EVALUATION OF THE PERFORMANCE OF THE TABLE EGG MARKETING SYSTEM IN GHANA

BY

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THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PHILOSOPHY (M.PHIL) DEGREE IN AGRICULTURAL ADMINISTRATION

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DECLARATION

I, Sylvester Kwaku Ekpe, the author of this thesis: *"Evaluation of the Performance of the Table Egg Marketing System in Ghana"*, do hereby declare that with the exception of various forms of assistance and references to literature, which have been duly cited, the entire research leading to this thesis was carried out by me at the Department of Agricultural Economics and Agribusiness, University of Ghana, Legon, from August 2004 to August 2005. It is further declared that this thesis has never been presented either in whole or in part for any degree in this University or elsewhere.

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DEDICATION

To

My Wife Becky,

Son Elorm

&

Daughter Nunana

ACKNOWLEDGEMENT

It has been wonderful working with Dr. Akwasi Mensah-Bonsu (Major Supervisor) and Mr. D.P.K. Amegashie (Co- Supervisor) whilst I undertook this demanding task of writing a thesis. I therefore, wish to acknowledge with sincere appreciation the invaluable assistance, encouragement and criticisms I received from them. Senior members of the Department of Agricultural Economics and Agribusiness also deserve special mention for their constructive criticisms and advice during the seminar periods, which immensely gave shape to this work.

Mr Felicio Baëta, my employer, merits special mention for granting me permission to pursue the programme and for placing all necessary resources at my disposal to facilitate the writing of this thesis. The entire management and staff of Biotrade Limited and Mackba Farms also deserve mention for their cooperation and support. I gladly acknowledge the assistance of the Ghana National Association of Poultry Farmers, especially the Executive Secretary, Mr Kofi Henaku for the immense assistance he gave in obtaining the required secondary data and fine-tuning the survey questionnaires.

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My greatest thanks, however, go to Jehovah, the God I worship who gave me life, the strength and knowledge to do all things.

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ABSTRACT

The study evaluated the performance of the table egg marketing system in Ghana by analysing the market structure, price integration processes and the impediments to table egg marketing efficiency. The methods of analysis employed included descriptive analysis, marketing margin analysis and econometric (regression) analysis.

The market structure analysis, using the commodity sub-systems approach, showed that marketing channels for the table egg are moderately organised with the producer-retailer network being the dominant channel. There were few wholesalers but a large number of retailers. The distribution of the marketing margin appeared to favour the producers more than the wholesalers and retailers. Over 60 percent of marketing margin is taken up by transactional costs, largely the cost of transportation. The econometric models employed in the regression analysis of monthly prices of table eggs revealed that there is no short run market integration between the wholesale destination market (Accra area) and the wholesale producer markets (Sunyani and Kumasi areas). Also in the long run, there exists no market integration. The results however suggest that there exists moderate commodity arbitrage and price adjustment between market pairs. The outcome of the analyses shows that the table egg marketing system is operational but that price changes in the destination market do not result in parallel changes in the producer markets in the short run or long run. Low prices, inadequate storage facilities, inadequate capital, transportation difficulties and insufficient market information serve as impediments to efficient arbitrage and integration of the markets (producer and destination markets).

It is, therefore, recommended that farmer groups be strengthened to centralise table egg marketing. Additionally, government policy should be geared towards the promotion of egg consumption, processing, improved market information flow between producing and consumption areas and the provision of credit to producers to enhance efficient price formation and integration of the table egg marketing system in Ghana.

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LIST OF ABBREVIATIONS AND ACRONYMS

FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
GNAPF	Ghana National Association of Poultry Farmers
IMC	Index of Market Concentration
LPIU	Livestock Planning and Improvement Unit
LSPFA	Large Scale Poultry Farmers Association
MOFA	Ministry of Food and Agriculture
NARP	National Agricultural Research Project
SAP	Structural Adjustment Programme
ISSER	Institute of Statistical, Social and Economic Research

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The economy of Ghana continues to be dominated by agriculture, absorbing over 60 percent of the economically active population and remains the highest contributor to GDP (about 40%) among the main sectors of the economy (ISSER, 2003).

The poultry sub-sector is crucially important in the context of agricultural growth and in the improvement of diets of people in Ghana. The sub-sector is particularly vital as a source for the supply of proteins in the daily diet of the average household. It is characterized by large capital investments, mechanization and specialization. It also lends itself to small holder activity, hence an attractive economic activity, especially for women and poor populations. The sub-sector continues to grow as indicated by increased poultry population from 22.28 million birds in 2001 to 24.25 million birds in 2002, an increase of 8.8% over 2001 (ISSER, 2003). With increasing population, high income growth, urbanization and high income elasticity of demand, the demand for poultry products is expected to increase appreciably in the future (Islam, 2003).

