. A multivariate method, the multiple regression analysis was preferred to simple regression models for various reasons. First, multiple regression models capture the interaction of the independent variables in their influencing the dependent variable. The joint interaction of the independent variables is very important in this study because of the theory of price determination reviewed in Chapter 2 which states that price is the joint interaction of supply and demand factors. Second, the use of multivariate models reflects the multiplicity of factors that explain a marketing research problem. Therefore, many marketing investigations (particularly in brand share models) usually use more than one variable. Some margin variation studies have also employed multiple regression analysis to test their hypothesis (Preston, 1963, the U.K.'s National Board for Prices and Incomes, 1975, Noteboom 1985, and Bode *et al*, 1986).

Prior to carrying out the regression analysis, one-way analyses of variance (ANOVA) were performed to assess the statistical significance of the differences in mean scores within the dependent variable mark-up. As a matter of testing statistical reliability and consistency, one-way analyses of variance tests were also performed on the two major independent variables - cost and turnover rate. ANOVA test was not done on the other two independent

variables, location of retail outlet and population size, because the research design had already provided for such differences. That means that the other pertinent data were collected in areas with different population sizes and different locations of the retail outlets. Overall, the tests sought to investigate the statistical significance of the differences in the scores. Some t-tests were also used to assess for significance in differences in scores where relevant.

Furthermore, it is noted that our mark-up data is in the form of percentages. Indeed percentages present a lot of complications when it comes to use of statistical techniques. In some cases like the use of ANOVA test, special mathematical transformations of the data must be made. However, it is observed that the percentages of which most books refer to are those which add up to one hundred. In other words, there is always a total figure on which all proportions are based on.[9] The type of percentages being dealt with in this case are not consistent with the kind of percentages described above, because they are not dependent on any total figure. Therefore, it was felt that to undertake mathematical transformations on such data would distort the whole data.

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[9] See for example a discussion on this subject by Robert Ferber Market Research (McGraw-Hill Book Company Inc., 1949), pp. 281-290.

Finally, multiple regression analysis were performed with the assistance of a computer programme - the Minitab package.

3.6.1. Functional Model Forms

This study considered both linear and non-linear functional models. The non-linear models employed are multiplicative, exponential and other mathematically transformed models like the reciprocal functions. All these models were used in the analysis to choose the best form and fit. They are defined as follows:

$$M_{ij} = \alpha_o + \alpha_1 c_{ij} + \alpha_2 s_{ij} + \alpha_3 l_{ij} + \alpha_4 p_{ij} + \varepsilon_{ij}$$

$$M_{ij} = \alpha_o C_{ij}^{\alpha_1} S_{ij}^{\alpha_2} l_{ij}^{\alpha_3} P_{ij}^{\alpha_4} \varepsilon_{ij}$$

$$M_{ij} = \exp (\alpha_o + \alpha_1 C_{ij} + \alpha_2 S_{ij} + \alpha_3 l_{ij} + \alpha_4 P_{ij} + \varepsilon_{ij})$$

$$M_{ij} = \alpha_o + \frac{\alpha_1}{C_{ij}} + \frac{\alpha_2}{S_{ij}} + \frac{\alpha_3}{l_{ij}} + \frac{\alpha_4}{P_{ij}} + \varepsilon_{ij}$$

where $\alpha_o \ldots \alpha_4$ are parameters to be estimated.

ϵ probability of unexplained variance - the error term.

The multiplicative model was, further transformed into a logarithmic function as follows

$$\log M_{ij} = \alpha_o + \alpha_1 \log C_{ij} + \alpha_2 \log S_{ij} + \alpha_3 \log l_{ij} + \alpha_4 \log P_{ij} + \varepsilon_{ij}$$

The above models were chosen for several reasons. First, the use of multiplicative and exponential models allows for an interaction between all variables and characterize some decreasing and increasing returns to scale.[10] These models, therefore, assume a multiplicative rather than constant variation between the independent and dependent variables. Second, mathematical transformations into logarithmic and reciprocal are carried out with the assumption that the variables may not be linearly related, in which case then the Ordinary Least Square (OLS)

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[10] See for example Ronald E. Frank (1966) on the use of transformations. According to Frank transformation to the exponential and multiplicative serve to relax the constraints imposed by two assumptions both of which are common to a broad range of statistical techniques.

(i) That the relation between the expected value of the dependent variable (Y) and an independent variable (X) is additive and linear.

(ii) That the range of variations between actual and expected values is the same for all values of X (i.e. that the errors are homoscedastic (p. 248).

See also a discussion by Gilbert A. Churchill (1983: 585-6) and Morris Hamburg (1977).

technique cannot be employed. Since the OLS technique can only be applied to relationships where the parameters appear in a linear fashion[11] (no matter the appearance of the original variables, squares, cubes, inverses, linear etc.) it is inevitable that the relationship be transformed to make the parameter appear linearly or to see if it is nonetheless linear in the parameters. In other words, transformations into logarithmic and reciprocal relationships are carried out to see if the unknown parameters $\alpha + \beta$ are linear.

Third, in view of the above, mathematical transformations may greatly expand the scope of the regressions or relationships. In the case of logarithmic relationships, for example, the model implies that there is a constant percentage change in Y per one percentage change in X.

It is further noted that many marketing investigations have used both linear and multiplicative models. These models have equally been extensively cited in the marketing literature as possible mathematical relationships to explain various phenomena (Lilien and Kotler, 1983). For instance many market share studies have used such models with great success (Naert and Weverbergh,

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[11] See Julia Hebden "Statistics for Economists" Phillip Allan 1981, p. 173.

1985; Weiss, 1968; Nakanishi and Kooper, 1974; Ghosh, Neslin and Shoemaker, 1984; Brodie and de Kluyver, 1987). Retail margin studies that have employed both linear and multiplicative models include those by Bode *et al* (1986), and the UK's National Board for Prices and Incomes (1975).

On the other hand, the issue as to which functional form provides better fit to the data has sparked widespread debate in the past, especially in market or brand share model building studies (e.g. Naert and Weverbergh, 1985; Leeflang and Reuyl 1984, Ghosh, Neslin and Shoemaker, 1984, Brodie and Kluyver, 1987). Results of some studies revealed that the transformed models provided better fits to their data than the linear model (Bode *et al* 1986, UK's National Board for Prices and Incomes, 1975).

3.7. OPERATIONAL HYPOTHESES

In this section the conceptual hypotheses which were formulated in general terms in Chapter 2 are stated in testable forms. Accordingly, the null and alternative hypotheses which were te"sted are as follows:

Hypothesis 1a:

Retail mark-ups are not uniform among product groups, they tend to vary from one product to another. The null hypothesis to be tested is:

H_o : The mean scores of the criterion (dependent) variable mark-up are equal among all product categories

$$i.e. \quad \mu_1 = \mu = \ldots = \mu_r$$

Hypothesis 1b:

Mark-up variations among product groups are greater than those among product items. The null hypothesis to be tested is:

H_o : The differences among mark-up mean scores of product groups were equal to the differences among mark-up mean scores of product items

$$i.e. \quad \mu_{pg} = \mu_{g1} = \mu_{g2} \ldots \mu_{gk}$$

Hypothesis 2a:

The mean scores of the predictor variable, merchandise unit cost, are significantly different from each other. The null hypothesis to be tested is:

H_o: The mean score of the predictor variable merchandise unit cost are equal among product categories

$$i.e.\ \mu_{c1} = \mu_{c2} \ldots \mu_{ck}$$

Hypothesis 2b:

The mean scores of the predictor variable merchandise rate of stock turn are significantly different from each other among the various product groups. The null hypothesis to be tested is:

H_o: The mean scores of the predictor variable merchandise rate of stock-turn are equal among product categories

$$\mu_{s1} = \mu_{s2} \ldots = \mu_{sk}$$

Hypothesis 3:

The four independent variables cost, rate of stock-turn, location of retail outlet and population significantly influence the scores on the dependent variable mark-up. That is to say that the influence of at least one of the variables differs from zero. The null hypothesis is:

H_o: The beta coefficients of the parameters, cost, rate of stock-turn, location of retail outlet and population size are equal and statistically insignificant (equal to zero).

Hypothesis 4:

The independent variables merchandise cost, merchandise rate of stock-turn, location of retail outlet and population size substantially explain the variation in the dependent variable mark-up. The null hypothesis to be tested is:

H_o: The regression equations do not explain significant amount of variation in mark-ups.

CHAPTER 4

RESULTS OF DATA ANALYSIS

4.0. INTRODUCTION

The previous chapter described the research design that was employed, defined the operational variables (dependent and independent), presented and discussed the analytical methods, and finally outlined the testable null hypotheses. This chapter will employ the sample data collected to test the pertinent null hypotheses. The objective of the present chapter is, therefore, to analyze the data on the variation of retail margins. More precisely, the chapter attempts to find out whether the theoretical factors reviewed in chapters one, two, and three hold true in a developing retailing economy.

The chapter is divided into two major sections. Section one presents the results of data analyses in Dar es Salaam. Thus the results of the one-way analysis of variance of retail margin differences among product groups are given. Furthermore, mark-up differences between product classes and product items are analysed.

The objective of section two is to present further statistical results on the pricing behaviour of retailers. This section is divided into four subsections. Subsection one analyzes differences in the scores of the two major independent variables, unit cost and rate of stock-turn, to ensure that they are statistically consistent and reliable. In subsection two, retail margins of different locations and population (market sizes) are compared. The third subsection carries out further statistical investigations to assess the influence of merchandise unit cost, merchandise rate of stock-turn, location of retail outlet, and population size on retail margins. Finally, the null hypotheses are tested in subsection four.

4.1. RETAIL MARGIN VARIATION IN DAR ES SALAAM: EMPIRICAL EVIDENCE

In this section mark-up practices of retailers in Dar es Salaam are evaluated to assess the extent of variation of such mark-ups. However, before carrying out statistical significance tests on the margin differences, the mean mark-up scores of the six product classes studied are presented. These mean scores are given in Table 4-1.

It is discernible from Table 4-1 that the beverage group had the lowest mark-ups (12.08%) while the pharmaceutical group had the highest mark-up score (37.81%), followed by the furniture group (24.72%).

Table 4-1

Margin Mean Scores For Six Selected Product Classes In Dar es Salaam

Product Class	No. of Observations	Mark-up Mean Scores
Textile	355	16.24
Pharmaceutical	216	37.81
Beverages	863	12.08
Groceries	695	20.70
Bar soap (laundry)	289	22.83
Furniture	597	24.72

Retailers' margins also appear to vary within a product group. The ranges of retail margin variations within a given group are presented in Table 4-2. The table suggests that within the grocery group, average margins went as high as 56.2 percent. The lowest average gross margin of 7.0 percent was observed within the beverage category represented by 500-gramme Green label tea packet, the largest pack in the series of packeted

tea. The highest mark-up (56.2%) is observed in the product item orange juice. It is not easy, at this stage, to explain why, for example, the 500-gramme Green label tea packet, and orange juice should have the lowest and highest mark-ups respectively. However, with respect to the former, it is likely that the high cost-low margin rule will apply, because this particular product item is the most costly in the product line - Green label tea[1]. On the other hand, it is probable that the low cost - high margin or the low turnover - high margin rules may apply on retailers' pricing behaviour with respect to the item orange juice. As it can be seen in Appendix 4-1 this item was the second least costly among the products in the grocery class. Furthermore, although it is beyond the scope of this study, to ascertain the consumption patterns of orange juice and its substitute soft drinks (e.g. cocacola, sprite, pepsi, fanta, mirinda), it is likely that the consumption of these substitutes is greater than that of orange juice.

With respect to variability of mark-ups within a product class, the sample evidence in Table 4-2 suggests that the widest (absolute) range in retail margins is

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[1] At the time of this research in October 1988, the cost of the smallest packet (50 grammes) was TShs 11.73 while 100 grammes and 250 grammes retailed at TShs 23.86 and 59.21 respectively, on the average. The cost of the 500 grammes packet was TShs. 117.37

represented by the grocery product class, while the narrowest range is found in the furniture group. As far as the furniture group is concerned the narrow range in retail margins may be explained by the cost factor. Thus when, compared to the other samples of this study, the

Table 4-2

Minimum and Maximum Mean Scores of Gross Retail Margins for Six Selected Product Classes

Product Class	Percentage Gross Margin	Range
Textile	8.6 - 34.1	25.5
Pharmaceutical	23.0 - 48.8	25.8
Beverages	7.0 - 17.8	10.8
Groceries	8.8 - 56.2	47.4
Bar soap	14.3 - 26.7	12.4
Furniture	19.8 - 28.0	8.2

Note: A full list of product types and their gross margins is given in Appendices 4-1 to 4-7.

furniture group appears to be the most costly product class[2]. On the other hand, it is not easy to explain the widest range observed in the grocery group. At the same time a definitional bias cannot be ruled out.

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[2] See Appendix 4 - 1 to 4 - 7 for details.

Although the retail margin variations are discernible from the above presentations, it is not easy to tell at this stage whether the mark-up differences observed above are worth any further investigations. In other words, were margin variations among product classes statistically significant? To test whether the mean scores were significantly different from each other two methods of analysis can be employed. The first one is the one-way analysis of variance (ANOVA) and the second method requires the use of the t-test. However, the second method was not used in this study because it would have involved many comparisons (30) in which case some comparisons may be statistically significant purely by chance. Thus to overcome this problem one-way analysis of variance (ANOVA) involving an F-ratio test was employed. The distinct advantage of the ANOVA test over the t-test is that of being applicable when there are more than two mean scores being compared (Churchill, 1983:541). It tests for an overall statistical significance among several mean scores.

The ANOVA test essentially uses sample information to determine whether three or more stimuli or treatments yield different results. The technique involves the

calculation of "between"[3] treatment variation and "within" treatment variation. In this study the conventional term "between" instead of "among" will be used throughout.

The results of the F-test using one-way analysis of variance are presented in Table 4-3.

Results of the ANOVA test (F-test) indicate that the mean scores of the different treatment groups were statistically different from each other. This means that at least two of the retail mark-ups of the six product classes were significantly different from each other on the overall. As earlier explained, this finding is very important if further investigations on retail margin differences are to be undertaken in subsequent sections.

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[3] Conventionally the word "between" rather than "among" is used even when there are more than two groups (Morris Hamburg, Statistical Analysis for Decision Making 4 ed., Harcourt Brace Jovanovich Inc., 1987 p. 335.

Table 4-3

One-Way Analysis of Variance Results for

Margins Among Product Classes

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F[5] Ratio	Sign.[4] Level
Between Group	3,644.88	5	728.98	12.9	2.37 (signif.)
Within Group	3,995.737	71	56.278		
Total Variation	7,640.617	76			

Another investigation on the sample mark-up scores attempted to compare the differences of the means between the six product classes on the one hand and the product items on the other. In other words, it attempted to show whether the margin differences between product categories were significantly different from those of product items. This test was accomplished by using the t-test, since it involved comparing two group means at a time. The t-test was used under the assumption that the samples are independent and that the sampling distribution of the means is normal. Given the large sample in this study, the

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[4] The numbers presented under this column throughout the text denote critical (tabular) values.

[5] All tests in this study are done at 5% level of significance.

Central Limit Theorem[6] allows us to assume that the sampling distribution of the means is normal.

The t-test results for the comparisons are, accordingly, presented in Table 4-4. The summary results in Table 4-4 generally indicate that the mark-up differences among product classes were not statistically different from the mark-up differences within the respective product groups. This is shown by the fact that, except for the furniture group, all other variation comparisons were not significant. Therefore, the sample evidence tends to suggest that generally retail margin variations among product classes and those among product items were more or less the same.

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[6] The Central Limit Theorem states that if a population distribution is non-normal, the sampling distribution of x may be considered approximately normal for a large sample. For a wide variety of population types, samples do not even have to be very large for the sampling distribution of x to be approximately normal (Morris Hamburg "Statistical Analysis for Decision Making" 3rd ed. Harcourt Brace Jovanovich, Inc. 1983, New York.

Table 4-4

Comparison of Mark-up Differences Between all Product Categories and Each of the Respective Product Group

	Mean Differences	Standard Error	D.f.	t-test[7]	Level of significance
Textile group	2.612	2.336	23	1.118	1.714 (N.S)
Pharmaceutical Group	-9.242	2.891	11	-3.197	1.796 (N.S)
Beverage Group	2.646	1.720	17	1.538	1.740 (N.S)
Grocery Group	-2.052	3.207	23	0.640	1.740 (N.S)
Bar Soap Group	2.675	2.501	11	1.069	1.796 (N.S)
Furniture Group	4.652	1.808	16	2.573	1.746 (S)

The comparison with the furniture group, however, suggests that the margin differences within it were lower than those among product groups. It is not evidently clear why

[7] The formula used to compute t - values is

$$t = \frac{X_1 - X_2}{\sqrt{\frac{\sum_{i=1}^{n_1} (X_{i1} - \bar{X}_1)^2 + \sum_{i=1}^{n_2} (X_{i2} - \bar{X}_2)^2 \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}{n_1 + n_2 - 2}}}$$

The t-test are all one-tailed because direction is specified in the alternative hypothesis.

this is so, but the high value of most items within the furniture class may be a probable explanation for this finding. Presumably, given the high cost - low margin rule, the retail margins in furniture may be consistently low, depicting less margin fluctuations across different items. The data sets in Appendices 4-1 to 4-7 show that the furniture group was the most expensive when compared to the other five product categories.

4.2. DETERMINANTS OF RETAIL MARGIN VARIATION: EMPIRICAL EVIDENCE

In the previous section, the analysis of margin differences among the product classes tended to confirm and reinforce many of the mark-up variations that were observed in the data set. Average mark-ups were shown to vary between 12 and 37.8 percent among product classes and between 7 and 56.2 percent among product types. This empirical evidence justifies further investigations on the determinants of such variations.

However, before carrying out statistical analyses on the influence of the predictor variables on the criterion variables, an analysis of the two major independent variables is undertaken. There was no need of carrying out similar analyses with the other two variables, namely, location of retail outlet and population, because such

differences were automatically provided for by the research design employed.