Historically, intensive commercial poultry farming took root during the second half of the 1950s in Ghana, then called the Gold Coast (Gyasi, 1970). Initially, these operations were state owned and mainly broiler operations. The returns on investment and short gestation period made poultry production, especially broilers, attractive. This inducement inspired some of the backyard pioneers to venture into medium to large scale operations. However,

high mortality rates from diseases dented some of the appeal of the poultry business. In the 1960s, the Government through the Veterinary Services Department of the then Ministry of Agriculture intervened and took steps to control diseases by sponsoring the use of drugs, vaccines, and improved hygiene practices. This support, in terms of subvention on costs of drugs, drug application and other veterinary services was probably the first instance of direct government subsidy to the poultry industry (GNAPF, 2000). With the challenge of disease under control, growth in the industry proceeded to increase from about 1 million birds in the late 1960s to about 10 million birds during the second half of the 1970s.

Another constraint occurred in the middle of the 1970s. This had to do with the inadequate provision of nutrients for high levels of production. The rapid growth of poultry stocks called for increased supply of local raw materials and feed ingredients. The demand for poultry feed inputs outstripped their supply. The Government reacted by removing duties and taxes on basic raw materials needed by the industry (GNAPF, 2000). Support for the production of local raw material such as grains, vegetable oilseeds and other feed ingredients were initiated. Feed and feed concentrates and ingredients such as maize, fishmeal and soy-bean meal were imported to supplement the local supply when shortages occurred. Often Government subventions were applied to reduce the prices of these imported raw materials to poultry farmers. The industry itself resorted to sourcing cheaper feed ingredients to reduce the cost of production. These cheaper alternatives such as wheat bran and groundnut cake used to be discarded industrial waste products. They gradually became by-products with commercial value. Currently, many agro-processing industries including flour mills and fish processors rely on the poultry industry to dispose of their by-products and generate revenue as well as create employment.

The poultry industry also indirectly benefited from policies designed to support the agricultural sector in the 1970s. The Government's monetary policy directives caused commercial banks to direct credits to the agricultural sector. The cost of agricultural credit at the time was lower than that for the services and the industrial sectors. This vigorous support from Government generated private sector investment in the poultry industry (GNAPF, 2000).

With the introduction of the Structural Adjustment Programme (SAP) in the 1980s and its attendant rationalization directives, Government subsidies on poultry drugs were abruptly removed. The importation and subvention, by the Government for stopgap feed ingredients were discontinued. The active support of the Government in mobilizing credit for agriculture at lower than commercial rates was gradually reduced to negligible levels. Many poultry operators began to lose control of their production costs.

By the 1990's the challenges had shifted from production constraints to extra-production constraints such as challenges associated with access to credit and marketing. Financing challenges having to do with cashflow constraints resulting from the removal of preferential rates to agriculture were shortly followed by marketing problems due to the SAP directive on trade liberalization. The trade liberalization regime allowed for the influx of cheaper imported poultry products which nearly collapsed the local poultry industry. The impact of imports on the local poultry industry could be measured given that by 1999, over 12,000 metric tonnes of frozen chicken worth $11 million was imported. In 2001, the import value rose to over 30,000 metric tonnes of the commodity, worth $26 million (MOFA, 2004). This

trend impacted negatively on the growth of the local poultry meat industry, resulting in the table egg industry overtaking broiler production in Ghana (LSPFA, 2003).

In terms of world poultry production however, the table egg industry has not enjoyed the success of the poultry meat industry. This situation is generally related to the controversy over the cholesterol content of eggs and human health which continues to receive undue adverse publicity, although more recently these views have been questioned even by the medical profession (Leeson and Summers, 1997). However in developing economies such as Ghana, that are striving to meet their human protein needs, the table egg continues to occupy a very important place in the average daily diet, irrespective of the strong flow of opinion against the consumption of the egg, which is perceived to be the best protein source known to humanity (Leeson and Summers, 2001).

1.2 Problem Statement

In Ghana, egg production increased steadily from about 3000 metric tons in 1961 to about 22,000 metric tons in the year 2000. Poultry meat production on the other hand increased from about 5000 metric tons in 1961 to about 20,000 metric tons in the year 2000 (FAO, 2004). In terms of production volumes therefore, the egg industry overtook the poultry meat industry in Ghana by about 9 percent in 2000.

However, per capita egg supply in 2000 stood at 0.8kg per year (FAO, 2004). This implied that only about 12 table eggs were available or consumed per person over a whole year in Ghana. Comparing that with the world value of 8.1kg, translating into about 125 eggs per capita, it is obvious Ghana's table egg supply is in deficit.

In spite of the observed supply deficit and comparative advantage over poultry meat production, a yearly dose of seasonal glut periods have been reported. During an egg glut, price cutting becomes acute and farmers have no choice than to sell at reduced prices to avoid spoilage, impacting negatively on profitability and growth of the industry (Kekeocha, 1985).

Anecdotal evidence* suggests that serious bottlenecks exist in the functioning of the table egg marketing system in Ghana. There may be a lack of efficient pricing, reflected in a weak correlation between producer and consumer market prices. Certain conditions inherent in the market may also be responsible for the inefficiency in the egg marketing system. These may include poor public market information flow and price communication between participants in the market, substandard market infrastructure, poor storability and hence high risks of assemblage and inter-market arbitrage.

Although it may be established that there is a deficiency in the table egg marketing system in Ghana, knowledge about the exact areas of the problem and the impediments therein is not clear. In order to adopt measures in solving the problem of inefficiency in the table egg marketing system, it is necessary to source more specific evidence regarding the magnitude of inefficiency, level of market integration and the impediments to market efficiency. These are important issues whose investigation can be useful for the formulation of marketing policies to strengthen and improve the efficiency of the table egg marketing system.

Consequently, the main questions the study addresses are:

1. What are the existing marketing channels for table egg in Ghana?

* *Personal communication with the General Manager of Mackba Farms Ltd, a large scale table egg producer.*

2. What is the distribution of the marketing margin among the major participants of the existing egg marketing system?
3. To what extent is the table egg marketing system integrated in Ghana?
4. What are the impediments to ensuring the efficiency of table egg marketing in Ghana?

1.3 Objectives of the Study

The primary objective of the study is to evaluate the performance of the table egg marketing system in Ghana.

The specific objectives of the study are to:

1. To identify the existing marketing channels for table eggs in Ghana.
2. To compute the marketing margins for the major market participants along the marketing channel.
3. To determine the extent of integration of the table egg marketing system in Ghana.
4. To identify the factors impeding efficient marketing of table eggs in Ghana.

1.4 Relevance of the Study

The table egg continues to constitute an attractive source of protein and is a versatile food source. While cholesterol intake has been a factor in the minds of health conscious consumers, the health benefits of eggs have been promoted by the industry through campaigns encouraging the consumption of an egg a day especially for children of school going age (GNAPF, 2001). The egg is an important source of a number of valuable nutrients, such as proteins of outstanding biological value, phospholipids, minerals and vitamins (FAO, 2003). The popularity of various protein rich diets is also impacting positively on the demand for table egg.

Apart from being consumed as whole egg, fried or boiled, eggs are also supplied to the food industry, specializing in products such as cakes, confectionery and creams. Consequently, with increasing population and rising per capita consumption, there exists more room for growth of the table egg industry. An efficient marketing system is required for a sustainable table egg industry. The efficiency of the marketing system is important since it determines both the consumer's living costs, the trader's profit margin and the producer's income.

The literature on table egg marketing in Ghana is largely not detailed or exhaustive, since apparently most researchers tend to concentrate more on issues relating to poultry meat (broiler) than eggs. Any rational planning as well as economic forecast of egg production and consumption has to be based on a thorough knowledge and understanding of the peculiar characteristics of the table egg market. An insight into the processes and procedures of egg trade in Ghana will provide guidance for policy modifications aimed at enhancing economic activity in the table egg industry.

1.5 Organization of the Study

The thesis is divided into five chapters. Existing body of knowledge relevant to the study is reviewed in Chapter two. The methodology of the study is presented in Chapter three. This includes a discussion on the theoretical and the analytical framework used and the method of data collection. The analysis of data and a discussion of the results is presented in Chapter four. The summary of findings, conclusion and policy implications of the study are presented in Chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, the existing body of knowledge relevant to the study is reviewed. The review is centred on agricultural product marketing and its importance in developing economies to obtain facts that provide the context within which the study can be understood. The review also provides insights into the methods used by previous empirical studies that can be applied in the analysis.

2.2 The Definition of Agricultural Marketing

Marketing has been defined among others as "all those business activities involved in the flow of goods and services from production to consumption" (Abbot, 1991) or "the process that links production to consumption" (Scott, 1995). Agricultural marketing has been defined as, "the performance of all business activities involved in the flow of goods and services from the point of initial agricultural production until they are in the hands of the ultimate consumer" (Kohls and Uhl, 1990). The importance of agricultural marketing has long been recognised as a critical component in the process of economic development (Scott, 1995).

2.3 Importance of Agricultural and Food Marketing

In developing economies, agriculture constitutes the biggest single production sector, typically employing over 50 percent of the labour force, with industry and commerce dependent upon it as a source of raw materials and as a market for manufactured goods

(Reddy, 1991). Hence it is generally argued that the development of agriculture and the marketing systems which impinge upon it are at the heart of the economic growth process in developing economies. Yet in most developing economies, the consumer frequently spends in excess of 50 percent of the household income on food, much of which is inadequate both in quality and nutritional content (FAO, 1990). By contrast, in developed economies the average household spends between 12 percent and 19 percent of disposable income on food. Furthermore, whereas in developed economies the level of poverty is relatively low, and therefore it is economically feasible to establish special food distribution programmes to meet their needs, the higher level of poverty in most developing economies is such that the commercial marketing system must be relied upon to perform the task of food distribution. This being so, it is imperative that the marketing system performs efficiently (Kriesberg, 1974).

Economic development itself provides the impulse towards more sophisticated and more efficient marketing systems. Dixie (1989) suggests that as countries experience economic growth, their rate of urbanisation tends to increase substantially. He reiterated that whereas the rate of population growth, in developing countries, averages around 3 percent per annum, their cities and towns are increasing in population by about 4 percent per annum. Essentially, this means that the number of people in urban areas who needed to be fed would have doubled within the past 16 years. This has clear implications for marketing systems that distribute the output to the point of consumption.