4.2.1. Analysis of Major Independent Variables

As a matter of statistical reliability and consistency it is necessary to assess the variability of the scores of the major independent variables, namely, merchandise unit cost and merchandise rate of stock-turn. To accomplish this one-way analyses of variance were performed. The first step, however, involved the determination of the cell mean scores on these two variables. These scores are presented in Table 4-5 for merchandise unit cost.

The data set in Table 4-5 reveals that furniture products were the most costly among the six product groups studied, while the pharmaceuticals represented the cheapest items. This average low cost in pharmaceutical products was, however, brought about by the measurement method used during the field work. As a matter of convenience, the cost of a tablet instead of a packet or tin, was considered, because it constituted the buying behaviour or pattern for this particular product.

Table 4-5

Sample Mean Scores for Merchandise Unit Cost

Product Category	Unit Cost Mean Scores TShs
Textiles	1027.99
Pharmaceuticals	36.10
Beverages	51.75
Groceries	106.33
Bar Soap	104.55
Furniture	6339.08

Furthermore, variation of merchandise unit cost can be examined within a product group. The data presented in Appendices 4-1 to 4-7 shows that the costs also differed within a product group.

Although the mean scores appear to vary widely, relevant statistical tests are necessary to examine whether the differences were statistically significant or not. The results of the one-way analysis of variance are then presented in Table 4-6. The results show that the mean scores of merchandise unit cost among the product categories were significantly different from each other. In other words, the sample evidence appears to suggest that buying prices of the six product categories studied

were quite different from each other. The analysis of the turnover rate scores is discussed next.

Table 4-6

One-Way Analysis of Variance for Merchandise Unit Cost Mean Scores

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Ratio	Signi-ficance
Between Groups	311,440,564.2	5	62,288,112	15.57	2.37 (Sign.)
Within Groups	283,954,030.3	71	3,999,353		
Total	595,394,594.5	76			

The mean scores of turnover rates are shown in Table 4-7. The table reveals that turnover rate scores varied from 14.57 to 45.11%. The lowest mean turnover rate was observed in the pharmaceutical[8] group, while the highest mean turnover rate score was found in the grocery group. When individual items are examined, the lowest mean

[8] The demand for pharmaceutical products at retail level in Tanzania may be termed as imperfect because of the country's health policy of "free medical care for everybody". Drugs can be obtained from hospitals free of charge. However, recently the hospitals have been facing shortages of most essential drugs. It is because of these shortages that private pharmacies/medical stores are now gaining strength.

Table 4-7

Cell Mean Scores for Merchandise Turnover Rates for the Selected product Groups

Product Category	Turnover Rate Mean Scores
Textile	16.82
Pharmaceutical	14.57
Beverages	17.81
Groceries	45.11
Laundry Soap	44.60
Furniture	20.44

turnover rate of 9.43% is found to be represented by a product item branded "Fair soap" in the laundry category, while the highest mean turnover rate of 86.84% is observed in a product item branded "Dabaga" tomato sauce in the grocery category (see Appendices 4-1 to 4-7). It is not clear why this is so. Comparison with substitutes may probably reflect some demand patterns.

The variability in mean turnover rates within product groups is as shown in Table 4-8. The table contains the minimum and maximum mean scores for the six product categories.

Table 4-8

Minimum and Maximum Mean Scores of Merchandise Turnover Rates within Groups

Product Category	Turnover Rate Mean Scores Minimum		Maximum	Range
Textile	10.40	-	24.82	14.42
Pharmaceuticals	10.92	-	18.70	7.78
Beverages	9.58	-	23.09	13.51
Groceries	24.85	-	86.84	61.51
Laundry Soap	9.43	-	43.86	34.43
Furniture	12.33	-	45.95	33.62

The data set shows that the variability range is very low in the pharmaceutical group, followed by the beverage group. It is probably for the reason highlighted above that the low turnover variability is observed in the pharmaceuticals. With respect to the beverage group, a possible explanation is that the rate of stock-turn may not only be a function of demand but may also be a function of the retail market structure, namely, competition and industry production capabilities and trends[9]. It is likely that the supply of such products has been quite

[9] In this study, the most commonly observed item was the blended tea. This phenomenon is corroborated by the number of observations in the category, given a uniform sample of food retail outlets (see Appendices 4 - 1 to 4 - 7).

steady over the years when compared to other consummables. As earlier explained in the setting the Tanzanian economy has for many years been characterized by shortages. The results of the one-way analyses of variance presented in Table 4-9 indicate that the turnover rate scores were significantly different from each other. That means that the sample evidence suggests that turnover rates varied widely across the product classes.

Table 4-9

One-Way Analysis of Variance for Merchandise Turnover Rate Mean Scores

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Ratio	Level of Signif.
Between Group	10,944.25	5	2,188.85	22.75	2.37
Within Groups	6,819.63	71	96.05		
Total	17,763.88	76			

The following section presents a preliminary analysis of the other two independent variables, location of retail outlet and market size (population). As previously explained, there was no need of analysing their differences because such differences were provided for in the research design of the current study.

4.2.2.1. Comparison of Retail Margins in Different Locations: Preliminary Investigation

This section examines retail margins in different locations. To this end, mean mark-up scores of retail outlets in different locations were compared to assess whether they were significantly different from each other. The F-test was employed to do this. However, before carrying out the analysis the scores of the margins, based on averages, in the various locations are presented. Six locational types by distances in kilometres from the City centre were identified. They were as follows:

Distance in Km.	Wards/Branches
0 - 3	Mchafukoge, Gerezani, Kariakoo
4 - 7	Ilala, Magomeni, Buguruni, Kinondoni
8 - 11	Manzese, Tandale, Keko
12 - 15	Ubungo, Mtoni, Temeke 14,
16 - 19	Vingunguti, Kipawa
20 and above	Kawe, Msasani

The relevant mean scores of retail margins by location are presented in Table 4-10 and the corresponding graphs in Figure 4-1.

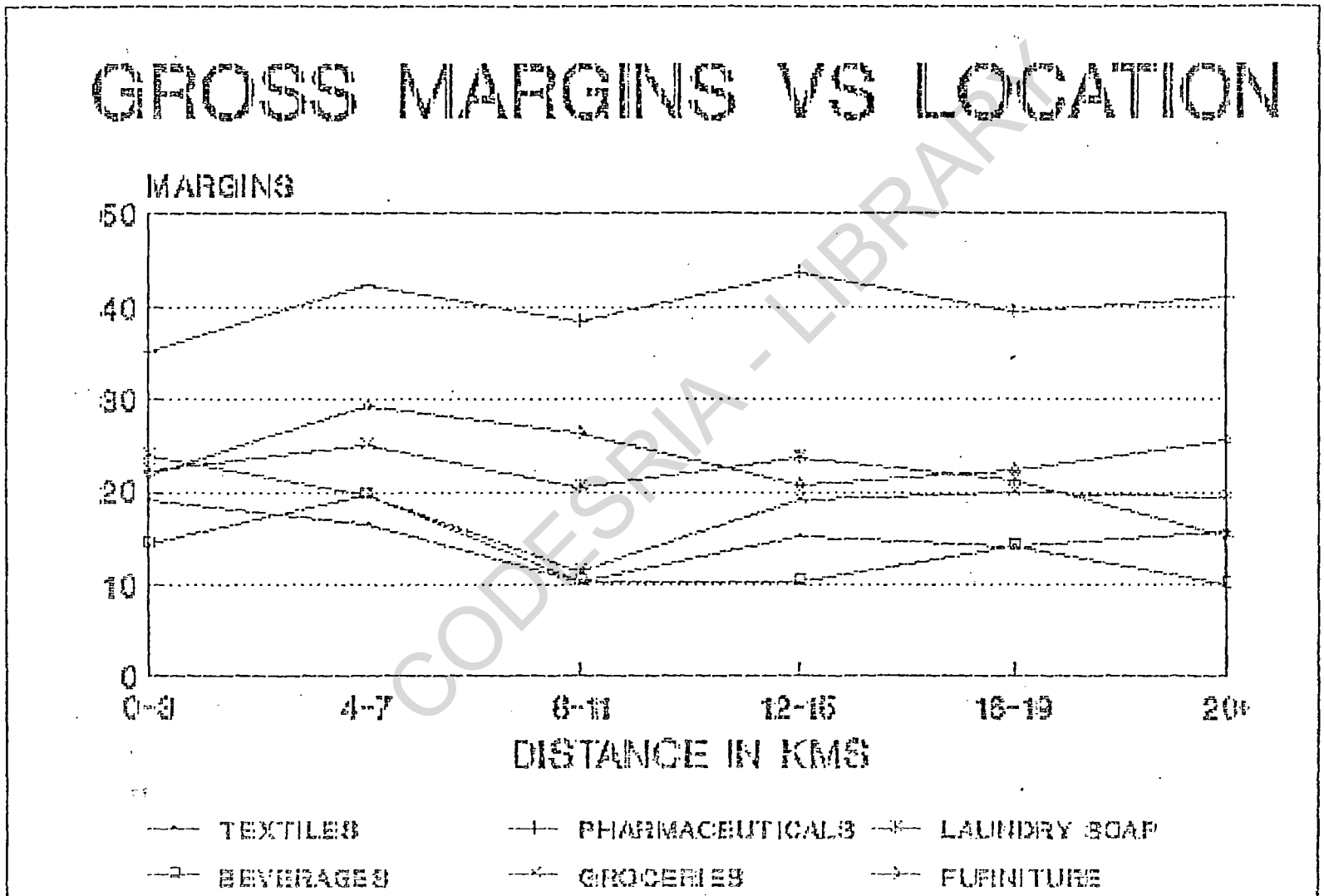

FIG 4-1

Table 4-10

Mean Scores of Percentage Gross Margins for Different Locations

Product Group	Distance in Kilometres					
	0-3	4-7	8-11	12-15	16-19	above 20
Textiles	19.19	16.31	10.16	14.98	14.00	15.54
Pharmaceuticals	34.99	42.18	38.39	43.58	39.29	41.08
Laundry Soap	22.26	25.01	20.33	23.52	21.24	15.08
Beverages	14.28	19.72	10.24	10.35	14.03	10.06
Groceries	23.95	19.48	11.33	19.16	19.92	19.35
Furniture	21.74	29.18	26.25	20.79	22.41	25.41

The figure shows that, given the six product groups studied, there is no clear picture although, to some extent, margins appeared to be lower around the city centre. However, the graphs may not show much because the data represented are based on averages. Similarly, it is difficult at this stage to assess whether on the overall, the margins were really different in different locations. Therefore, an analysis of variance test is in order.

Table 4-11 presents results of the one-way analysis of variance for the mark-up mean scores with respect to variability in locations of retail outlets.

Table 4-11 indicates that margins of one location were not statistically different from those of other locations. In other words, it appears that margins are the same irrespective of the location of the retail outlets. This leads us to suggest that margins do not vary between retail outlets located in different areas as would be expected.

Table 4-11

One-Way Analysis of Variance for Retail Margins in Different Locations

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Ratio	Level of Signif.
Between Groups	259.74	5	51.948	0.445	2.53 (N.S)
Within Groups	3498.547	30	116.618		

The insignificance of location variable, however, appears to be corroborated by the interview data which revealed that 93 percent of retailers interviewed used public transport because it was cheap. Only a few, 2 percent, used hired transport, while 5 percent used carts. This explanation arises out of the assumption that markups will increase to cover for increased transport costs given long distances.

4.2.2.2. Comparison of Retail Margins in Areas with Different Population Sizes: Preliminary Analysis

In this section, mark-up scores of areas with different population sizes are compared to assess whether retail margins differed with variation in population. These scores are presented in Table 4-12.

Table 4-12

Mean Retail Margin Scores by Population Size[10]

Product Group	Population Size		
	0-20,000	20,001-40,000	40,001-above
Textile	20.27	17.47	15.29
Pharmaceutical	36.95	58.83	39.66
Bar Soap	21.52	27.97	21.94
Beverages	13.72	12.58	11.79
Groceries	21.42	18.90	20.02
Furniture	21.76	23.91	24.44

The figures presented in Table 4-12 indicate that the margins of the six product groups behaved differently. However, it is not easy to discern any particular trend,

[10] The population figures (1988 Census) for the various Wards/branches of the three districts; viz., Ilala, Kinondoni and Temeke are presented in Appendices 3-1, 3-2 and 3-3.

although, mark-up scores of product groups like textile tend to decrease with increasing population suggesting that mark-up rates are lower in high population areas than in low population areas. As far as the beverage and furniture groups are concerned, the sample evidence appears to suggest that margins are higher in higher population areas and lower in low population areas. Nevertheless, the one-way analysis of variance results presented in Table 4-13 show that the differences were not statistically significant.

Table 4-13

One-Way Analysis of Variance: Retail Margins VS. Population Sizes

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-Ratio	Level of Signif.
Between Groups	20.676	2	10.338	0.1343	3.32 (N.S.)
Within Groups	2540.586	33	76.987		
Total	2561.262	35			

4.3. FACTORS INFLUENCING RETAIL MARGINS

In the previous sections variability in the major independent variables was tested. Using one-way analysis of variance, the sample evidence did indicate differences in their mean scores. In other words, the scores for both

the major independent variables, namely merchandise unit cost and merchandise rate of stock-turn were significantly different from each other. Their scores were, therefore, different among the six product categories. Furthermore, a preliminary investigation on whether margins varied with the location of a retail outlet or its population size showed insignificant results at five per cent level of significance.

It is against this scenario that this section attempts to carry out further statistical investigations on factors influencing retailers' pricing behaviour. Whether or not the factors influence this behaviour was established after performing various forms of regression analyses. Although our preliminary investigations have suggested insignificant results as far as the location of a retail outlet and its population size are concerned it is still logical to subject these variables to further investigation using different and more powerful statistical methods, and different measurement criterion. In the subsequent investigations the interactive effect of these factors with others was considered. It is possible that they may significantly influence the mark-ups when they are combined with other variables. On the other hand, the use of dummy variables for location and population was considered in this second investigation, where 0 to 10 and beyond 10 kilometres were coded as 0 and 1, repectively. With respect to the variable population, 0 to 30,000 and above 30,000 people were coded as 0 and 1, respectively.

As discussed in chapter 3, various functional models were tested to determine lines of best fit by using the Minitab computer package. Initially, the multiple regression analysis tested for the influence of two main factors, namely cost and turnover. This is done in accordance with the theory of price determination reviewed in Chapter 2 which states that "price is the joint interaction of supply (cost) and demand (turnover) factors. In the second stage, the variables location of retail outlet and population size are each added to evaluate their contribution to the strength of the regression equation. All these procedures were done using the computer to enable the researcher to choose the best fit. Nevertheless, the ultimate objective of the regression analysis was to relate retail mark-ups to the four explanatory variables; thus requiring a multivariate investigation.

Multiple regression analysis was preferred to simple regression because of various reasons. First, apart from excluding the influence of other factors on the criterion variable, a single regression analysis does not consider the interaction of the independent variables and their influence on the dependent variable. Given that explanatory variables may themselves be interrelated a multiple regression analysis is inevitable. Second,

various retail margin studies that have used single regression analysis have widely been criticized. Proponents of multivariate analysis often argue that the business environment is very complex implying many variables influence a business decision (e.g. Tucker 1975: 32). In the present study the consideration of the joint interaction[11] of supply and demand factors in determining retail markups is very important.

4.3.1. **Regression Analysis Results**

In this particular analysis it was deemed important to use non-average data to properly evaluate the pricing behaviour of retailers. As explained above, various functional forms, both linear and non-linear, were estimated and where necessary the two variables (location and population) were treated as dummy variables. The use of such mathematical transformations of the variables can greatly improve or expand the scope of the regression model[12]. Mathematical transformations permit analysis of other forms of variation in the parameters being estimated

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[11] See also Charles T. Clark and Lawrence L Schkade Statistical Analysis for Administrative Decisions 2nd ed. South-Western Publishing Co., 1974 p. 604, on the importance of interaction effect in regression analysis.

[12] For further discussion on this topic, see for example, G.A. Churchill, Marketing Research: Methodological Foundations, 3rd ed. Drydren Press 1983 p. 585.

including exponentially decreasing or increasing trends. A summary of the results of the various functional forms of the regression analysis are contained in tables 4 - 14 to 4 - 19. These tables indicate parameter estimates for the six selected product classes. They also indicate results of the best fit only. The rest of the regression results are presented in Appendices 4-8 to 4-13.

4.3.2. Effects of Merchandise Cost, Rate of Stock-turn, Location and Population Size of Retail Outlets on Mark-ups

The results of multiple regression analyses are presented and discussed separately for products to vividly examine the influence of the four predictor variables on the dependent variable. All tests are done at the 5% level of significance and the t-tests are all two-tailed because no direction is specified in the alternative hypothesis.

The regression coefficients for the textile group are contained in Table 4-14 and Appendix 4-8. The results are discussed by examining the beta weight or t-values. The larger the t-values are the least likely it is that the parameter is zero (Aaker & Day, 1983).

Table 4-14

Estimated Multiple Regression Coefficients for Textile

A. Linear Form Variable[a]	Coefficient	t.Test	D.F.	Signific.
Unit Cost	-0.0074	-8.60*	357	0.000
Turnover rate	-0.0601	-2.58*	357	0.010
Location	-0.0907	-1.31	357	0.193
Market size (Pop.)	-0.00003	-2.11*	357	0.036
Regression constant	27.191	17.72		
Adjusted R^2	0.188			
B. Reciprocal Form **				
Variable[b]				
Reci-Unit cost	1941.60	1852.28*	357	0.000
Reci-Turnover Rate	27.8392	514.52*	357	0.000
Location	8.6334	3374.42*	357	0.000
Market size(Pop.)[c]				
Regression constant	10.1667	1877.73		
Adjusted R^2	1.00			

* Significant at 5% level of significance: All t-tests are two-tailed because no direction is specified in the alternative hypotheses.