Dixie (1989) also highlights the potential contribution of agricultural and food marketing towards the attempt to improve rural incomes in developing economies, indicating that the

inequality of incomes between the rural and urban areas draws people away from agricultural production and places great stress on the infrastructure and social services of a country's towns and cities.

Another development which has increased the interest in marketing practices is the trend towards market liberalization as part of the economic structural adjustment programmes. The view that direct and indirect Government participation in production and distribution had brought about structural distortions in economies has become widely accepted. Measures intended to correct these distortions include a return to market prices for all products and resources, the encouragement of a competitive private sector and the commercialization and/or privatization of all or some of the functions of the parastatals engaged in marketing. All of these require a better understanding of marketing practices and processes in general and the agricultural marketing parastatals affected, in particular (FAO, 1990).

Sherman (1985) asserts that a country's food self-sufficiency depends on having an effective marketing system, capable of equitably distributing agricultural produce from producers to those who need them. This is particularly important for small and marginal farmers who rely solely on the marketing of their surplus produce as their major source of income. An efficient agricultural marketing system has a positive impact on the living standards of small and marginal farmers, especially on those who live in villages remote from marketing centres (Bohle, 1985). An inefficient marketing system adversely affects the farmer's income; it is counter productive and causes high price differentials between producing and consuming areas (Bohle, 1985).

An efficient marketing system is one that allows the movement of commodities from the point of production to the point of use or consumption effectively and at reasonable cost (Abbot, 1991). An efficient marketing system has been likened to an important multiplier in economic development. It is an important factor for the commercialisation of agriculture, employment creation and effective urbanisation, export expansion of agricultural products, as well as encouraging innovation among farmers (Abbot, 1991). A transparent agricultural market stimulates production among farmers and competitiveness among traders, as well as ensures the adaptation of supply to the level of demand in the short run through spatial and temporal adjustment, and in the long run through production adjustment (Nweke, 1994).

2.4 Market Analysis

Market analysis can be carried out using descriptive measures, price efficiency and organizational criteria (Pomery and Trinidad, 1995). The descriptive approach contains little statistical analysis and reaches conclusions on market performance and efficiency on the basis of the researcher's subjective assessment. This method has been extensively used as a basis for studying commodity flows and marketing techniques (Smith, 1981). The price efficiency approach analyses marketing in its dimensions of time, space and form (Bresslar and King, 1970). The industrial organisational approach relies on the theory that the market structure, which forms the environment, determines market conduct, consisting of the behaviour of the economic agents within the market environment, and which in turn determines the performance or standard of operation of the market.

2.4.1 Market Structure and Conduct

Market structure is defined as the characteristics of the organisation of a market which seem to influence strategically the nature of competition and pricing behaviour within the market and also defines the concentration of the market, product differentiation, market integration, and conditions for entry into the market (Bain, 1968). The market structure determines the market conduct or the behaviour of economic agents within the market environment and thereby sets the level of market performance (Caves, 1982). The term also refers to the number of buyers and sellers, their size distribution, the degree of product differentiation, and the ease of entry of new firms into the industry (Tomek and Robinson, 1990; Pomery and Trinidad, 1995). The structural characteristics of a market may be used as a basis for classifying markets. For example, markets may be classified as perfectly competitive (i.e. many buyers and sellers), oligopolistic (i.e. more than one seller but where the number is not large enough to render negligible, the contribution or behaviour of each), monopolistic competition (i.e. many sellers of a differentiated product) or monopolistic (a single seller of a product for which there is no close substitute). Market structure is important in that it affects market outcomes through its impact on the motivations, opportunities and decisions of economic actors participating in the market (Broaddus, 1991).

Market conduct as a subset of market structure constitutes the pattern of commercial behaviour of economic agents within a given market structure. Buying and selling practices and pricing behaviour are procedures used in the analysis of the conduct of a market (Pomery and Trinidad l, 1995). Hence, the pricing policies employed by traders along the various stages of the marketing channels make up the determining factors of the conduct of a commodity market.

2.5 The Table Egg Marketing System

Smith (1992) observed that due to the rapid expansion of the poultry production industry, it was easy for the farmer to have surplus supply of eggs and for capital intensive poultry production, farmers producing eggs may go bankrupt due to the over supply of eggs. Kekeocha (1985) reported that the objective of the egg marketing process was to supply consumers with eggs with the least possible deterioration of product quality. He further indicated that the whole process involved the collection, grading, transportation, storage and merchandizing of eggs. A first step towards the evaluation of the marketing system however is to understand how it functions. Hence a review of the nature of distribution and pricing in the table egg marketing in Ghana is necessary in evaluating its performance and efficiency.

The marketing of food in Ghana gives neither a fair return to the producer nor a fair price to the consumer (NARP, 1995). The reason for this is the lack of effective commodity arbitrage, inadequate market information and consequently, the failure of the marketing system to effectively transmit demand signals from the consumer to the farmer (NARP, 1995). Generally, the tasks involved in marketing eggs are a)collecting b)grading and packaging on farm or transporting to a grading, packaging and processing plant c) storage d) selling through wholesale and retail channels and/or selling directly to consumers (FAO, 2003). In Ghana however, the marketing of table eggs is not highly organised. Efforts to establish marketing schemes in various areas have not been successful (Gyasi, 1970). Marketing and sales of eggs have largely depended on the farmers' own initiative (Baëta, personal conversation, 2004).

Producers who are situated within easy reach of the consumers are often able to market a considerable proportion of produce directly to consumers. Their customers are usually made up of those individuals who go to the farm to buy even if it means travelling some distance to obtain the produce as they believe the eggs bought directly from the producer would be fresher, of better quality and cheaper than eggs bought from retailers (Gyasi, 1970). Hotels, schools, restaurants and other institutions who buy large quantities prefer to buy directly from the producers to take advantage of lower prices. In the semi-urban and rural areas where most of the small farms are located, nearly all the eggs produced are sold at farm-gate (Gyasi, ibid). For many producers however, table egg marketing is executed through private marketing enterprises which are operated by individuals, partnerships and department stores which are registered with the producers. About 90 to 95 percent of the egg trade is controlled by middlemen in Ghana (Koney, 2004). The individually operated enterprises are mostly found in the retail trade sector. Since these buyers finance their own purchases, the volume of eggs handled by one individual is generally small, usually between 60-90 dozen (24-36 crates) at a time but a few individuals, largely semi-literate women, undertake wholesale distribution. These women operate independently, obtaining their supplies directly from the farms. Some of them, particularly those in the deficit production areas, travel to the surplus production areas to obtain their supplies (Gyasi, ibid). In the major consuming centres, their main outlets are the numerous individual retailing enterprises ranging from those in the local markets and kiosks to chop-bars and peddling egg retailers found on the streets, railway and lorry stations, and at rest-stops. These usually sell in single units. The eggs are presented to the consumer in three forms; raw, boiled and fried. The boiled and fried eggs are sold by the chop-bars, snack stands and peddling retailers.

Departmental stores and supermarkets are also engaged in table egg marketing. They retail eggs in addition to other types of foods and household requisites. The principal difference between them and the other types of retailers already described is that they provide better packaging for their eggs- retailing in dozens. Their customers tend to be people in the middle and upper income groups and their selling prices tend to be generally higher than those of the other retailing enterprises (Gyasi, ibid).

NARP (1995) noted that the cost of transportation, which accounts for about 60 percent of the total marketing cost of the commodity, is a major marketing constraint in Ghana. This comprises several dimensions, including transport unavailability, high cost of transportation and poor road and vehicle conditions. Inadequate transportation means inefficient distribution of the commodity, food wastage, poor allocation of resources and consequently low farm incomes, which has profound negative implications for increased egg production. According to Bohle (1985), transportation, brokerage and personal expenses constitute the major marketing costs components, which are further raised by poor inaccessibility by farmers to market centres. For NARP (1995), the numerous market places in the country dealing with agricultural commodities are poorly integrated due to socioeconomic factors, poor transportation and poor information systems network. This causes large price differences between markets and inequitable distribution of food commodities over space.

2.6 Marketing Efficiency

Marketing efficiency measures the competitiveness of a market with regards to pricing and functioning of infrastructure and services. According to Ejiga (1988), marketing efficiency refers to the maximisation of the output-input ratio, where input resources are labour, capital

and management and the outputs are consumer satisfaction with the goods and services. Marketing efficiency comprises pricing efficiency, technical (operational) efficiency and innovative efficiency (Okereke, 1988). The ideal market structure for optimal marketing efficiency, ceteris paribus, is pure competition (Dittoh, 1994). Inefficiency in the marketing systems is in five respects: pricing, technical (operational), communication, innovation and management (Bohle, 1985). According to Ejiga (1988), the efficiency of agricultural commodity markets is reduced by factors such as poor transportation, poor storage and processing facilities, inadequate market information and lack of standardisation of weights and measurements as well as inadequate credit facilities. These factors prevent effective arbitrage and the balancing of spatial and temporary equalization of supply.

In an efficient marketing system, the price difference between two markets should not exceed the costs of transporting the produce from one market to the other. An efficient marketing system therefore leads to minimization of marketing and related costs and as a consequence reduces inter-market price differentials, with the result of ensuring increased production (Amikuzuno, 2001).

2.7 Marketing Channels

Commodity transactions require marketing effort such as bulking, transportation and storage. These activities affect the exchange price. Additionally, the types of participants, methods and locations of sales usually affect the efficiency, hence the performance of the marketing system. The chain of participants through which a commodity passes from the producer to the consumer is called the marketing channel. A typical marketing channel includes retailers, wholesalers, assemblers and transporters (Sherman, 1985). Antonio (1968)

identified ten possible distribution channels from the producer to the consumer in agricultural commodity markets, and noted that this makes marketing both difficult and time consuming.

In Ghana, the marketing process for agricultural commodities may be simple or complex, depending on the type of trade, commodity, extent of processing and the location of production and consumption. In general however, marketing channels are very long, involving some unnecessary duplication of activities which result in low producer prices, high marketing costs, disproportionate marketing margins and high consumer prices (NARP, 1995). Since losses occur at all levels of the marketing chain, long marketing channels would lead to delays between production and consumption, hence high losses of produce (Scott, 1991).