** The results with double asterics in tables 4-14 to 4-19, are taken for further analysis in subsequent sections because of their relatively large amount of explained variance in the respective product group.

a An attempt to add two variables, viz; location and population led to an increase of the adjusted R^2 by 0.010 (1%) only. In other words the two variables did not improve the explained variance.

b An initial attempt to estimate the regression fit by using the major 2 variables, viz; unit cost and turnover rate explained only 25.9% of the variation in mark-up. The inclusion of the location variable improved the adjusted R^2 to 1.0 Although the result appeared a bit uncommon, the author was satisfied that it represented the true finding after running the regression equation four more times - and obtaining the same result.

c The variable population was removed from the equation because it was found to be highly correlated with the rest of the explanatory variables.

major variables namely, cost and turnover as reciprocals was able to explain only 25.9% of the total variation in margins. When the other two variables were added, population was found to be strongly correlated (Appendix 4-8) with the rest of the independent variables and was thus removed from the estimation equation. Therefore, the inclusion of location variable improved the explained variance to 100%, with beta coefficients of the three factors (cost, turnover, and location) being statistically significant.

Nevertheless, the interpretation of the above final results requires greater caution because although the beta coefficients were all positive it does not imply that the higher the values of the independent variables the higher the retail margins (dependent variable).[13] In fact, our reciprocal function obtained is of the form $y = \alpha + \beta_1 (1/C) + \beta_2 (1/S) + \beta_3 (1/L)$ and the graphical representation of one independent variable such as $y = \alpha + \beta (1/C)$ in a partial analysis (holding other variables constant) will depict a shape like that of Figure 4-2. The results of the reciprocal function suggest that the lowest mark-up the retailer selling textile products can charge is 10 percent, implying that whatever the merchandise cost, the rate of

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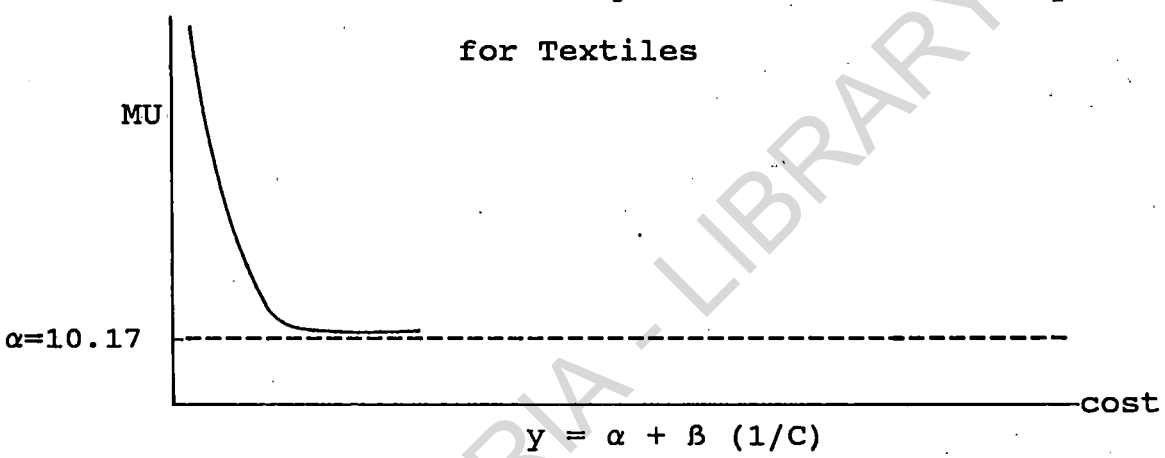
[13] See for example, Julia Hebden Statistics for Economists, Philip Allan, 1981, p. 181.

stockturn, and the location of the retail outlet the minimum mark-up is 10 percent. However, the resultant curve obtained from the curvilinear relationship between the dependent and the independent variables never quite touches the floor called the "asymptote", implying margins are usually above the 10 percent (asymptote).

Figure 4-2

Effects of Cost on Retail Margins in a Partial Analysis for Textiles



Against the above evidence therefore, the results suggest that margins fall at a decreasing rate with higher merchandise cost, higher turnover rate and with greater distance the retail outlet is located from the City Centre; but they never fall beyond the limit of 10.17 percent. The functional relationship, therefore, suggests an inverse relationship between the dependent variable and the independent variables.

On one hand, the higher the merchandise cost and rate of stock-turn, and the farther the retail outlet is from the City Centre, the lower the retail margins. On the other hand, the lower the marchandise cost and turnover rate and the nearer the retail outlets is located from the city centre, the higher the retail margins. Overall, the sample evidence, with respect to the textile group, tends to suggest that the relationship between the retail margins and the independent variables is non-linear rather than an additive one.

With respect to the pharmaceutical group, two functional models provided the best estimation. The results of these models, namely, the linear and the logarithmic forms are presented in Table 4 - 15. The rest of the results are contained in Appendix 4 - 9.

As it can be seen in Table 4 - 15 an attempt to transform the two variables, location and population, into dummies did not improve the strength of the linear regression line. It is further observed in Appendix 4 - 9 that the inclusion of these two variable in the regression equation added only 0.003 to the R^2. The sample evidence, on the other hand, suggests that the logarithmmic model provided the best estimation for the data.

Table 4 - 15

Estimated Multiple Regression Coefficients for Pharmaceuticals

A. Linear Form: Variable[a]	Coefficient	t-Test	D.F	Signific
Unit Cost	-0.227	-12.04*	214	0.000
Turnover Rate	0.0495	0.52	214	0.601
Location	-0.037	-0.18	214	0.860
Market size (pop.)	-0.000087	1.46	214	0.147
Regression constant	44.4	19.19		
Adjusted R^2	0.427			
Unit cost	-0.226	-11.99*	214	0.000
Turnover Rate	0.0545	0.57	214	0.566
Dummy variable (Location)	-0.0582	0.36	214	0.721
Dummy variable (pop)	-0.00027	-1.74	214	0.084
Regression Constant	48.1	22.49	214	
Adjusted R^2	0.427			
B. Logarithmic form:** Variable[b]				
Log- Unit Cost	-0.137	-12.94*	214	0.000
Log- Turnover Rate	0.0167	0.42	214	0.672
Regression Constant	3.81	35.30		
Adjusted R^2	0.448			

Notes:

a When only the two major variables were estimated, the explained variance decreased from 0.427 to 0.424, lower by only 0.003 (0.3%). In other words little margin variation was explained by the addition of two more variables, location and population.

b The addition of the variables location and population explained insignificant variation in retail margins. Therefore, they have been excluded in the presentation here.

Overall then, the results suggest that the variable merchandise unit cost has the only significant influence

on the dependent variable mark-up, at the 5% level of significance. Furthermore, the negative beta coefficient of the independent variable, cost, suggest an inverse relationship between the dependent variable and the independent variable. It may tentatively be concluded that, as far as the pharmaceutical class is concerned, margins are inversely related to merchandise cost. The sample evidence in this group further suggests that the variation between the dependent and the independent variables is a non-linear rather than a linear one.

As far as the beverage group is concerned, two functional forms were worthy considering (see Table 4-16). These were the linear and the logarithmic forms. The best results, however, with 98.9 percent of the variation in the dependent variable being explained was obtained from the linear estimation. In both forms the t-test results suggest that the variable merchandise unit cost had very significant effect. On the other hand, in the logarithmic function an additional factor, location, appeared to have a statistically significant influence although the regressors explained only 11.6 percent of the total variation in the regressand. The fact that the beta coefficients of the two significant variables were negative means that the higher the merchandise unit cost and the farther the retail outlet is from the city centre the lower

the retail margin. On the other hand, the lower the merchandise unit cost and the nearer the retail outlet is from the city centre the higher the retail margin. It may,

Table 4-16

Estimated Multiple Regression Coefficients for Beverages

A Linear Form **				
Variable	Coefficient	t-Test	D.F	Significant
Unit Cost	-4.13	-252.37*	702	0.000
Tunover Rate	-0.782	-1.51	702	0.131
Location	-1.88	-0.93	702	0.354
Market size (pop)	-0.000819	1.15	702	0.250
Regression Constant	259.06	8.91		
Adjusted R^2	0.989			
B. Logarithmic Form				
Variable				
Log-Unit cost	-0.259	-9.19*	702	0.000
Log-Turnover rate	-0.0416	1.16	702	0.245
Log-Location	-0.132	-3.80*	702	0.000
Regression Constant	4.644	11.86		
Adjusted R^2	0.116			

Note:

a Population effect was insignificant. Therefore it does not appear here.

therefore be concluded, with respect to the beverage group, that margins are inversely related to cost of merchandise and location of the retail outlet. The sample evidence in this product class, further suggests that the variation between the dependent variable and the independent variables is a linear one rather than a multiplicative or

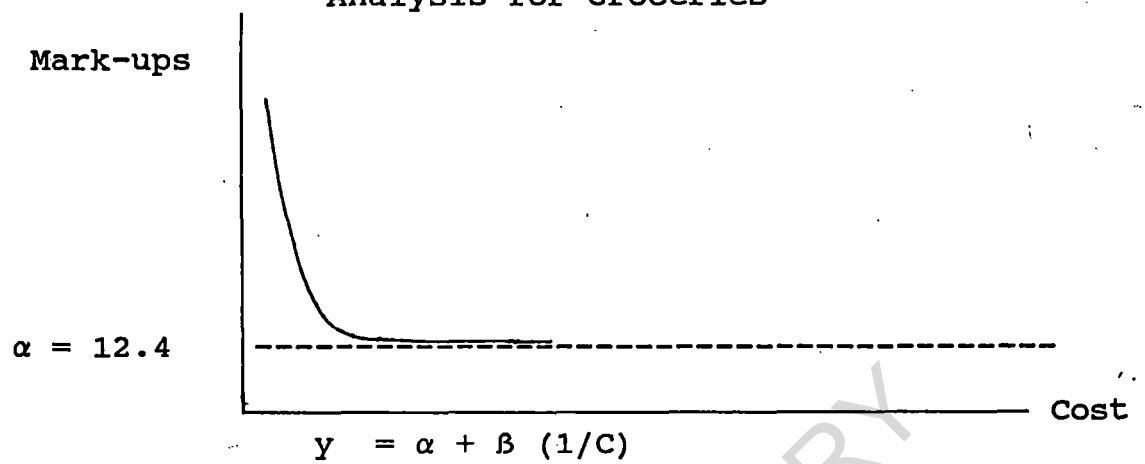
other non-linear forms. In other words, it assumes a constant variation between the dependent variable mark-up and the independent variable merchandise cost.

The regression analysis in the grocery group reveals two relatively stronger outcomes. These outcomes representing the logarithmic and the reciprocal functional forms are presented in Table 4-17. The rest of the results can be found in Appendix 4-11. It is however, discernible from Table 4-17 that the best estimation was obtained by the reciprocal function. In both forms the t-test results suggest that the effect of the variable merchandise cost is statistically significant. Nevertheless, when the regression equation is transformed into a reciprocal one, the variable population also has statistically significant impact. Since the reciprocal function is of the form $y = \alpha + \beta_1 (1/c) + \beta_2 (1/p)$ (see figure 4-3), the sample evidence suggests an inverse relationship between the dependent variable and the independent variables. In other words, the results imply that the higher the merchandise costs and the higher the population, the lower the retail mark-ups.

Therefore, as far as the grocery group is concerned, the sample evidence appears to suggest that margins are inversely related to merchandise cost and population.

Figure 4-3

The Effects of Cost on Retail Margins in a Partial Analysis for Groceries



The final tentative conclusion here is that the relationship between retail margins and the independent variables merchandise cost and population is a non-linear (curvilinear) rather than a linear one. The non-linear function is also a reciprocal one rather than a multiplicative (quadratic) one.

With respect to the laundry soap group, results of the best functions are presented in Table 4-18 while the rest of the results are given in Appendix 4-12. In both functions two variables, location and population, do not appear in the estimated equation because they were very insignificant. In the linear function the t-test results suggest that only merchandise cost is statistically significant, while in the relatively better estimation, the

reciprocal function, the variable rate of stock-turn is statistically significant.

Table 4-18

Estimated multiple Regression Coefficients

for Laundry soap

A. Linear Form				
Variable[a]	Coefficient	t-test	D.F.	Signif.
Unit Cost	-0.0477	-2.10	258	0.037
Turnover Rate	0.02121	1.18	258	0.239
Regression Constant	27.110	10.82	258	
Adjusted R^2	0.014			
B. Reciprocal Form**				
Variable[b]				
Reci-Unit cost	-46.3	-0.31	258	0.756
Reci-Turnover Rate	-25.36	-2.45	258	0.015
Regression Constant	24.781	15.71		
Adjusted R^2	0.020			

Notes:

a The variables location and population do not appear here because they added less than 0.010 R-squared (coefficient of determination).

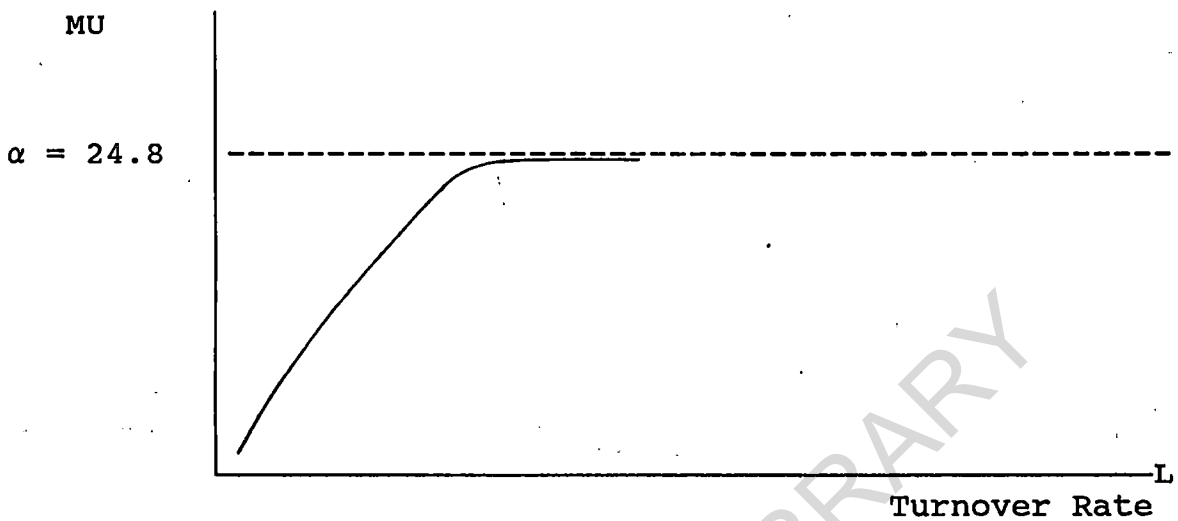
b Similarly, in the reciprocal function, location and population were insignificant.

The interpretation of the results of this reciprocal function requires caution. Although an inverse relationship between the dependent and the independent variables is implied by the negative sign of the beta

coefficient, it is not realistically so. In a partial analysis, the shape of the curve depicting the relationship between retail margins and merchandise rate of stock-turn looks like that shown in Figure 4-4. The graph, which represents the reciprocal function $y = \alpha - \beta (1/S)$ depicts a direct relationship between retail margins and the merchandise rate of stock-turn. The sample evidence, therefore, suggests a direct relationship between the dependent variable and the independent variable. In other words, the higher the rate of stock-turn the higher the retail markups. However, with every increase in the turnover rate, markups will rise at a decreasing rate. Further, the reciprocal function here suggests that margins will not rise above the ceiling of 24.8 (the asymptote) which is never reached. The asymptote implies that whatever the rate of merchandise turnover, retail margins will not go beyond 24.8 percent. With respect to this sample evidence on laundry soap it may tentatively be concluded that margins will vary directly with the merchandise rate of stock-turn. The results further suggest that the relationship between retail margins and turnover rates is a non-linear (reciprocal) rather than an additive or multiplicative one.

FIGURE 4-4

Effects of Turnover Rate on Retail Margins in a Partial Analysis for Laundry Soap



$$y = \alpha - \beta\ (1/S)$$

Finally, as far the furniture group is concerned the logarithmic function provided the best estimation. The relatively more powerful results are presented in Table 4-19 while the rest of the results are contained in Appendix 4-13. The t-test results of the logarithmic function suggest that the variable merchandise cost is statistically significant. Given that the sign of the beta coefficient is positive the sample evidence suggests that the higher the merchandise cost the higher the retail margin. In the weaker function, however, turnover rate was observed to be statistically significant and linearly related to the retail margins. A negative beta

coefficient suggests that the higher the turnover rate the lower the retail margins. But given that the sample evidence suggests a logarithmic relationship between the dependent and the independent variables it can tentatively be concluded that margins are directly related to merchandise cost and that this relationship is multiplicative rather than an additive one.

Table 4-19

Estimated Multiple Regression Coefficients For Furniture

A. Linear Form				
Variable[a]	Coefficient	t-Test	D.F.	Signific
Unit Cost	-0.0089	-0.60	193	0.549
Turnover Rate	-6.25	-3.29	193	0.001
Location	2.087	0.25	193	0.802
Market size (Pop)	-0.00403	-1.55	193	0.122
Regression constant	317.2			
Adjusted R^2	0.074			
B. Logarithmic Form**				
Variable[b]				
Log-Unit Cost	0.167	6.61	193	0.000
Log-Turnover Rate	0.0477	0.76	193	0.446
Log-Market size (Pop)	0.0895	1.31	193	0.258
Regression Constant	0.7133	0.02	193	
Adjusted R^2	0.179			

a The effect of location parameter was very insignificant. It was therefore removed from the estimation.

The above conclusion pertaining to the furniture group, appears to be inconsistent with the results obtained in the

case of the other four products (textile, pharmaceutical, beverages and groceries) where there was either a negative beta coefficient or a reciprocal function of an inverse relationship. It is not clear at the moment why the furniture group results were an exception. Nevertheless, a comparison with other regression equations, depicting cost as a significant variable, reveals a weaker relationship in the furniture group.