Sherman (1985) noted that in Africa where markets are not distinctively segmented, more participants may be performing more than one task and different types of traders may be performing similar tasks. To this end, intermediaries in a typical agricultural commodity market in West Africa may include the village resident buyer, trader apprentices, assemblers, local traders, regional traders, national traders and urban retailers. The marketing channel does not include transporters and commissioned agents, since these play only a facilitating role rather than an active role in the marketing process. In addition, the marketing channels in a given area also depend on the geographical and temporary patterns of markets in the area, the road conditions, demand and supply conditions and market access (Amikuzuno, 2001). Weak marketing channels aggravated by parastatal interference, is a major cause of market disintegration (Delgado, 1985).

In Ghana, the table egg marketing channels differ and are dependent on the scale of production, the degree of concentration of egg producers in a given area and the alternative outlets available to the producer (Gyasi, 1970). Producers who are situated within easy reach of the final consumers are often able to market a considerable proportion of their produce directly to consumers who consist of individual households, hotels, restaurants, schools, hospitals and other institutions. In the semi-urban and rural areas where most of the small farms are located, nearly all the eggs produced are sold at the farm-gate. Most producers however sell to independent wholesalers and/or retailers who in turn sell to the final consumers.

2.8 Marketing Margin

A marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. The margin must cover the costs involved in transferring produce from one stage to the next and provide a reasonable return to those doing the marketing (FAO, 2002). Marketing margin measures the share of the final selling price of the commodity that is "captured" by a particular participant in the marketing channel (Mendoza, 1995). It represents the difference between prices at the various market participant levels, such as between the producer and wholesaler or wholesaler and retailer. High marketing margins are an indication of market inefficiency. However, looking at margins and changes in margins cannot tell you that there is a problem. It can only suggest that there may be a problem which requires further investigation by studying the marketing costs (FAO, 2003). "Margins" are often used in the analysis of the efficiency of marketing systems. Often they are misused even if they are correctly calculated. The presentation of a trader's share of the final selling price in percentage terms can give a totally misleading

impression, unless one knows the costs involved. Often researchers of marketing costs and margins start out with the assumption that traders exploit farmers. Because margins are expressed in percentages they appear to be high. Moreover, where farmers receive only a comparatively small share of the selling price this does not necessarily mean that they are being exploited. Total margins will depend on the length of the marketing chain and the extent to which the product is stored or processed. To know whether margins are reasonable one needs to understand the costs (FAO, ibid).

Since the size of the marketing margin affects producer and consumer prices, marketing margins are determinants of marketing efficiency. According to Nadkarm (1983), marketing inefficiency is due to the exploitative role of traders to get higher margins or due to inadequate market infrastructure. Epstein (1985) on the other hand observed that the high profits earned by some traders is not due to their monopolistic approach but can be attributed to the large volume of operations they handle by the advantage of their command of capital or other scarce resources.

Jackson (1990) holds the view that marketing margins increased up the marketing chain towards the final consumer. Thus for producers to maximize their share of the consumer's spending, they should seek ways of building creative alliance with other actors in the marketing chain and move away from the traditional attitude of the confrontational style of bargaining over prices.

2.9 Empirical Studies

The performance of marketing systems has been evaluated using marketing efficiency studies. These studies have been conducted using several methodologies. Jones (1979), used correlation coefficients, which typically involved the analysis of bivariate correlation between price series to measure market integration and infer marketing efficiency in terms of pricing and arbitrage. In spite of its seeming suitability, the use of bivariate coefficients to measure market integration has been found to be problematic (Fafchamps and Gavian, 1996). The problems include the static nature of the models (whereas price formation is dynamic), the likelihood of serial correlation which affects the statistical significance of the coefficients and its limitation in simultaneously handling cases where more than two markets are involved.

Other studies (Fafchamps and Gavian, 1996) have made use of co-integration analysis to determine market integration and infer marketing efficiency. Goodwin and Schroeder, (2001) empirically evaluated the co-integration and spatial price linkages for regional slaughter cattle markets in the USA, and then determined the impact on co-integration of several markets characteristics using price series data. Fafchamps measured the extent of livestock market integration in Niger by using a wide variety of marketing efficiency measures including tests for co-integration and Granger causality of average price differentials and parity bounds models that showed a lack of close market integration in the Nigerien cattle market. These models were also deficient because of the difficulty of testing for stationarity of the price series and the problem of multicolinearity (Palaskas and Harriss, 1993).

Delgado (1983) proposed the use of the variance component approach that allows for a joint test of seasonal differentials in the prices of different markets to measure market integration. The methodology involves decomposing the variance of food prices into components and allows a joint test on a sample of time series of prices to determine temporal market integration. Marketing margins can be used to determine marketing efficiency, yet a lack of adequate data often hinder the use of marketing margins to directly evaluate marketing efficiency (Mendoza, 1995).