4.3.3. **Tests For The Regression Equations**

In the previous section the four explanatory variables (merchandise cost, rate of stock turn, location of retail outlet and population) were investigated to determine their influence on retail markups. In addition to this investigation, however, one needs to know, whether these explanatory variables' ability to predict values of the dependent variable is significant. The major issue therefore is: do the predictors explain a significant portion of the variation in the dependent variable? To answer this question an F-test is required. The F-tests in a regression model essentially test whether there is a significant relationship between the dependent and the independent variables. Results of the F-tests for the models which represented the highest coefficient of determination for the selected product groups are presented in Table 4-20. The results

Table 4-20

Analysis of Variance Tests For Regression Equations

Functional Form	Source	MS	D.F.	F-test	Sign.
Textiles					
Linear	Regression	1787.0	4	21.63	0.000
	Error	82.6	353		(sign.)
Reciprocal*	Regression	12104	3	5149000	0.000
	Error	0	354		(sign.)
Pharmaceutical					
Linear	Regression	5754.2	4	40.92	0.000
	Error	140.6	210		(sign.)
Linear (2 dummies)					
	Regression	5744.4	4	40.80	0.000
	Error	140.8	210		(sign.)
Logarithmic*	Regression	8.97	2	87.91	0.000
	Error	0.10	212		(sign.)
Beverages					
Linear*	Regression	1889543296	4	15947.3	0.000
	Error	118487	690		(sign.)
Logarithmic	Regression	20.11	3	31.77	0.000
	Error	0.63	699		(sign.)
Groceries					
Logarithmic	Regression	8.25	3	23.46	0.000
	Error	0.35	513		(sign.)
Reciprocal*	Regression	2100.9	4	19.04	0.000
	Error	110.3	512		(sign.)
Laundry Soap					
Linear	Regression	216.04	2	2.89	0.57
	Error	74.78	256		(N.S.)
Reciprocal*	Regression	266.80	2	3.59	0.029
	Error	74.38	256		(sign.)
Furniture					
Linear	Regression	1334405	4	4.88	0.001
	Error	273478	187		(sign.)
Logarithmic*	Regression	4.98	3	15.07	0.000
	Error	0.33	190		(N.S.)

* The functional forms with asterics are taken for further analysis because they represent the best estimation in the respective product groups (having largest R^2 value).

contained in Appendices 4-8 to 4-13 suggest other significant regression results. However, they are not discussed here because they explained little variation in the dependent variables.

Table 4-20 suggests that all the "better" outcomes in the respective product groups had statistically significant relationships, given the F-tests. In the laundry soap category, however, the second best functional model (the linear form) was not statistically significant. It should also be noted that the estimation was the weakest among the six product categories.

Having examined the statistical significance of the regression equations, it is now proper to investigate the amount of variation that was explained by these regression equations. This involved the calculation of the coefficients of determination. The coefficient of determination gives the percentage of the variation in the dependent variable that is explained by the variations in the independent variable. In table 4-21 the adjusted R-squared values of the results are presented.

Table 4-21

Coefficients of Determination for the Six Selected Product Groups

Product Group	Functional Form	Adjusted R-Squared
Textiles	Reciprocal	100
	Linear	18.8
Pharmaceutical	Logarithmic	44.8
	Linear	42.7
Beverages	Linear	98.9
	Logarithmic	11.6
Groceries	Reciprocal	12.3
	Logarithmic	11.6
Laundry Soap	Reciprocal	2.0
	Linear	1.4
Furniture	Logarithmic	17.9
	Linear	7.4

The research evidence suggests that a large portion of the margin variations in the laundry soap, groceries and furniture groups remained unexplained. In other words, these findings appear to suggest that, although the independent variables turnover rate, cost and population, and cost, significantly influenced the retail margins in soap, groceries and furniture, respectively, they could only explain a small portion of the variation. It can tentatively be concluded that, in these samples, factors other than those incorporated in the study influence retail margins. Again the research evidence appears to suggest that the margin variation is better explained by non-linear

type of relationship with the independent variables. This was so in five out of the six cases. This concludes the investigation on the influence of the four explanatory variables, cost, turnover, location and population on retail margins.

4.4 Testing the Hypotheses

The null hypotheses which were outlined in chapter 3 are now tested using the results discussed in the preceding sections.

Hypothesis 1a: The null hypothesis to be tested is:

H_0: The mean scores of the dependent variable (mark-up) are equal among all product categories.

ie. $\mu_1 = \mu_2 = \mu_3 = \ldots \mu_K$

This hypothesis was derived from the theory of price discrimination described in chapter 2. It was explained in that chapter that the theory of price discrimination essentially backs up the economic theory of profit maximization. That is, firms will seek to maximize profit by varying their prices and hence the margins. It essentially emanates from the general understanding that pricing strategy plays a very important and decisive role

in the survival, growth, and profitability of a firm. From the marketing strategy point of view, price strategy is the only source of direct revenue. The other elements (product, place, and promotion) are cost elements.

Arguments from proponents of price discrimination theory tend to suggest that a "rigid" customary mark-up over cost may not make any logical sense (Kotler 1984:517). These propositions were then investigated in this study. Whether the theory is supported in the case of retailing business is the issue in question.

Results of the one way analysis of variance (table 4-3) for margin scores suggest that the means of the different "treatment" groups were statistically significantly different from each other at all conventional levels. The margins were shown to vary from 12 percent to 37.8 percent among product categories and between 7 and 56.2 percent among product types (Tables 4-1 and 4-2). It was further

observed that the highest mark-ups were found in the pharmaceutical[13] products while the lowest were found in groceries.

Overall, the sample evidence suggests that the null hypothesis that the mean scores of the dependent variable mark-up were equal among product categories is rejected at all conventional levels of significance and the alternative hypothesis that retail margins are different among the product categories is supported.

In view of the above, the conclusion that can be made from this research evidence is that retail margins are not uniform; they vary widely among different product groups. This conclusion is consistent with the theoretical framework described in chapter 2 and suggests that retailers vary their margins to maximize profits.

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[13] It is not clear why pharmaceutical products had the highest average margins. Nevertheless, the source of supply may have some influence. In this study, Vendors and Hawkers were found or reported to be distributing pharmaceutical products to pharmacies and medical stores. Their prices were generally very low, according to the retailers interviewed. This is a common phenomenon in many developing countries. Buonofina, M.o. (1987) evaluates the presence of "Ambulatory Vendors" in Guatemala as comprising the largest segment of the undocumented sector (informal). In Tanzania, Maliyamkono and Bagachwa (1990) discuss at length the operation of the second economy.

Hypothesis 1b: The null hypothesis to be tested is:

H_O: The differences among mark-up mean scores of product categories are equal to the differences among mark-up mean scores of product items.

$$\mu_{pg} = \mu_{g1} = \mu_{g2} = \ldots \mu_{gK}$$

This hypothesis was also derived from the theoretical bases for hypothesis 1a. It, however, attempts to assess retailers' pricing behaviour in the different classes and types of merchandise. Whether or not margin variations were greater or lesser among product categories than among product items will be revealed by the results of t - tests.

An examination of the results of the t-tests (Table 4-4), on the one hand, suggests equal margin variation among product classes and among product items. The differences were therefore not statistically significant. This proposition is supported in five out of the six comparisons. Overall, therefore, the sample evidence tends to suggest that margins varied widely among product classes as well as among product items or within a product class. The null hypothesis that the differences among mark-up mean scores of product categories are equal to the differences among mark-up mean scores of product items is generally supported against the alternative hypothesis that the

differences were greater among product categories than among product items. This conclusion is based on the summary results of the t-tests contained in Table 4-4.

Hypothesis 2a: The null hypothesis to be tested here is:

H_o: The mean scores of the predictor variable merchandise unit cost are equal among product categories.

$$\mu_{c1} = \mu_{c2} = \mu_{c3} = \ldots = \mu_{cK}$$

This hypothesis was derived from the theory presented in chapter 2, which described the conditions of price discrimination. Proponents of price discrimination theory have argued, for example, that only under special conditions like when average (unit) costs are fairly constant and price elasticity fairly constant (demand) will a rigid mark-up at the right level lead to optimum profits (Kotler: 1971:341). It is logical then to examine the variation in the variable merchandise costs if it is hypothesized to explain variation in margins. In other words, for statistical reliability and consistency an empirical evidence in the variability of the mean scores is a pre-requisite to further investigations on its influence on retail margins.

Results of the one-way analysis of variance for the mean scores (Table 4-6) have an F-value which is statistically significant at 5% level. This means that the merchandise costs of the various product categories were significantly different from each other. The conclusion that can be made here is that the costs of the merchandise were very different. As earlier explained this conclusion is imperative and requisite for further investigation on the influence of merchandise cost on retail margins.

In view of the above discussion, the overall conclusion that can be made is that the null hypothesis is rejected and the alternative hypothesis that the mean scores of the predictor variable merchandise unit costs are significantly different from each other is supported. The results suggest that a rigid mark-up will not make sense because merchandise costs vary widely among the different classes of merchandise.

Hypothesis 2b: The null hypothesis to be tested is

H_O: The mean scores of the predictor variable merchandise rate of stock-turn are equal among product categories.

$\mu_{s1} = \mu_{s2} = \mu_{s3} \ldots = \mu_{sK}$

Again this hypothesis was developed from the same theoretical bases that explain hypothesis 2a. The theory suggests that only when price elasticity is fairly constant will a rigid mark-up over cost enable a firm to maximize profits. It is, therefore, deemed logical to investigate the scores of the rate of stock-turn on the various kinds of merchandise. The question to be answered is "were turnover rates of the various kinds of merchandise carried by retailers really different from each other?" This question is answered by testing the above hypothesis. Such a procedure, as in the case of hypothesis 2a, also guarantees statistical reliability for further investigation on the relationship between mark-ups and the turnover rates. The relevant data for testing this hypothesis is contained in Tables 4-7 and 4-8.

As per Tables 4-7 and 4-8 the merchandise rate of stock-turn for the six selected product classes ranged between 14.6 and 45.1. The lowest and highest turnover rates were observed in the pharmaceuticals and grocery groups, respectively. A probable explanation for such low turnover rates in pharmaceuticals is imperfect demand. This is because Tanzanians are still able to obtain free medicines from state-owned hospitals.

Results of the one-way analysis of variance (Table 4-9) for the mean scores of turnover rates have an F-value which is statistically significant at 5% level. This means that the turnover rates of the various merchandise are quite different from each other. In other words, the research finding suggests that stock-turn rates vary significantly among the different types of merchandise implying that highly demanded goods turn over faster than lowly demanded items.

The above findings lead the researcher to conclude that the null hypothesis is rejected and the alternative hypothesis that the mean scores of the merchandise rate of stock-turn were significantly different among the various classes of merchandise is supported. These results appear to suggest that a rigid mark-up is illogical since the demand facing various products is different.

Hypothesis 3: The null hypothesis to be tested here is:

H_o: The beta coefficients of the independent variables merchandise cost, merchandise rate of stock-turn, location of retail outlets and population size are equal and statistically insignificant i.e. they are no better than zero.

$\beta_1 = \beta_2 = \ldots = \beta_K = 0$

This hypothesis was derived from the theoretical framework reviewed in chapter 2, which stated the three rules of thumb, namely that a) Mark - ups should vary inversely with unit cost, (b) mark-ups should vary inversely with turnover, and (c) mark-ups should be higher and prices lower on retailers' private brands than on manufacturers' brands. These rules, commonly hypothesized to explain mark-up variation at retail level, have been essentially derived from the Marshallian economic ("neo-classical" economic school) theory which advocated that the value or price of a good is determined by an equilibrium between forces of supply (costs) and demand (depicted in turnover). Proponents of this theory have argued that "...with differential price elasticity (demand) and differential cost (supply) price discrimination is inevitable" (Koch 1980:36). They further argue that "any model that ignores current demand elasticity in setting prices is not likely to lead, except by chance, to the achievement of maximum profits either in the long run or in the short run. Thus as demand elasticity changes the optimum mark-up should also change (Kotler 1971:340). Whether the above theory holds true in the Tanzanian retail sector is the current concern. Both t-test and F-test are used to test this hypothesis. While the t-test investigates statistical significance of the individual beta coefficients the F-statistic tests whether or not one or a set of independent

variables contribute any information or rather influence the dependent variable. In other words, it will show whether one or more of the variables differ from zero.

Results of the multiple regression analysis (Tables 4-14 to 4-19) give the following findings. The testing of the hypothesis is only based on the best functional relationships in each product class (Table 4-21).

With respect to the independent variable merchandise unit cost, the t-test results indicate that the parameter was significant in five cases out of the six selected product categories. In all the significant cases the results suggest that there was 99 percent probability that the variable described the true relationship existing between mark-ups and the variable cost. The five product groups were textile, pharmaceuticals, beverages, groceries, and furniture. It is only in the case of laundry soap that the beta coefficient was not significant.

Furthermore, the variable either bore a negative coefficient or was a reciprocal with positive beta coefficient in four out of the five significant cases. The only exception was in the furniture group which had positive beta coefficient. This implies a direct relationship between the dependent and the independent

variables. There is no obvious reason as to why the relationship in the furniture group should be different from the rest. However, the fact that most of the furniture items surveyed in this study were those made to order may be a probable explanation.

Based on the above findings it can now be concluded that, in general, merchandise cost significantly influences retail margins. Moreover, the hypothesized direction that mark-ups are inversely related to merchandise cost is supported in all except in one significant result. The null hypothesis of no influence (ie $\beta_c = 0$) is generally rejected against the alternative hypothesis that it has influence. These conclusions are summarized in Table 4-22.

As shown in the table, in general costly merchandise will have lower margins and less costly merchandise will have higher margins.

Table 4-22

Summary Results of the Influence of Merchandise Cost on Retail Mark-ups

Product Group	Functional Form	Coefficient	t - test	Significance	Relationship
Textile	Reciprocal	1941.6	1852.28	0.000 (sign.)	inverse
Pharmaceutical	Logarithmic	-0.14	-12.94	0.000 (sign.)	inverse
Beverages	Linear	0.13	-252.37	0.000 (sign.)	inverse
Groceries	Reciprocal	531.09	7.94	0.000 (sign.)	inverse
Laundry Soap	Reciprocal	-46.3	-0.31	0.756 (Not Significant)	
Furniture	Logarithmic	0.17	6.61	0.000 (sign.)	direct

In the case of the independent variable merchandise turnover rate, the results of the t-tests indicate that the variable was statistically significant in only two out of the six product groups. These product groups were textiles and laundry soap. In these two cases the research findings suggest that there was 100 and 98 percent probability that the parameters described the true relationship existing between the dependent variable mark-up and the independent variable rate of stock-turn. In the laundry soap class,

merchandise turnover was the only significant factor in explaining retail margins.

Furthermore, the relationship between the dependent and the independent variable for the significant results was a reciprocal one with a positive sign in textiles and a negative one in the laundry soap category. This implies an inverse and a direct relationship, respectively.

On the basis of the above findings it can be concluded that, except in two product groups, the variable merchandise rate of stock-turn does not influence retail margin variation and as such the null hypothesis is not rejected except in two cases. A summary of these conclusions is presented in Table 4-23.

Table 4-23

Summary Results of the Influence of Merchandise Rate of Stock-turn on Retail Mark-ups

Product Group	Functional Form	Coefficient	t - test	Significance	Relationship
Textile	Reciprocal	27.84	514.52	0.000 (sign.)	inverse
Pharmaceutical	Logarithmic	0.02	0.42	0.672 (N.S.)	direct
Beverages	Linear	0.04	1.16	0.131 (N.S.)	direct
Groceries	Reciprocal	-3.17	-0.54	0.589 (N.S.)	direct
Laundry Soap	Reciprocal	-25.36	-2.45	0.015 (Sign.)	direct
Furniture	Logarithmic	0.05	0.76	0.446 (N.S.)	inverse

With respect to the independent variable location a preliminary investigation using one-way analysis of variance to test whether margins varied with location of retail outlets indicated that the results were not statistically significant (Table 4-11). On the other hand the t-test results (Table 4-14 to 4-19) reveal that the impact of the variable was statistically significant in only one product group (textile) out of the six product groups. Further, the multiple regression results show that the variable location interacted with the variable cost and

variable turnover rate to virtually explain all the variations of retail margins in the textile group. For all the three factors, the findings suggest that there was over 99 percent probability that the variable described the true relationship existing between the dependent and the independent variables.

Again the sample evidence appears to suggest that, in the one significant result, the relationship between the dependent and the independent variable is an inverse one. This implies that, retail outlets located far from the city centre will charge lower mark-ups and those located near and around the city centre will charge high mark-ups.

On the basis of the above evidence, it can be concluded that, except for the textile group, the variable location does not influence retail margin variation. The null hypothesis of no influence cannot be rejected so far as location of retail outlet is concerned. However in the significant case, the hypothesized direction that margins are inversely related to location of retail outlet is supported. These conclusions are summarized in Table 4-24.

Table 4-24

Summary Results of the Influence of Location of Retail Outlet on Mark-ups

Product Group	Functional Form	Coefficient	t - test	Significance	Relationship
Textile	Reciprocal	8.63	3374.4	0.000 (sign.)	inverse
Pharmaceutical	Logarithmic	*			
Beverages	Linear	-1.88	-0.93	0.354 (N.S.)	inverse
Groceries	Reciprocal	0.09	1.79	0.075 (N.S.)	inverse
Laundry Soap	Reciprocal	*			
Furniture	Logarithmic	*		(N.S.)	

* In those cases with asterics the variable location did not enter the estimation because they contributed close to zero in the R square.

Finally, as far as the variable population is concerned, preliminary findings based on one-way analysis of variance generally indicate no relationship between the variable and retail margins. Further an investigation using multiple regression reveals more or less the same conclusion. The t-test results indicate that the factor significantly influenced retail margins in only one (groceries) out of the six product classes. In this one case there was over

99 percent probability that the variable explained the true relationship existing between the criterion variable and the population variable. Moreover, the positive reciprocal beta coefficient implied an inverse relationship between the dependent variable and the independent variable population. This finding suggests that retailers located in high population density areas charge low mark-ups and those located in low population density areas charge high mark-ups.

Overall, however, the above research evidence leads the researcher to conclude that the null hypothesis of no influence cannot be rejected in all except one product group. It can further be concluded that in the one significant case, the hypothesized direction that margins are inversely related to population is supported. A summary of these conclusions is contained in Table 4-25.

Table 4-25

Summary Results of the Influence of Population on Retail Mark-ups

Product Group	Functional Form	Coefficient	t - test	Significance	Relationship
Textile	Reciprocal	Strongly correlated with other variables			
Pharmaceutical	Logarithmic	*			
Beverages	Linear	0.00	1.15	0.250 (N.S.)	direct
Groceries	Reciprocal	36,530	2.95	0.003 (Sign.)	inverse
Laundry Soap	Reciprocal	*			
Furniture	Logarithmic	0.09	1.31	0.258 (N.S.)	direct

* The variables did not enter the estimation because they contributed close to zero in the R square.