Adekanye (1988) assessed the pricing efficiency of rice marketing in Nigeria using the price consonance and price difference analyses. The former measures the degree to which market prices move together, while the latter indicates inter-market price differences. These methodologies help establish the existence and level of an integrated marketing system and hence infer marketing efficiency. Nevertheless, market integration evidence must be supplemented by information on market structure before relevant conclusions can be drawn (Ravallion, 1986).

2.10 Conclusion

An efficient marketing system is a key contributor to the speedy growth of the agricultural sector. Marketing efficiency is subject to the nature of competition in the marketing system. The nature of competition on the other hand has a bearing on pricing and commodity arbitrage.

Efficiency in the table egg marketing system would ensure efficient arbitrage, by moving the commodity from the producer markets (low price areas) to the destination market (high price

area) and as a result reduce undue price variability between the two market areas. The benefits of an efficient marketing system include guaranteeing fair producer prices, providing incentive profit margins to egg traders and reducing consumer prices. The available literature on Ghana provides little analytical knowledge on the performance of the table egg marketing system in Ghana. Any attempt to ascertain marketing efficiency for the table egg in Ghana would require knowledge of the specific areas of pricing and arbitrage. This knowledge should serve as the basis for improving the performance of the table egg marketing system in Ghana. In this regard, the present study is therefore significant in closing the gap in knowledge on Ghana's table egg marketing system in particular and the poultry marketing system in general.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the framework within which the study is conducted. The theoretical framework, concepts and the method of data analysis are presented. The type of data and sampling method are also described.

The first objective which seeks to identify the existing table egg marketing channels is addressed by the commodity sub-systems approach which involved tracing the movement of the commodity from the source of supply to the point of final sale by interviewing participants involved in the marketing process. Empirical data collected is used in computing marketing margins, in order to address the second objective. The third objective which seeks to determine the extent of integration between the producer markets and the destination markets is achieved by employing regression analysis. The forth objective which is to identify the factors impeding efficiency in the marketing of table egg in Ghana is achieved by using results obtained from participatory market surveys comprising the use of semi-structured, open-ended questions put together in the form of written questionnaires and empirical results from the market integration analyses. Implications of the results from the present study are used to formulate policy strategies to help strengthen the table egg marketing system in Ghana. The relevant concepts and analytical tools required for the study are expounded in the next section.

3.2 Theoretical Framework and Concept

This study aims at evaluating the performance of the table egg marketing system in Ghana. This covers market structure analysis, involving the identification of marketing channels, calculation of marketing margins and the determination of indices for market integration. Reportedly, these are relevant measures of marketing system evaluation.

Marketing efficiency is a measure of marketing performance. The concept of marketing in agriculture itself encompasses the processes by which an agricultural commodity is transferred from the producer (farmer) to the final consumer. In between are middlemen and/or agents who perform various marketing functions to get the produce from producers to the consumers.

Marketing efficiency analysis measures the competitiveness of a market as regards pricing and the performance of both market infrastructure and services. An efficient market guarantees efficient allocation of resources and increased production. Granted that cost data is available, certain conditions must hold for marketing efficiency. Markets are efficient if and only if:

(i) Inter-temporal price differences reflect storage costs.

(ii) Inter-market price differences reflect transportation costs.

(iii) Price differences due to product form reflect processing costs (Harriss- White, 1995).

(iv) Price differences through competition of middlemen reflect the size of the net marketing margins.

Marketing efficiency comprises pricing efficiency, technical (operational) efficiency and innovative efficiency (Okereke, 1988). For this study, the concept of marketing efficiency is scaled down to technical and pricing efficiency, which demonstrate the effectiveness of the movement of table egg between the source and destination markets plus the existence and nature of price linkages between these markets.

A number of methods for the evaluation of marketing efficiency exist. However, the study employs marketing margins and market integration analyses. In an efficient marketing system, the marketing margins of all actors in the system are identical and inter-market prices are correlated, suggesting an integrated marketing system. The present study employs the regression analysis approach to market integration analysis to evaluate the performance of the table egg marketing system. The inferences are that agents in the table egg marketing system only earn normal profits and that source and destination table egg market prices move together.

3.3 Marketing Channels

Marketing channels constitute combinations of organizations and individuals (channel members) that perform the required activities to link producers of products to users of those products to accomplish marketing objectives (Bennet, 1995). These intermediaries (channel members) include retailers, who sell to ultimate consumers and wholesalers, who sell to retailers, other wholesalers, government buyers (commissioned agents), and other business customers. Theoretically, a typical consumer marketing channel comprises the following categories of participants (Bennet, 1995): (i) Producers (ii) Commissioned agents (iii) Wholesalers (iv) Retailers and (v) Consumers (last in the link). These definitions help to

identify and classify participants in the marketing process, but are not mutually exclusive in the real world. The types of participants in the channel also depend on the ethnic mix, climate, the type of commodity, and available infrastructure among other factors of the study area.

The commodity sub-systems approach is the method for determining marketing channels. This involves tracing the movement of the commodity from its source of supply to the point of final sale by interviewing all the participants in the marketing process. A marketing channel traces agents involved in the marketing process, including their linkages and functions. Since the kind of linkage between the participants of a marketing system largely affects both the market performance and the pricing characteristics, in this study, the determination of marketing channels is a relevant objective in evaluating marketing performance.