On the basis of the above findings, the null hypothesis that the beta coefficients of the variables merchandise cost, merchandise rate of stock-turn, location of retail outlet and population, are equal can now be tested. Results of the relevant t-tests have revealed that the variable merchandise cost influenced retail margin variation in more cases than the variables merchandise rate of stock-turn, location of retail outlet and population.

As far as the most dominant variable cost is concerned, the results suggest that it was able to singly explain all margin differences observed in the pharmaceuticals, beverages, and furniture. While the merchandise rate of stock-turn was able to explain all the margin differences in the laundry soap category, location of retail outlet accounted for a greater proportion of the margin variations in textiles. Given these research findings it can be concluded that the null hypothesis that the beta coefficients are equal is rejected. That is, the alternative hypothesis that the beta coefficients are not equal is supported.

Finally, the last part of hypothesis 3, which seeks to show whether or not one or a set of variables influence the dependent variable, is tested by examining the value of the F-statistic. Results of the F-test (table 4-21) indicate that the regression equations were statistically significant. Therefore, in general, the null hypothesis that the beta coefficients of the variables merchandise cost, merchandise rate of stock-turn, location of retail outlet, and population are statistically insignificant is rejected in favour of the alternative Hypothesis that at least one of the parameters $\beta_1, \beta_2, \ldots \beta_K$ differ from zero in all the product groups. Put another way, one or more

variables help to explain variations in retail margins. A summary of these conclusions is given in table 4-26

Hypothesis 4: The null hypothesis to be tested is:

H_o: The regression equations do not explain significant amount of variations in mark-ups.

In this section the above null hypothesis is tested against the alternative hypothesis that the regression equations accurately predict variations in mark-ups. This hypothesis is derived from the theoretical framework and empirical evidence, presented in chapter 2. In general, the hypothesis sought to investigate whether some of the

Table 4-26

Summary of F-test Results for the Regression Equations

Product Group	Significant Variables	Source	MS	DF	F-test	Signifi-cance
Textile (Reciprocal)	cost Turnover Location	Regression	12,104	3	5,149,000	0.000
		Error	0	354		(Sign.)
Pharmaceuticals (Logarithmic)	Cost	Regression	8.97	2	87.91	0.000
		Error	0.10	212		(Sign.)
Beverages (Linear)	Cost	Regression	1889543296	4	15,947.3	0.000
		Error	118487	690		(Sign.)
Groceries (Reciprocal)	Cost	Regression	2100.9	4	19.04	0.000
		Error	110.3	512		(Sign.)
Laundry Soap (Reciprocal)	Population Turnover	Regression	266.8	2	3.59	0.000
		Error	74.38	256		(Sign.)
Furniture (Logarithmic)	Cost	Regression	4.98	3	15.07	0.000
		Error	0.33	190		(Sign.)

conventional economic theories concerning price hold true in real business practice since it is essentially the micro-evidence that may verify or fail to verify some of the broadly stated-macro theories. Whether the business practice is consistent with the economic theory is the issue in question.

Testing the above hypothesis required an examination of the strength of the relationship between the hypothesized independent variables and the dependent variables. The relationship was evaluated through the calculated values of the coefficient of determination (the R^2 or the explained variance) and the error term (unexplained variance). The error term simply shows the magnitude of the variance that is accounted for by factors other than those examined by the relevant research.

The results of the regression equations (Table 4-21) indicate a very strong relationship in two product groups, namely, textile and beverages, a moderate relationship in one product group, pharmaceutical, and a fairly weak relationship in the other three product groups, groceries, furniture and laundry soap.

Furthermore, in the relatively stronger relationships, the margin differences are better explained by the reciprocal

(textile), linear (beverages), and the logarithmic (pharmaceuticals) form. For the weaker relationships, the margin variations were better explained by the non-linear function.

In view of the above the overall conclusion is that the null hypothesis that the regression equations do not explain significant amount of variation in retail margins is supported in three out of the six product categories. Put another way, in fifty percent of the cases studied the results suggest that the effects of factors other than those investigated should be explored.

CHAPTER 5

SUMMARY, CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH

5.0. SUMMARY

As stated in chapter one, the primary objective of the study was to explore the variability of retail margins, focusing on the effect of merchandise unit cost, merchandise rate of stock-turn, location of a retail outlet and population size on retail mark-ups or margins. It was further explained that many hypotheses had been advanced to explain margin variations at the retail level. The most commonly tested hypotheses in the past were the three rules of thumb: a) that mark-ups should vary inversely with unit cost b) that mark-ups should vary inversely with turnover and c) that mark-ups should be higher and prices lower on retailers' private brands than on manufacturers' brands. These rules of thumb largely explain micro business behaviour. They also constitute a restatement of the economic model that relates mark-ups to price elasticity as well as the formulation that price is determined by the joint interaction of supply (cost) and the demand (price elasticity).

A review of the literature covered in chapter 2 revealed that the first two rules of thumb had been widely tested in the United States of America and Europe. The relevant studies were of three kinds. There were those studies which investigated mark-up variations among product groups and types. Others investigated mark-up variations between categories of retail trade and retail organisations. A few other studies were reported to have investigated mark-down variations. In most of these studies the margin variances could not be fully accounted for. To the extent that these studies took place in industrialized countries, an empirical research in developing countries was necessary since no major empirical work had been undertaken within the framework of a developing retail economy.

The research design which incorporated a cross-sectional study was used to gather pertinent data on retail mark-ups as dependent variable and unit cost, rate of stock-turn, location and population as independent variables. In chapter 3, the use of this particular design is justified by presenting various constraints that did not permit the use of a time-series research design. These constraints included the unstable economic environment and the lack of record keeping on the part of the retailers in Tanzania.

Once the above data was collected, they were subjected to various statistical tests that included one-way analysis of variance, t-tests, and multiple regression analysis. Unlike many of the studies reviewed in the literature, this study employed both linear and non-linear functional forms to derive the various relationships. The advantages of non-linear functional models or more precisely, the use of mathematical transformations, were discussed in chapter 3. Moreover, they allow for an interaction of the variables.

The use of multiple regression analyses was also justified. Opponents of single regression analyses have often argued that the business environment is very complex and therefore a single variable cannot explain a particular business behaviour. The major findings and conclusions of the analyses performed in chapter 4 are discussed next.

5.1. **CONCLUSIONS**

Two strands to the methodology supported the study. The first one searched for margin differences among the product categories while the second strand investigated causal relationships between four independent variables and the criterion variable markups.

Against this scenario, a summary of findings and a highlight of the major conclusions are presented below.

It is evidently clear from this empirical study that retail price margins vary widely among different product categories. Average percentage gross margins were very high among the pharmaceutical products (37.81%), followed by furniture (24.72%), laundry soap (22.83%), grocery products (20.70%) and textile (16.24%). The lowest average percentage gross margin was observed in the beverage group (12.07%). A wide variation in margins was also observed among product items within a product group. Within the grocery category, for example, margin variation was very wide as indicated by the highest standard deviation among the six product categories studied. These findings are on the overall consistent with the theoretical bases and expectations that firms will practice price discrimination to maximize profit. It is, therefore, concluded from this research evidence that retailers do practice price discrimination and that this practice is evident among product categories as well as items within a category.

On factors explaining margin variations, a summary of the findings and conclusions is presented below. With respect to the four explanatory variables, the analysis revealed a significant markup-unit cost relationship in five out of

the six (83%) product categories studied; significant markup-turnover rate relationship in two product categories (33%); significant markup-location relationship in one group (16.6%) and significant markup - population relationship in one group (16.6%) out of the six product categories studied. Although the results of the "causal" relationship analyses were not overwhelming, the hypothesized directions of the variables, except location, were supported. This implies that some higher-priced and high-turnover merchandise carry lower markups and conversely some low-priced and low-turnover merchandise carry higher markups. Also that some merchandise sold in retail outlets located in high-populated areas carry low markups and conversely, some merchandise sold in retail outlets located in low population areas carry high markups. However, with respect to the variable location, some merchandise sold in retail outlets located in and around the city centre(commercial centre) carry high markups and those sold in retail outlets located in the outskirts carry low markups. A probable explanation of these practices is that retailers will attempt to take advantage of differences in elasticities, and costs functions.

The empirical evidence further shows that in all the relationships, except one, the factors explain markup variations in the form better described by multiplicative

and reciprocal functions. It implies that in 83 percent of the sample data the variable changes are not linear.

On the basis of the above findings some conclusions on each variable can now be drawn. With respect to the influence of merchandise unit cost on retail margins (first rule of thumb) several conclusions emerge. First, the empirical evidence suggests that its role in explaining the pricing behaviour of retailers in Tanzania is indeed very dominant and significant. This finding was more discernible and consistent than those of past studies reviewed in the literature (e.g. Preston, 1963; Nelson and Preston, 1966; Dalrymple and Thompson, 1969; Reefs and Young, 1975; and Bode et al, 1986). Second, the theoretical and hypothesized direction that markups were inversely influenced by unit costs appear to be supported by the empirical evidence in 80 percent of the significant relationships. The main conclusion here is, therefore, that if costs of goods are high retail markups will be low and if costs of goods are low, retail markups will be high. This finding implies that higher markups on costly merchandise will make the retail prices to be prohibitively expensive.

Against this scenario, the dominant role of cost in explaining markup variations in a developing country such

as Tanzania, may be looked at in terms of the existing low purchasing power of the masses. Although a study on the influence of consumer spending on prices in Tanzania is beyond the scope of this study, it is possible that the variable may have an impact. Another probable explanation for the dominant role of cost in explaining retail margins may be the absence of other differential, competitive, advantages available to the retailer given the underdeveloped status of the retail sector. In both situations it is probable that a relatively most important marketing strategy is one based on cost. Therefore, the probability that price discrimination will be based on cost is very high.

As far as the influence of merchandise rate of stockturn on mark-ups (second rule of thumb) is concerned several conclusions are drawn. First, an inference from the empirical evidence suggests that the variable was less dominant in explaining retail margin variations in Tanzania. It was observed to influence margin variations in only 33 percent of the six product categories studied. This finding appears to contradict earlier studies. Second, the theoretical and hypothesized direction that the rate of stock-turn inversely influences markups is supported in one out of the two significant relationships.

The less dominant role of the rate of stock-turn in explaining margin variations in Tanzania can perhaps be better understood by comparing the nature of retail structure (supply side) and the consumers' purchasing power (demand side) of developed and less developed economies. In general competition in retailing is very intense in developed countries; the level of competition in developing countries such as Tanzania, is relatively low mainly because of the slow growth of economic activities in the latter countries.

On the demand side, it is obvious that in developed countries the retail sector operates among affluent communities where per capita incomes are far higher than those found in less developed countries such as Tanzania. The low purchasing power in developing countries leads to a decline in consumer spending (hence small market size) and, as discussed earlier may lead to pricing strategy based on cost. Ironically, this situation appears also to suggest, other things being equal, that the low per capita incomes (hence low consumer spending) have contributed to the slow growth of the retail sector in less developed countries. It is, therefore, not surprising that retail margin variations in developed countries will tend to be explained more in terms of the rate of stock-turn than cost. In these countries price becomes a less competitive

marketing weapon. Here, effective and competitive marketing strategies with turnover or market share objective may include, among others, credit sales, promotional sales, size of retail organisation, brand advertising; and so forth. The absence of these marketing strategies in Tanzania's retail sector appears to corroborate the above finding, thus leaving price (cost) to be the major differential advantage, at least at the time of writing.

With respect to the influence of location on margin variations only a few conclusions emerge from the current study. First, the variable was not dominant in explaining margin variations, since it was only significant with respect to the textile group. Second, the hypothesized direction was not supported, implying that margins were higher for merchandise sold in retail outlets located near and around the city (commercial) centre and lower for merchandise sold in retail outlets located far from the city centre. The initial assumption of the study was that since most of the supplies are obtained from wholesale points located around the city centre, as distances increase markups increase to cover the transport costs, among the other costs.

The most probable explanation for its less dominance is that most of the retail outlets in Dar es Salaam are small, usually family businesses, that operate with small inventories. This implies that store owners rarely use hired transport to ferry supplies. This argument is corroborated by the interview data which revealed that 93 percent of store owners interviewed used public transport because it was cheap, while 5 percent used carts and only 2 percent used hired transport. Even where the location variable was found to have a significant impact it could not be interpreted in a similar sense as above, but rather in a manner better described by consumer behaviour (preferences) governing an individual product.

Finally, several conclusions pertaining to the influence of population (as a proxy of market size) on mark-up differences can also be drawn. First, contrary to theoretical expectations, the factor was not dominant in explaining retail margin variations. It was found to have a significant impact in only one (grocery) out of the six product categories. Second, the theoretical and hypothesized direction that population was inversely related to mark-ups was supported. More specifically, markups appear to be higher for merchandise sold in retail outlets located in low populated areas and lower in high - populated areas. This finding appears to contradict Bode

et al's (1986) conclusion that percentage gross margins are in general higher for stores located in high population areas and lower in stores located in low population areas.

The basic assumption for investigating the variable was that, the higher the population the greater the potential market, and hence retailers will make higher profits from higher sales volume. Low mark-ups are, therefore, still consistent with the profit maximization objective.

The results showed that the factor was highly correlated with the other variables and had often to be eliminated from the investigation. All in all it was not a dominant factor. A more probable explanation here is that the city population is not static. More specifically, buyers are very mobile. It is recalled from the population census (1988) data that busy commercial centres like Kariakoo and Mchafukoge have a smaller population (residents) of 12,569 and 8,547, respectively, than that of 44,085 and 46,980 for Kawe and Ubungo wards. A study seeking population as an explanatory variable for retailers' pricing behavior may, therefore, be quite misleading, unless a different measurement criterion is used. This is because many of the people residing in the outskirts do their shopping at major commercial centres like Kariakoo and Mchafukoge (which form part of the City Centre).

With respect to the amount of margin variance explained by the joint interaction of the four independent variables discussed above, some conclusions can be drawn. The empirical evidence revealed that in 50 percent of (pharmaceutical, beverages and furniture) the total product categories studied a single rule relating unit cost to markup helped explain 44.8, ninty eight point nine and 17.9 percent of the variance in mark-ups, respectively. While in one group (textiles) a combination of the first two rules of thumb (cost and turnover rate) and the location variable helped explain over 99 percent of the total variation in markups. In two product groups, laundry soap and grocery, 98 and 87.7 percent of the margin variance, respectively, remained unaccounted for.

Such evidence on fairly large portion of unexplained variance is consistent with the findings of many of the earlier studies reviewed in the literature in chapter 2. The most relevant here is Preston's (1963) study which concluded that the three rules of thumb were significant only to a limited extent in the pricing of supermarket grocery items. Similar findings are also described by Reefs and Young (1975) and Bode et al (1986). It can, therefore, be concluded that while some of the rules fully explained margin variance in some products, they did not do so in others. These findings appear to suggest that the

importance and validity of the two rules of thumb are understated in some retail pricing behaviour in Tanzania. In fact, such findings would also appear to suggest that some economic theories are not supported in real life business practice.

It would mean, therefore, that a new set of factors to explain a micro behaviour should be investigated. As a guide to the identification of such factors, retailers' marketing strategies may depend on the prevailing business environment as well as the performance of the individual product. It is thus primarily concluded that pricing strategies and policies are not at any point universally optimal. A firm or retailer will seek to maximize profits by employing a pricing strategy that will suit existing market conditions and, to a large extent, product characteristics. It is basically the complexity and non-universality of the market conditions in the business environment that dictate the use of different marketing strategies. The nature of the product characteristics is discussed next.

Of further interest in this study is the differing portions of explained variance for the various product categories, and the different kinds of variables and variable combinations explaining margin variations. A better

evaluation can be done by comparing and contrasting the various product categories chosen for this study. The sample data included convenience, shopping and durable goods. The sample evidence has shown that the margin variance was particularly least accounted for in the laundry soap category. It was observed during the field work that retailers in this category operated in nearly perfect competitive market, implying that where customers obtained their items did not matter. Items could be obtained from any store at almost comparable prices. Therefore, location and cost did not account for any of the variations in the laundry soap margins. Turnover rate, was the only significant factor but then it could only explain 2 percent of the total margin variance. Given a nearly perfect competitive market structure, preferences and customer loyalty based on brands of laundry soap may be weak.

On the other hand, most of the textile products are shopping goods for which customers tend to take a long time comparing quality, prices, style/fashion, durability, material and suitability before a buying decision is made. A lot of the shopping activities may tend to be done where a concentration of retail outlets is found to allow for quality, fashion/style, durability and suitability comparison. A concentration of stores is normally found

around and near the city centre. It is in this respect that location may be found to have a very significant influence in such kind of products. It is thus not surprising, that for textile products, margins are higher in and around the city centre and lower in the outskirts. Fashion and design may be a probable explanation to this finding.

With respect to the beverage group for which almost all margin variation was explained, the markup-cost relationship may be looked at in terms of customers' purchasing power which may tend to dictate preferences based on affordable/non-affordable sizes. This is because the beverage group basically constitutes convenience goods. Small size hence low cost blended tea, for example, carry higher mark-ups than large packets which cost more.

Similar observations are noted for the grocery group. However, the preferences here appear to be shaped along affordable/non-affordable brands, with population also exerting some influence.

The discussion pertaining to the pharmaceutical group is also interesting. Indeed, the product is almost a necessity. Prices, however, appear to depend on affordable/non-affordable brand names. As earlier

discussed, the market for pharmaceutical products appears to be imperfect given the availability of free medical products from public hospitals.

With respect to the furniture category, a large portion of the margin variance remained unexplained. Quality and credit could, for example, be investigated in future research.

From the above discussion, it may be concluded that percentage gross margins are variously influenced by the four explanatory variables. While one rule explains a pricing behaviour in one product, it is not able to significantly do so in another. The findings are, therefore, both at variance and in conformity with the literature. A search for other factors to explain markup variations in products with different characteristics is necessary. The conclusions in this chapter should, however, be considered, preliminary.

5.2. IMPLICATIONS FOR PUBLIC POLICY AND MARKETING

5.2.1. Public Policy

On the basis of the above findings and conclusions, the following implications for public policy formulation and marketing emerge.

The findings of this study generally imply that price fixing by decree, at retail level, is highly questionable. In the Tanzanian price control system, margins are fixed at both wholesale and retail level. Margins of between 5 and 15 percent for wholesalers are set for fast moving items, and between 10 and 20 percent for slow moving products. In retailing such margins range between 10 and 20 percent for locally produced goods. It would appear, therefore, that the margins at both levels are set solely on the basis of the rate of stock-turn. Nevertheless, these rates apply only to price controlled products.[1]

Against this scenario, two major implications of the study are identified. First, for the few remaining price controlled items, there is need to review the margins. This recommendation is based on the findings that retail margins of non-controlled products were differently influenced by the four explanatory variables investigated; and more important, the role of cost in explaining margin variations

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[1] See for example footnote 10, page 24 on the number of controlled products.

was more dominant than the rest of the variables. Second, the whole question of having more or less rigid markups should be reviewed. This practice tends to ignore the differences in market conditions, product characteristics and the structure of retailing in the country. It is probably for the understatement of such factors that the Tanzanian price control system has never been a success story.

On the other hand, even if the control system was to take account of many of the above mentioned elements, its administration and policing, on a wider scale, would practically render it impossible; given the multiplicity of the products and complexity of the business environment. To the extent that this is true, price liberalization would be more favourable than price controls.

Price controls could, however, still be beneficial to the society in a few isolated cases. It is the fewness of the cases that makes the administration of it more simple than when the policy is applied on a wider scale. Such controls could, for example, apply to enterprises operating as monopolies.[2] It would then appear that the decree cannot

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[2] In the absence of competition (characterizing a monopoly market structure) there is always the fear that firms will reap exorbitant profits by charging higher margins.

apply to retailers because of the general absence of monopolies at this level.

Nevertheless, price controls can successfully be implemented by the firm itself and not by the government. The justification for this argument lies in the fact that it is the manufacturer who knows the market conditions facing own produced commodities. Furthermore, at firm level it is, relatively, easy to evaluate the characteristics and hence the performance of an individual product. In this connection, resale price maintenance systems and practices would appear to be consistent with the firm's marketing objectives. Less than that, wholesalers and retailers will charge margins to meet their own profits maximizing objectives. In a perfect competitive and oligopolistic market structures, particularly maintenance of resale prices may appear to be consistent with the firm's objectives; otherwise the firm may be priced out of the market.

Similarly, in situations where demand exceeds supply (e.g. beer supply in Tanzania at the moment), if the producer is not able to enforce resale prices, wholesalers and retailers will take advantage and charge higher mark-ups. The main danger of not controlling such a situation is the attraction of many uneconomic intermediaries, both legal

and illegal, in the so called distribution channel, in the sense that business activities increase without necessarily supporting or contributing to real economic growth.

A similar discussion on public policy implication of the study concerns the pricing policy of consumer cooperatives. As reported in Chapter 1, the Tanzanian's cooperative by-laws stipulate the use of 10 percent or uniform mark-up to be added on all products, regardless of the varying product characteristics. Practically and theoretically there appear to be no rationale in the practice. The disregard of the different market conditions and product characteristics by these retailers is a probable explanation for the generally poor performance of many such organisations in Tanzania. This has resulted into lesser and lesser economic and social gains to the owners(Rutashobya, 1991). It is recommended that some degree of price discrimination to take account of the different market conditions and product characteristics should be practised.

Finally, other important implications, not necessarily emanating from the major findings of the study but other issues raised in the study, are highlighted by focusing at the development of the retail sector in general. The major observation and concern here is the undeveloped nature of

the retail sector in Tanzania. As reported in Chapter 1, the retail sector in Tanzania is still dominated by the small retailer. It was also noted from the setting of this study described in the same chapter that the retail sector faced dramatic and frequent changes in the wake of changing government and Party policies. It is probable that these changes have led to the underdeveloped status of the retail business in Tanzania. It follows then that the development of the retail sector in the country will require conducive trade policy which may hopefully contribute to growth in economic activities. Within this framework, the participation of both private and public enterprises is needed. Furthermore, given the limited amount of capital owned by the citizens, foreign investment should be promoted.

The social and economic benefits of increasing economic activities are indisputable. Socially, employment opportunities will expand and eventually will lead to high per capita incomes hence high levels of consumer spending. It is the growth in consumer spending that may result in an enlarged market size and thus stimulating the development and growth of the retail sector, given a well-defined and conducive trade policy.

The trade liberalization policy of 1984 is a move towards the right direction. Its impact on the retail sector is already being noted. In this study, out of the total retail outlets which reported year of establishment 71 percent were set up between 1985 and 1988. This is a very significant growth given that retail business had been there even before independence in 1961.

5.2.2. **Marketing and Business**

The results of the present study also provide useful insights into marketing and business in general.

Two findings appear to be of interest here: First, that retail margins are variously influenced by the four variables studied. Second, that a fairly large portion of the variance in some products remained unexplained. This appears to imply that retailers should not use rigid rules or formulas. It is necessary to employ flexible pricing policy and practice to take account of the complex marketing environment. More specifically, different marketing/pricing strategies, namely; price differentiation or price discrimination according to market conditions and product characteristics are imperative.

Finally, although the findings of this study appear to suggest the dominant influence of cost on retail

margins/prices, a flexible mark-up is still recommended because the market conditions are not static. They tend to change with time.

5.3. THEORETICAL IMPLICATIONS

The findings of this study appear to support and on the other hand contradict the theoretical framework, and earlier studies conducted in economically advanced countries. The support is mainly observed with respect to the hypothesized directions of the research variables and the extent of unexplained margin variance. It was observed that the hypothesized direction of all the variables, except location, were supported. Furthermore, the findings, to some extent, appear to be consistent with those of previous studies undertaken in Developed Countries in terms of the presence of unexplained variance. Given that a fairly large portion of the margin variance in some product groups remained unexplained, the theory appears not to be supported in some Tanzanian's retail pricing behaviour.

On the other hand, the findings appear to differ from those of earlier studies because the intensities of the variables hypothesized to explain retail margin variations were different from those observed in advanced countries. More specifically, the relative importance of the factors appeared to vary in different countries. Whereas cost played a dominant role in explaining margin variations in Tanzania, merchandise rate of stock-turn had the most influence in advanced countries. This implies that at no point in time or place are retailers' pricing policies universally optimal.

Further, the theoretical findings of this study appear to be strengthened by the methods of analysis used. The various mathematical transformations (multiplicative and reciprocals) undertaken to take account of different relationships and ways the variables changed was able to expand the scope of the causal relationships. It is understood that these methods are more capable of explaining a complex socio-economic phenomenon than the commonly used linear models. This argument is affirmed by the high R^2 scores in some product categories. It is noted that not a single earlier study (reviewed in chapter 2) had been able to attain an R^2 of 100 percent, for example. The findings of this study have further shown that the strongest relationships in each product group were better explained by the multiplicative or reciprocal functional forms (in 5 out of 6 product groups). This implies that the variable changes are not linear.

Despite the capability, strength and importance of such functional forms, they have not been widely used in earlier retail margin variation studies. It follows then that future studies which do not to take into consideration such models may present misleading results and thus understate the intensities of the various "causal" relationships.

5.4. DIRECTIONS FOR FUTURE RESEARCH

The present study investigated cross-sectional margin differences, focusing on factors explaining such variations. It was noted that, despite its limitations, cross sectional design was the only feasible alternative at the time of the research. The results presented in Chapters 4, therefore, show the pricing behaviour of retailers at a particular point in time. Given the current changes taking place in the retail sector and an expected enabling business environment in the near future in Tanzania, a similar research should be directed at investigating margin variation over a period of time. It could, for example, be hypothesized that margins differ significantly from one period to another for the different product categories. Or that margins differ widely among different product categories over a specified period of time. The main advantage of this type of research is its ability to provide a trend over a given period of time. Such research is definitely needed given the dynamic nature of retailing.

The investigation in the study incorporated only four independent variables. A disregard of other variables led to a large portion of margin variance in some product categories being unexplained. Future research should identify more factors and find out whether by doing so the

unexplained variance decreases. Such factors could include, for example, brand names, credit, quality and whether the product is locally manufactured or imported. In this study some of these factors were taken for granted.

Furthermore, the survey technique used in this study did not capture the differences between small and big retailers, supermarket and other retail organisations, public and private, and Dar es Salaam retailers and others in the rest of the country. Future research should be directed at evaluating such differences. Such studies may broaden the number of explanatory variables.

Finally, the causal relationships may sometimes be insignificant not because the explanatory variables have no influence on the criterion variable, but because of the presence of unequal cell sizes. In this study the degrees of freedom differed among and within product groups. This phenomenon was unavoidable because it reflected the replicability of observations in the retail outlets surveyed. To the extent that the impact of the current trade liberalization policy is yet to be felt to its fullest magnitude, such a procedure was methologically consistent. Future research should consider this factor and work with uniform cell sizes. The above mentioned

directions for future research are needed before definite implications in business are made.

Concluding Remarks

Economic advancement in Tanzania depends, to a large extent, on logistical development, partly constituted by wholesale and retail trade. This study aimed at making a contribution towards a better understanding of retailers' business behaviour, focusing on factors that determine their pricing policy.

It is hoped that in this way this sector which has often been affected by conflicting and inconsistent policies will be better understood and stimulated to grow. This will ensure that the most needed link between industries and imports, and the final consumer is provided. It is this social contribution of retailing which makes the sector particularly important. It gives a natural incentive to the living masses by providing goods at the right time, right place, right quantity and right price. Such convenience helps to stimulate hard work on the part of the citizens and eventually bringing about overall economic growth in the country, other things being equal.

The author's hope is that this work will stimulate future research on retailing in Tanzania.

APPENDICES

Appendix 1-1

In political science, socialization has been equated to nationalization, where nationalization denotes the action of vesting the ownership and/or control of property, such as land and industries, in the nation. That means the ownership and control of such property or rather the means of production are vested in the hands of the people. In this sense, therefore the word nationalization is one of a group of cognate terms that include socialization, public ownership, state ownership, common ownership and social ownership, all of which are employed to designate one of the principal objects of modern socialist parties (A dictionary of Social Sciences definition, 1964). It is in this sense that the term socialization is commonly used in Tanzania and therefore in the present study.

APPENDIX 1-2

Population Density and Household Size by Region 1967, 1978 and 1988

Region	Land area (Sq. Kms)	Density [1] 1967	1978	1988	H'hold Number 1988	H'hold Average Size (Persons) 1967	1978	1988
Dodoma	41,311	17	24	30	244,684	4.4	4.7	5.0
Arusha	82,306	7	11	16	249,436	4.8	5.3	5.4
Kilimanjaro	13,309	49	68	83	205,302	5.0	5.3	5.4
Tanga	26,808	29	39	48	249,147	3.8	4.7	5.1
Morogoro	70,799	10	13	17	227,705	4.2	4.7	5.3
Coast	32,407	13	16	20	128,218	..	4.3	4.9
Dar es Salaam	1,393	256	605	977	314,304	..	4.1	4.3
Lindi	66,046	6	8	10	138,070	3.7	4.4	4.6
Mtwara	16,707	37	46	53	198,726	3.8	4.3	4.4
Ruvuma	63,498	6	9	12	146,874	4.0	5.2	5.3
Iringa	56,864	12	16	21	248,479	4.5	4.5	4.8
Mbeya	60,350	12	18	25	297,636	4.8	5.0	4.9
Singida	49,341	9	12	16	148,937	4.1	4.6	5.3
Tabora	76,151	7	11	14	180,129	4.5	5.0	5.7
Rukwa	68,635	4	7	10	130,759	4.7	5.1	5.3
Kigoma	37,037	13	18	23	146,961	4.5	5.5	5.8
Shinyanga	50,781	18	26	35	279,690	5.7	5.8	6.3
Kagera	28,388	23	36	47	269,626	3.9	4.5	4.9
Mwanza	19,592	54	74	96	292,962	5.7	6.0	6.4
Mara	19,566	28	37	50	143,246	6.0	6.2	6.7
Mainland	881,289	14	19	26	4,240,891	4.5	4.9	5.3
Kaskazini-Unguja	470	124	169	206	23,347	3.2	3.9	4.1
Kusini-Unguja	854	47	62	82	15,284	3.1	4.1	4.5
Mjini-Magharibi	230	428	640	906	42,142	3.7	4.2	4.9
Kaskazini-Pemba	574	157	232	239	29,324	3.5	4.4	4.6
Kusini-Pemba	332	226	242	385	26,300	3.5	4.5	4.8
Zanzibar	2,460	149	201	260	136,397	3.5	4.2	4.7
Tanzania	883,749	14	20	26	4,377,288	4.4	4.9	5.2

[1] Inhabitants/Sq.Km., according to the relevant area the particular year.

Source: Adopted from table 2 of 1988 Census Results Preliminary Report - Page 25

CENSUS POPULATION AND INTERCENSAL GROWTH RATES BY REGION.
gions arranged by census classification

Region	Population (Number)					Annual Average Intercensal Growth Rate	
	Census 1967	Census 1978	Projections 1978-88	Census 1988	Deviation[1]	1967-78	1978-88
Dodoma	709,380	972,005	1,274,000	1,237,819	-36,181	2.9	2.4
Arusha	610,474	926,223	1,321,000	1,351,675	+30,675	3.8	3.8
Kilimanjaro	652,722	902,437	1,193,000	1,108,699	-84,301	2.9	2.1
Tanga	771,060	1,037,767	1,340,000	1,283,636	-56,364	2.7	2.1
Morogoro	682,700	939,264	1,237,000	1,222,737	-14,263	2.9	2.6
Coast	428,041	516,586	611,000	638,015	+27,015	1.7	2.1
Dar es Salaam	356,286	843,090	1,723,000	1,360,850	-362,150	7.8	4.8
Lindi	419,853	527,624	645,000	646,550	+1,550	2.1	2.0
Mtwara	621,293	771,818	934,000	889,494	-44,506	2.0	1.4
Ruvuma	395,447	561,575	758,000	783,327	+25,327	3.2	3.4
Iringa	689,905	925,044	1,193,000	1,208,914	+15,914	2.7	2.7
Mbeya	753,765	1,079,864	1,469,000	1,476,199	+7,199	3.3	3.1
Singida	457,938	613,949	791,000	791,814	+814	2.7	2.5
Tabora	502,068	817,907	1,236,000	1,036,293	-199,707	4.4	2.4
Rukwa	276,091	451,697	684,000	694,974	+10,974	4.5	4.3
Kigoma	473,443	648,941	851,000	854,817	+3,817	2.9	2.8
Shinyanga	899,468	1,323,535	1,839,000	1,772,549	-66,451	3.5	2.9
Kagera	658,712	1,009,767	1,451,000	1,326,183	-124,817	3.9	2.7
Mwanza	1,055,883	1,443,379	1,889,000	1,878,271	-10,729	2.8	2.6
Mara	544,125	723,827	932,000	970,942	+38,942	2.6	2.9
Mainland	11,958,654	17,036,499	23,371,000	22,533,758	-837,242	3.2	2.8
Kaskazini-Unguja	56,360	77,017	..	97,028	..	2.3	2.3
Kusini-Unguja	39,087	51,749	..	70,184	..	3.1	3.1
Mjini-Magharibi	95,047	142,041	..	208,327	..	3.7	3.8
Kaskazini-Pemba	72,015	106,290	..	137,399	..	3.6	2.6
Kusini-Pemba	92,306	99,014	..	127,640	..	0.6	2.6
Zanzibar	354,815	476,111	625,000	640,578	+15,578	2.7	3.0
Tanzania	12,313,469	17,512,610	23,996,000	23,174,336	-821,664	3.2	2.8

[1] Actual population according to the 1988 census, compared to the population projections

Source: Adopted from table 1 of 1988 Census Results Preliminary Report - Page 21

Appendix 1-4

The National Price Commission was formed in 1973 to perform the following functions as spelt out in the Act.

(i) to determine reasonable price structure on a national basis and provide for their orderly variation when necessary;

(ii) to ensure that prices of goods and services in Tanzania Mainland are compatible with and conform to the principles of socialism and the political, economic and social aspirations of the people of he United Republic;

(iii) to perform such other functions as are conferred on it by this Act or as the President may from time to time confer it (see the Regulation of Prices Act, An Act to Repeal and Replace the Price Control Ordinance No. 19, p. 284).

Appendix 2-1

To illustrate the concept, price elasticity is usually negative and is given in two forms:

(i) Arc elasticity which measures the responsiveness of sales quantity to price changes between two points.

$$\text{i.e. } \epsilon = \frac{\frac{Q_1 - Q_2}{Q_1 + Q_2}}{2} \Big/ \frac{\frac{P_1 - P_2}{P_1 + P_2}}{2}$$

(ii) Point elasticity which measures the responsiveness of sales quantity to price changes at a given point on the demand curve.

$$\text{i.e. } \epsilon \quad \frac{dQ}{dP} \Big/ \frac{P}{Q}$$

Enterpreting the index, when $\epsilon > 1$ demand for the product is said to be elastic and sensitive to price changes. When $\epsilon < 1$, demand is inelastic and insensitive to price changes and when $e = 1$, demand is unitary.

Appendix 3-1

QUESTIONNAIRES

Product Type: (e.g. Mbuni)

Product Group: (e.g. Bar Soap)

Instructions to Interviewers

Fill in the blanks or tick as required.

Questions 1 - 9 require mainly profile data of a single retail outlet. Therefore, one questionnaire form is designed for each retail outlet.

Because questions 10 - 21 elicit information on a single product type, a special form (attached) has been designed. In this special form you are required to list all the relevant product types sighted in a single shop and answer questions 10 - 21 accordingly. Make sure each questionnaire contains the special form.

Before starting the interview, you are required to greet the interviewee, introduce yourself, and give a brief explanation on the work you are undertaking.

Begin:

Good morning/afternoon

I am ..... from.....

I am carrying out a study which aims at examining problems and factors that influence retail prices in Dar-es-Salaam. It is hoped that the findings of the study will enhance greater understanding of the retail business.

I wish to emphasize that the research is purely academic and in no circumstances should it be viewed otherwise. All information given and views expressed shall be treated with maximum confidence. I would, therefore extremely appreciate your kind response.

1. Name of Retail Outlet: .....
2. Location (Ward) .....
3. Estimated distance from City Centre: (kilometres) .....
4. Year of Establishment: .....
5. Number of employees: .....

6. Annual operating expenses:
   (a) Rent: ..... TShs
   (b) Salaries: ..... TShs
   (c) Taxes: ..... TShs
   (d) Other: ..... TShs

7. Kind of business:

(a) Restaurant, kiosks, canteen, soft drinks ( )

(b) Textile and food ( )

(c) Food and miscellaneous items ( )

(d) Timber and Furniture ( )

(e) Hardware, building material and electrical goods ( )

(f) Printing and Binding ( )

(g) Stationery ( )

(h) Pharmacy ( )

(i) Textile, tailoring and miscellaneous items ( )

(j) Fish, vegetables and fruits ( )

8. Type of Retailer

(a) General store ( )

(b) Specialty store (e.g. furniture only, textile only) ( )

(c) Supermarket ( )

(d) Flea Market stalls ( )

9. Kind of retailer by ownership:

(a) Private ( )

(b) Cooperative ( )

(c) Parastatal ( )

SOURCE OF SUPPLY

10. Where do you buy commodity X? (mention the product)

From (a) Another retailer ( ) (mention the place)

(b) Wholesaler ( ) "

(c) Manufacturer ( ) (mention the place and name of the manufacturer)

BUYING PRICE

11. What is the buying price (commodity X) per

(a) crate ( )

(b) carton ( )

(c) individual item ( )

(d) other measure ( )

12. If it is a carton, how many items are there in a carton/bale? ( )

TURNOVER

13. Each time you buy commodity X, how many

(a) crates ( )

(b) cartons ( )

(c) dozens ( )

do you buy on the average?

14. How long does it take to sell the above quantity on the average?

(a) ..... days

(b) ..... weeks OR

(c) ..... months

15. Is there any period during the month or year when you experience

	Period
(a) increased sales	.....
(b) reduced sales	.....

16. How do you get your new stock?

(a) the supplier/manufacturer brings ( )

(b) I go for it myself ( )

TRANSPORTATION COST

17. If (b) what is the cost per trip? T.Shs.....

RE-ORDER POINT

18. If it is the supplier/manufacturer who brings the stock, do you place and order?

Yes ( ) No ( )

19. If Yes, when do you place an order?

(a) When the old stock is finished ( )

(b) When I have .... crates, cartons items or dozens remaing ( )

(c) When I have the money ( )

(d) Other (underline the relevant). ( )

SELLING

20. What is the unit selling price for commodity X?

T.Shs.....

21. What factors do you consider in pricing your product?

Questions

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

Appendix 3-2

Population Figures for Temeke district

Ward/Branch			Population			Household	
Code	Name	Type	Total	Male	Female	Number	Average Size
013	Kigamboni	Mixed	26,078	13,786	12,292	6,197	4.2
021	Vijibweni	Rural	2,557	1,314	1,314	520	4.9
031	Kibaha	Rural	3,003	1,442	1,442	752	3.9
041	Kisarawe II	Rural	2,821	1,494	1,494	697	4.0
051	Somangira	Rural	6,730	3,443	2,287	1,596	4.2
061	Kimbiji	Rural	6,465	3,192	3,273	1,457	4.4
073	Mbagala	Mixed	40,866	21,009	19,857	9,539	4.2
081	Chamazi	Rural	5,452	2,602	2,850	1,261	4.3
091	Yombo Vituka	Rural	13,408	7,012	6,396	2,876	4.6
103	Charambe	Mixed	18,624	9,290	9,334	3,974	4.6
111	Toangoma	Rural	6,652	3,292	3,360	1,553	4.2
122	Miburani	Urban	72,892	38,403	34,489	16,793	4.3
132	Temeke 14	Urban	91,144	47,754	43,390	22,271	4.0
142	Mtoni	Urban	39,417	20,562	18,855	9,745	4.0
152	Keko	Urban	42,868	23,261	19,607	10,493	4.0
162	Kurasini	Urban	26,776	14,510	12,266	5,781	4.6
District Total			405,753	212,366	193,387	95,505	4.2
Region Total			1,360,850	715,925	644,925	314,304	4.3

Source: Adopted from Table 3 of 1988 Census Results Preliminary Report p.79.

Appendix 3-3

Population Figures for Ilala district

Ward/Branch			Population			Household	
Code	Name	Type	Total	Male	Female	Number	Average Size
013	Ukonga	Mixed	45,203	24,707	20,496	10,127	4.4
021	Pugu	Rural	6,226	3,427	2,799	1,178	5.2
031	Msongola	Rural	13,351	6,607	6,744	3,058	4.3
042	Tabata	Urban	18,465	9,721	8,744	3,780	4.8
051	Kinyerezi	Rural	3,048	1,556	1,492	730	4.1
062	Ilala	Urban	35,048	17,787	17,261	8,241	4.2
072	Mchikichini	Urban	15,040	7,835	7,205	3,372	4.4
082	Vingunguti	Urban	33,690	17,643	16,047	8,731	3.8
092	Kipawa	Urban	36,910	19,589	17,321	9,282	3.9
102	Buguruni	Urban	48,247	25,514	22,733	13,198	3.6
112	Kariakoo	Urban	12,569	6,668	5,901	2,499	5.0
122	Jangwani	Urban	15,320	8,219	7,101	2,908	5.2
132	Gerezani	Urban	7,487	3,730	3,757	1,557	4.8
142	Kisutu	Urban	8,358	4,328	4,030	1,699	4.9
152	Mchafukoge	Urban	8,547	4,463	4,084	1,604	5.3
162	Upanga East	Urban	9,807	5,107	4,700	752	3.0
172	Upanga West	Urban	11,020	5,354	5,666	1,633	6.7
182	Kivukoni	Urgan	5,372	2,887	2,485	781	6.8
District Total			333,708	175,142	158,566	75,130	4.4

Source: Adopted from Table 3 of 1988 Census Results Preliminary Report p.79

Appendix 3-4

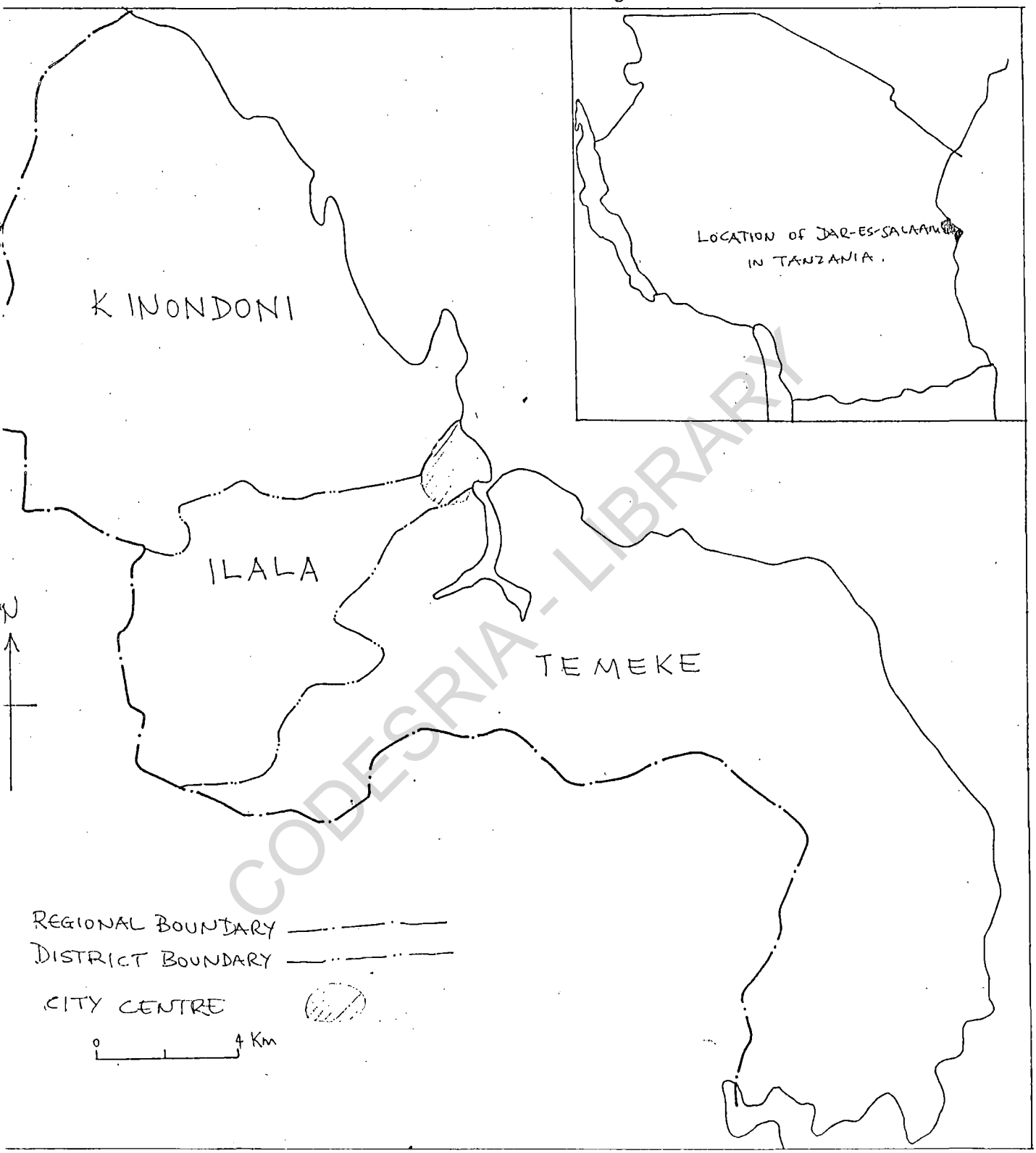
Population Figures for Kinondoni District

Ward/Branch			Population			Household	
Code	Name	Type	Total	Male	Female	Number	Average Size
012	Magomeni	Urban	16,944	9,087	7,857	4,361	3.8
022	Makurumla	Urban	53,991	28,493	25,498	12,987	4.1
032	Ndungumbi	Urban	32,736	17,341	15,395	7,933	4.1
042	Tandale	Urban	58,413	30,738	27,675	13,380	4.3
052	Mwananyamala	Urban	72,508	37,611	34,897	16,943	4.2
062	Msasani	Urban	51,293	27,164	24,129	10,839	4.7
072	Kinondoni	Urban	42,387	22,088	20,299	9,526	4.4
082	Mzimuni	Urban	23,985	12,606	11,379	5,807	4.1
092	Kigogo	Urban	21,222	11,530	9,692	4,693	4.5
102	Mabibo	Urban	45,963	24,389	21,574	10,761	4.2
112	Manzese	Urban	54,499	28,639	25,860	12,834	4.2
122	Ubungo	Urban	46,980	25,030	21,950	9,521	4.9
131	Kibamba	Rural	16,751	8,823	7,928	3,875	4.3
141	Goba	Rural	4,753	2,479	2,247	1,186	4.0
152	Kawe	Urban	44,085	23,398	20,687	10,527	4.1
161	Kunduchi	Rural	22,743	12,632	10,111	5,452	4.1
171	Mbweni	Rural	2,159	1,217	942	551	3.9
181	Bunju	Rural	9,977	5,152	4,825	2,493	4.0
District Total			621,389	328,417	292,972	143,667	4.3

Source: Adopted from Table 3 of 1988 Census Results Preliminary Report p.81.

APPENDIX 3-5

MAP: Dar es Salaam Region



Appendix 4-1

Mark-up, Cost and Turnover Mean Scores for Six Product Categories

	No. of Observations	Mark-up	Buying Price	Turn-over Rate (%)
Textile	355	16.24	1027.99	16.82
Pharmaceutical	216	37.81	36.10	14.57
Beverages	863	12.07	51.75	17.81
Groceries	695	20.70	106.33	45.11
Laundry Soap	289	22.83	104.55	44.60
Furniture	597	24.72	6339.08	20.44

Appendix 4-2

Mark-up, Cost and Turnover Mean Scores for Textiles

	Mark-up	Buying Price	Turn-nover
Kanga - China	14.56	1005.21	18.08
Kanga - Kenya	8.38	1416.22	17.73
Kanga - Pakistan	17.28	777.78	13.44
Kanga - India	14.39	916.67	24.82
Kanga - Indonesia	16.57	757.14	12.57
Kitenge - India	13.92	956.76	17.88
Kanga - Urafiki	13.64	837.27	16.25
Kitenge - Urafiki	19.88	1013.64	10.64
Kanga - Sungura	18.25	733.75	19.44
Kitenge - Sungura	12.56	1038.89	21.21
Kitenge - Malawi	13.00	1703.13	15.11
Kitenge - India	17.25	875.00	24.00
Kanga - Morogoro	15.89	931.58	16.07
Kitenge - Pakistan	14.74	844.44	15.78
Kitenge - Japan	14.00	762.50	14.00
Kitenge - Indonesia	16.07	1420.00	10.4
Kitenge - Zaire	12.4	2743.33	14.39
Napkins Imported	29.67	265.09	10.93
Napkins Local	34.11	122.56	11.03

Appendix 4-3

Mark-up, Cost and Turnover Mean Scores for Pharmaceuticals

PHARMACEUTICALS	Mark-up	Buying Price	Turnover
Chloroquine Tablets	40.33	1.34	15.68
Chloroquine Syrup	27.12	75.08	12.53
Panadol Tablets	48.67	1.53	15.18
Koflyln Syrup	31.47	72.50	11.89
Salimia Liniment Sloans	22.96	133.65	10.92
Asprin Tablets	48.84	0.69	15.56
Magnesium Tricillicate Tables	42.87	2.21	18.70

Appendix 4-4

Mark-up, Cost and Turnover Mean Scores for Beverages

	Mark-up	Buying Price	Turn-Over
Kilimanjaro Tea	8.38	58.65	15.16
Green Label 50 Gr	4.12	11.73	22.91
Top Cup Coffee 250 Gr	9.12	75.25	12.70
Green Label 100 Gr	8.99	23.86	20.31
Green Label 500 Gr	7.04	117.37	16.58
Sifting Tea 50 Gr	7.13	9.42	23.09
Instant Coffee 250 Gr	8.16	255.43	13.25
Instant Coffee 100 Gr	17.26	95.998	10.996
Top Cup Coffee 50 Gr	17.77	15.63	13.80
African Pride Tea	10.77	130.58	11.69
Green Label 250 Gr	9.16	59.21	14.96
Sifting Tea 100	14.53	18.47	18.02
Sifting Tea 150 Gr	16.43	19.65	9.58

Appendix 4-5

Markup, Cost and Turnover Mean Scores for Groceries

	Mark-up	Buying Price	Turn-over
Life Pineapple Jam	11.28	137.67	40.94
Tanzfoods Macaroni (Spaghetti)	19.70	86.04	53.14
Tomato Sauce (Tangold)	18.09	103.55	70.42
Maria Biscuits	24.18	34.55	39.67
Baked Beans in Tomato Sauce	22.50	67.20	44.09
Nice Biscuits	27.38	68.18	42.70
Mixed Fruit Jam	32.19	100.00	35.27
Tomato Juice	8.82	76.46	43.82
Orange Juice	56.24	48.42	44.14
Jersey Creams	15.96	82.98	40.89
Betta Pineapple Juice	27.75	240.69	33.02
Tanzfoods Vermicell Tambi	24.63	62.50	57.07
Club Master	9.80	135.64	37.40
Mango Juice	10.81	78.62	38.76
Leenox Corned Beef	10.36	273.90	27.72
Sunvita Orange Squash	2.32	135.85	31.87
Sunvita Black Current	145	179.69	24.85
Tomato Sauce (Dabaga)	10.53	144.88	86.84
Tomato Paste (Tangold)	26.12	120.83	64.12

Appendix 4-6

Mark-up, Cost and Turnover Mean Scores for Laundry Soap

	Mark-up	Buying Price	Turn-Over
Mbuni	24.25	104.09	43.86
Kisura	25.65	102.23	37.28
Hisoap	19.58	63.71	27.77
Fair Soap 200GR	14.35	41.77	9.43
Perfect Soap	18.66	128.29	26.56
Punda	24.31	70.55	29.60
Rani Bar	26.71	101.71	40.75

Appendix 4-7

Markup, Cost and Turnover Mean Scores for Furniture

	Mark-up	Buying Price	Turn-over
Sofa Set (Small)	22.14	10256.71	21.63
Sofa Set (Large)	19.78	19280.65	13.15
Beds-Single (3.5"x6")	26.53	4358.44	32.13
Beds-Single (4" x 6")	24.81	5515.48	26.12
Beds 5" x 6"	25.40	5078.85	15.54
Beds Double 6" x 6"	23.52	9738.46	12.33
Dining Chairs-Wooden Top	24.82	1265.10	26.00
Dining Chairs-Sponge Top	22.82	1792.80	25.28
Dining Table (small size)	26.15	5821.84	45.95
Dining Table (Large size)	23.54	1682.33	18.87
Book shelf (Local)	28.00	3673.10	13.75
Shelf (Household Item	25.49	7809.26	16.87

Appendix 4-8
Multiple Regression Results for Textiles

The regression equation is
MARKUP = 2,7-0.00738 BUYING-0.0601 TOVER - 0.0908 LOCATION - 0.000038 POP

Predictor	Coef	Stdev	t-ratio	P
Constant	27.191	1.534	17.72	0.000
BUYING	-0.0073842	0.0008582	-8.60	0.000
TOVER	-0.06008	0.02325	-2.58	0.010
LOCATION	-0.09077	0.06955	-1.31	0.193
POPU	-0.00003753	0.00001783	-2.11	0.036

s = 9.089 R-sq = 19.7% R-sq(adj) = 18.8%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	4	7147.9	1787.0	21.63	0.000
Error	353	29163.4	82.6		
Total	357	36311.4			

SOURCE	DF	SEQ SS
BUYING	1	6067.6
TOVER	1	575.0
LOCATION	1	139.2
POPU	1	366.1

The regression equation is
MARKUP = 24.5 - 0.00734 BUYING - 0.0613 TOVER

Predictor	Coef	Stdev	t-ratio	P
Constant	24.537	1.079	22.73	0.000
BUYING	-0.0073358	0.0008583	-8.55	0.000
TOVER	-0.06130	0.02337	-2.62	0.009

s = 9.142 R-sq = 18.3% R-sq(adj) = 17.8%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	2	6642.6	3321.3	39.74	0.000
Error	355	29668.7	83.6		
Total	357	36311.4			

SOURCE	DF	SEQ SS
BUYING	1	6067.6
TOVER	1	575.0

* RECI-PO is highly correlated with other X variables
* RECI-PO has been removed from the equation

The regression equation is
MARKUP = 10.2 + 1942 RECI-BUY + 27.8 RECI-TO + 8.63 LOCATION

Predictor	Coef	Stdev	t-ratio	P
Constant	10.1667	0.0054	1877.73	0.000
RECI-BUY	1941.60	1.05	1852.28	0.000
RECI-TO	27.8392	0.0541	514.52	0.000
LOCATION	8.63344	0.00256	3374.42	0.000

s = 0.04848 R-sq = 100% R-sq(adj) = 100.0%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	3	36311	12104	5.149E+06	0.000
Error	354	1	0		
Total	357	36311			

SOURCE	DF	SEQ SS
RECI-BUY	1	8925
RECI-TO	1	620
LOCATION	1	26765

The regression equation is
MARKUP = 10.2 + 1927 RECI-BUY + 27.8 RECI-TO

Predictor	Coef	Stdev	t-ratio	P
Constant	10.1871	0.9697	10.51	0.000
RECI-BUY	1927.3	187.7	10.27	0.000
RECI-TO	27.788	9.691	2.87	0.004

s = 8.683 R-sq = 26.3% R-sq(adj) = 25.9%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	2	9545.2	4772.6	63.30	0.000
Error	355	26766.1	75.4		
Total	357	36311.4			

SOURCE	DF	SEQ SS
RECI-BUY	1	8925.3
RECI-TO	1	620.0

Appendix 4-9

Multiple Regression Results for Phamaceutical

The regression equation is
Markup = 48.1 - 0.226 buying + 0.0545 tover - 0.058 CODE-LO -
0.000270 CODE-PO

Predictor	Coef	Stdev	t-ratio	P
Constant	48.091	2.138	22.49	0.000
buying	-0.22601	0.01884	-11.99	0.000
tover	0.05447	0.09480	0.57	0.566
CODE-LO	-0.0582	0.1627	-0.36	0.721
CODE-PO	-0.0002699	0.0001553	-1.74	0.084

s = 11.87 R-sq = 43.7% R-sq(adj) = 42.7%
Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	4	22977.5	5744.4	40.80	0.000
Error	210	29567.8	140.8		
Total	214	52545.3			

SOURCE	DF	SEQ SS
buying	1	22519.8
tover	1	28.3
CODE-LO	1	3.9
CODE-PO	1	425.6

Regression equation is
markup = 44.4 - 0.227 buying + 0.0495 tover - 0.037 location
+ 0.000087 popu

Predictor	Coef	Stdev	t-ratio	P
Constant	44.412	2.314	19.19	0.000
buying	-0.22693	0.01884	-12.04	0.000
tover	0.04955	0.09448	0.52	0.601
location	-0.0373	0.2111	-0.18	0.860
popu	0.00008731	0.00005996	1.46	0.147

s = 11.86 R-sq = 43.8% R-sq(adj) = 42.7%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	4	23016.8	5754.2	40.92	0.000
Error	210	29528.5	140.6		
Total	214	52545.3			

SOURCE	DF	SEQ SS
buying	1	22519.8
tover	1	28.3
location	1	170.6
popu	1	298.2

The regression equation is
markup = 32.4+17.7 RECI-BUY-18.0 RECI-LO-0.009 CODE-LO-
0.000182 CODE-PO

Predictor	Coef	Stdev	t-ratio	P
Constant	32.442	2.113	15.35	0.000
RECI-BUY	17.735	1.503	11.80	0.000
RECI-LO	-18.01	14.82	-1.22	0.226
CODE-LO	-0.0086	0.1669	-0.05	0.959
CODE-PO	-0.0001815	0.0001594	-1.14	0.256

s = 12.18 R-sq = 40.7% R-sq(adj) = 39.6%

Analysis Variance

SOURCE	DF	SS	MS	F	P
Regression	4	21397.5	5349.4	36.07	0.000
Error	210	31147.9	148.3		
Total	214	52545.3			

SOURCE	DF	SEQ SS
RECI-BUY	1	20989.7
RECI-LO	1	201.7
CODE-LO	1	13.7
CODE-PO	1	192.4

The regression equation is
markup = 31.3 + 17.8 RECI-BUY - 17.3 RECI-LO

Predictor	Coef	Stdev	t-ratio	P
Constant	31.331	1.781	17.59	0.000
RECI-BUY	17.842	1.498	11.91	0.000
RECI-LO	-17.26	14.78	-1.17	0.244

s = 12.16 R-sq = 40.3% R-sq(adj) = 39.8%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	2	21191	10596	71.64	0.000
Error	212	31354	148		
Total	214	52545			

SOURCE	DF	SEQ SS
RECI-BUY	1	20990
RECI-LO	1	202

The regression equation
LOG-MARK = 3.81 - 0.137 LOG-BUY + 0.0167 LOG-TO

Predictor	Coef	Stdev	t-ratio	P
Constant	3.8054	0.1078	35.30	0.000
LOG-BUY	-0.13683	0.01057	-12.94	0.000
LOG-TO	0.01671	0.03936	0.42	0.672

s = 0.3195 R-sq = 45.3% R-sq(adj) = 44.8%
Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	2	17.9472	8.9736	87.91	0.000
Error	212	21.6411	0.1021		
Total	214	39.5883			

SOURCE	DF	SEQ SS
LOG-BUY	1	17.9288
LOG-TO	1	0.0184

MTB>
The regression equation is
markup = 46.7 - 0.227 buying + 0.0423 tover

Predictor	Coef	Stdev	t-ratio	P
Constant	46.726	1.902	24.57	0.000
buying	-0.22709	0.01887	-12.04	0.000
tover	0.04229	0.09461	0.45	0.655

s = 11.90 R-sq = 42.9% R-sq(adj) = 42.4%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	2	22548	11274	79.68	0.000
Error	212	29997	141		
Total	214	52545			

SOURCE	DF	SEQ SS
buying	1	22520
tover	1	28

Appendix 4-10

Multiple Regression Results for Beverages

The regression equation is
LOG(C6) = 4.64 0.259 LOG(C1) 0.0416 LOG (C2) - 0.132 LOG(C5)

Predictor	Coef	Stdev	t-ratio	P
Constant	4.6449	0.3915	11.86	0.000
LOG(C1)	0.25907	0.02818	-9.19	0.000
LOG(C2)	0.04164	0.03576	1.16	0.245
LOG(C5)	0.13248	0.03491	-3.80	0.000

s = 0.7956 R-sq = 12.0% R-sq(adj) = 11.6%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	3	60.333	20.111	31.77	0.000
Error	699	442.420	0.633		
Total	702	502.753			

SOURCE	DF	SEQ SS
LOG(C1)	1	50.224
LOG(C2)	1	0.992
LOG(C5)	1	9.117

The regression equation is
MARKUP = 303 + 6461 RECI(81) + 1436 RECI(C2) - 19.0 DISTANCE
+ 9547 RCI(C5)

Predictor	Coef	Stdev	t-ratio	P
Constant	302.6	330.0	-1.16	0.248
RECI(C1)	6461	3752	1.72	0.086
RECI(C2)	1436	1476	0.97	0.331
DISTANCE	19.00	16.94	-1.12	0.262
RECI(C5)	9547	39079	0.24	0.811

s = 3298 R-sq = 0.6% R-sq(adj) = 0.1%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	4	49082460	12270615	1.13	0.342
Error	698	7591794176	10876496		
Total	702	7640876544			

SOURCE	DF	SEQ SS
RECI(C1)	1	24773622
RECI(C2)	1	10260854
DISTANCE	1	13424573
RECI(C5)	1	623411

The regression equation is
MARKUP = 259 - 4.13 B-PRICE - 0.782 T-OVER - 1.88 DISTANCE +
0.000819 POPUL

Predictor	Coef	Stdev	t-ratio	P
Constant	259.06	29.08	8.91	0.000
B-PRICE	-4.12833	0.01636	-252.37	0.000
T-OVER	-0.7818	0.5164	-1.51	0.131
DISTANCE	1.878	2.027	-0.93	0.354
POPUL	0.0000195	0.0007120	1.15	0.250

s = 344.2 R-sq = 98.09% R-sq(adj) = 98.9%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	4	7558173104	1889543296	15947.30	0.000
Error	698	82703728	118487		
Total	702	7640877056			

SOURCE	DF	SEQ SS
B-PRICE	1	7557707264
T-OVER	1	287484
DISTANCE	1	21343
POPUL	1	156965

Appendix 4-11

Multiple Regression Results for Groceries

The regression equation is
LOG(C6) = 5.47 0.443 LOG(C1) 0.0485 LOG(C2) - 0.0414 LOG(C5)

Predictor	Coef	Stdev	t-ratio	P
Constant	5.4651	0.4760	11.48	0.000
LOG(C1)	0.44320	0.05517	-8.03	0.000
LOG(C2)	0.04051	0.02622	1.85	0.065
LOG(C5)	0.04843	0.03734	-1.11	0.268

s = 0.5929 R-sq = 12.1% $R\text{-}s_9(adj)$ = 11.6%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	3	24.7370	8.2457	23.46	0.000
Error	512	179.9946	0.3516		
Total	515	204.7316			

SOURCE	DF	SEQ SS
LOG(C1)	1	23.4101
LOG(C2)	1	0.8941
LOG(C5)	1	0.4327

The regression equation is
LOG(C6) = 5.47 0.443 LOG(C1) 0.0485 LOG(C2) - 0.0414 LOG(C5)

Predictor	Coef	Stdev	t-ratio	P
Constant	5.4651	0.4760	11.48	0.000
LOG(C1)	0.44320	0.05517	-8.03	0.000
LOG(C2)	0.04051	0.02622	1.85	0.065
LOG(C5)	0.04843	0.03734	-1.11	0.268

s = 0.5929 R-sq = 12.1% R-sq(adj) = 11.6%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	3	24.7370	8.2457	23.46	0.000
Error	512	179.9946	0.3516		
Total	515	204.7316			

SOURCE	DF	SEQ SS
LOG(C1)	1	23.4101
LOG(C2)	1	0.8941
LOG(C5)	1	0.4327

The regression equation is
MARKUP = 28.8 0.0735 B-PRICE 0.00498 T-OVER + 0.0436 DISTANCE

517 cases used 1 cases contain missing values

Predictor	Coef	Stdev	t-ratio	P
Constant	28.758	1.112	25.85	0.000
B-PRICE	-0.07352	0.01069	-6.88	0.000
T-OVER	-0.004977	0.002764	-1.80	0.072
DISTANCE	0.04363	0.04949	0.88	0.378

s = 10.71 R-sq = 9.4% R-sq(adj) = 8.9%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	3	6007.4	2029.1	17.70	0.000
Error	513	58807.5	114.6		
Total	516	64894.9			

SOURCE	DF	SEQ SS
B-PRICE	1	5590.0
T-OVER	1	408.4
DISTANCE	1	89.1

The regression equation is
MARKUP = 30.1 0.0732 B-PRICE 0.00559 T-OVER + 0.0685 DISTANCE
0.000045 POPUL

517 cases used 1 cases contain missing values

Predictor	Coef	Stdev	t-ratio	P
Constant	30.087	1.366	22.03	0.000
B-PRICE	0.07319	0.01067	-6.86	0.000
T-OVER	0.005590	0.002783	2.01	0.045
DISTANCE	0.06852	0.05160	1.33	0.185
POPUL	0.00004535	0.00002714	1.67	0.095

s = 10.69 R-sq = 9.9% R-sq(adj) = 9.2%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	4	6406.5	1601.6	14.02	0.000
Error	512	58488.5	114.2		
Total	516	64894.9			

SOURCE	DF	SEQ SS
B-PRICE	1	5590.0
T-OVER	1	408.4
DISTANCE	1	89.1
POPUL	1	319.0

The regression equation is
MARKUP = 12.4 + 531 RECI-C1 - 3.18 ECI-C2 + 0.0915 DISTANCE
+ 36530 RECI-C5

517 cases used 1 cases contain missing values

Predictor	Coef	Stdev	t-ratio	P
Constant	12.413	1.388	8.94	0.000
RECI-C1	531.09	66.90	7.94	0.000
RECI-C2	3.175	5.879	-0.54	0.589
RECI	0.09155	0.05126	1.79	0.075
PRICE-C5	36530	12388	2.95	0.003

s = 10.50 R-sq = 12.9% R-sq(adj) = 12.3%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	4	8403.5	2100.9	19.04	0.000
Error	512	56491.5	110.3		
Total	516	64894.9			

SOURCE	DF	SEQ SS
RECI-C1	1	7277.6
RECI-C2	1	73.7
DISTANCE	1	92.9
RECI-C5	1	959.3

Appendix 4-12

Multiple Regression Results for Laundry Soap

The regression equation is
markup = 27.1 - 0.0477 buying + 0.0212 tover

Predictor	Coef	Stdev	t-ratio	P
Constant	27.110	2.506	10.82	0.000
buying	-0.04769	0.02271	-2.10	0.037
tover	0.02121	0.01776	1.18	0.239

s = 8.647 R-sq = 2.2% R-sq(adj) = 1.4%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	2	432.08	216.04	2.89	0.057
Error	256	19142.75	74.78		
Total	258	19574.83			

SOURCE	DF	SEQ SS
buying	1	327.72
Cover	1	104.36

The regression equation is
markup = 24.7 - 42 reci-buy - 25.0 reci-to - 0.117 location
+ 0.000030 popu

Predictor	Coef	Stdev	t-ratio	P
Constant	24.696	2.330	10.60	0.000
reci-buy	-41.6	152.3	-0.27	0.785
reci-to	-24.98	10.37	-2.41	0.017
location	-0.11676	0.08996	-1.30	0.196
popu	0.00003037	0.00003339	0.91	0.364

s = 8.627 R-sq = 3.4% R-sq(adj) = 1.9%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	4	672.68	168.17	2.26	0.063
Error	254	18902.15	74.42		
Total	258	19574.83			

SOURCE	DF	SEQ SS
reci-buy	1	87.10
reci-to	1	446.50
location	1	77.49
popu	1	61.58

The regression equation is
markup = 25.8 - 0.0540 buying + 0.0198 tover + 1.10 code-po

Predictor	Coef	Stdev	t-ratio	P
Constant	25.846	2.976	8.68	0.000
buying	-0.05404	0.02411	-2.24	0.026
tover	0.01982	0.01806	1.10	0.273
code-po	1.105	1.401	0.79	0.431

s = 8.654 R-sq = 2.4% R-sq(adj) = 1.3%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	3	478.65	159.55	2.13	0.097
Error	255	19096.18	74.89		
Total	258	19574.83			

SOURCE	DF	SEQ SS
buying	1	327.72
tover	1	104.36
code-po	1	46.57

The regression equation is
markup = 24.8 - 46 reci-buy - 25.4 reci-to

Predictor	Coef	Stdev	t-ratio	P
Constant	24.781	1.577	15.71	0.000
reci-buy	-46.3	148.7	-0.31	0.756
reci-to	-25.36	10.35	-2.45	0.015

s = 8.624 R-sq = 2.7% R-sq(adj) = 2.0%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	2	533.60	266.80	3.59	0.029
Error	256	19041.23	74.38		
Total	258	19574.83			

SOURCE	DF	SEQ SS
reci-buy	1	87.10
reci-to	1	446.50

The regression equation is
markup = 26.6 - 0.0524 buying + 0.0178 tover - 0.0929 location + 0.000051 popu

Predictor	Coef	Stdev	t-ratio	P
Constant	26.597	2.580	10.31	0.000
buying	-0.05242	0.02356	-2.23	0.027
tover	0.01779	0.01812	0.98	0.327
location	-0.09288	0.09046	-1.03	0.306
popu	0.00005095	0.00003364	1.51	0.131

s = 8.638 R-sq = 3.2% R-sq(adj) = 1.6%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	4	620.46	155.12	2.08	0.084
Error	254	18954.37	74.62		
Total	258	19574.83			

SOURCE	DF	SEQ SS
buying	1	327.72
tover	1	104.36
location	1	17.20
popu	1	171.19

Appendix 4-13

Multiple Regression Results for Furniture

The regression equation is
MARKUP = 317 -0.0009 B-PRICE - 6.25 T-OVER + 2.09 DISTANCE - 0.00403 POPUL

Predictor	Coef	Stdev	t-ratio	P
Constant	317.2	114.5	2.77	0.006
B-PRICE	-0.00885	0.01473	-0.60	0.549
T-OVER	-6.247	1.899	-3.29	0.001
DISTANCE	2.087	8.331	0.25	0.802
POPUL	-0.004031	0.002598	-1.55	0.122

s = 523.0 R-sq = 9.4% R-sq(adj) = 7.4%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	4	5337620	1334405	4.88	0.001
Error	189	51687268	273478		
Total	193	57024888			

SOURCE	DF	SEQ SS
B-PRICE	1	370309
T-OVER	1	4182422
DISTANCE	1	126441
POPUL	1	658447

The regression equation is
LOG(C6) = 0.713 + 0.167 LOG(C1) + 0.0477 LOG(C2) + 0.0895 LOG(C5)

Predictor	Coef	Stdev	t-ratio	P
Constant	0.7133	0.8666	0.82	0.412
LOG(C1)	0.16689	0.02523	6.61	0.000
LOG(C2)	0.04772	0.06255	0.76	0.446
LOG(C5)	0.08949	0.07889	1.13	0.258

s = 0.5751 R-sq = 19.2% R-sq(adj) = 17.9%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	3	14.9544	4.9848	15.07	0.000
Error	190	62.8438	0.3308		
Total	193	77.7983			

SOURCE	DF	SEQ SS
LOG(C1)	1	14.2550
LOG(C2)	1	0.2737
LOG(C5)	1	0.4257

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