3.4 Marketing Margins

Marketing margin measures the share of the final selling price of the commodity that is earned by a particular participant in the marketing channel and represents the difference between prices at the various market participant levels.

One of the widely used methods of evaluating marketing efficiency is to compare the shares of a final retail price of a commodity obtained at recorded points in the marketing channel. If the margins at the various stages of the marketing chain are identical, then the marketing system is efficient (Mendoza, 1995). Owing to the fact that high marketing margins generally lead to high consumer prices, marketing margins affect the efficiency of the

marketing system through their effects on consumer prices. Calculation of marketing margins requires knowledge of the prices of the commodity at the different segments in the channel, so that the price variations between the segments are compared to the consumer price. This principle is applied in this study.

3.5 Market Integration

The goal of market integration analysis is to determine marketing efficiency which basically is the extent and speed of price transmission between spatially separated markets (Golleti and Eleni, 1995). It is built on the premise that if a pair of markets is integrated, a price change in one of them will be reflected in a price change in the other. The demand for and price of a given unit of table egg in the destination market would have a dominant effect on the table egg trade and by extension, price formation at the producer markets. This would be an indicator for marketing efficiency since price differences between the given markets would reflect only transportation costs (Delgado, 1986). The more integrated a marketing system is, the more efficient it is.

An integrated marketing system is one in which prices among the individual markets are determined interdependently. The study adopts regression analysis approach to determine the level of integration within the marketing system. The approach is used to determine whether the price of a commodity in a producer market has the tendency to be influenced by the price in a destination market and is based on the following assumptions:

(i) There exists a system of several producer markets and a single central market.

(ii) While there may be trade among producer markets, it is trade with the destination market that dominates local price formation.

In this study, the existence, nature and degree of integration between the destination market and the producer market are determined. The market integration approach is only a necessary, but not sufficient condition for assessing marketing efficiency, and the reliability of the parametric estimates obtained from the analysis is compromised by the exclusion of marketing costs. The market integration approach appears to be however the farthest research efforts have reached in marketing efficiency analysis and is adopted for the present study.

3.6 Impediments to Marketing Efficiency

In determining the impediments to marketing efficiency, semi-structured and participatory interviews were employed to obtain the perceptions of table egg market participants about why the marketing system does not work well.

Theoretically, the determinants of marketing efficiency include trade activity, the operating environment, information flow, government policy, differences in production levels and supply shocks. The semi-structured questionnaire used for the survey therefore solicited the views of market participants on these issues. Data on the nature of trade flows between markets, access to market infrastructure, information and credit are applied to achieve this objective. The result is a descriptive analysis of the shortcomings of the marketing system and a perceptive determination of the factors which affect marketing efficiency.

3.7 The Analytical Models

This section describes how the theoretical framework is applied in analyzing the efficiency of the table egg marketing system in Ghana. The table egg marketing efficiency is assessed

by means of marketing margins computation and the regression analysis approach to market integration determination.

3.7.1 Model for Marketing Margins Computation

Objective two aims at computing the marketing margins of the major market participants along the marketing channels. The marketing margins are evaluated as follows:

$$TGMM = \frac{C_P - F_P}{C_P} \times 100 \quad \text{----------(1)}$$

Where TGMM is the Percentage Total Gross Marketing Margin, C_p is the Consumer Price and F_p is the Farm Gate (Producer) Price.

$$GMM_P = \frac{F_P - AC}{C_P} \times 100 \quad \text{----------(2)}$$

Where GMM_P is the Producer's Gross Marketing Margin, F_p is the Farm gate (Producer) Price and AC is the producer's Average Production Cost.

$$NMM_p = \frac{F_P - (AC + MC)}{C_P} \times 100 \quad \text{----------(3)}$$

Where NMM_P is the producer's Net Marketing Margin, F_p is the Farm Gate (Producer) Price, AC is the producer's Average Production Cost, MC is the producer's Marketing Costs and C_p is the Consumer Price.

$$GMM_T = \frac{P_S - P_C}{C_P} \times 100 \text{----------(4)}$$

Where GMM_T is the Gross Marketing Margin for a given trader (wholesaler or retailer), P_S the trader's selling price, P_c the Average Cost of Purchasing (i.e. the purchasing price) either from the farmer or another trader.

$$NMM_T = \frac{P_S - (P_C + M_C)}{C_P} \times 100 \text{----------(5)}$$

Where NMM_T is the Net Marketing Margin for a given trader (wholesaler or retailer), P_S the trader's selling price, P_c the Average cost of purchasing either from the farmer or another trader, and M_c is the trader's marketing costs (i.e. marketing costs per unit product).

The marketing margins computed for this study are, however, decomposed into the producer's share, wholesaler's margin and the retailer's margin of the consumer price using Mendoza's approach.

Margins are computed as follows:

$$PC_P = \frac{FP - (P_C + MC_P)}{C_P} \times 100 \text{----------(6)}$$

Where PC_p is the producer's percentage share of the consumer price C_p, FP is the farm-gate price, P_C is the producer's average production costs and MC_p is the producer's average marketing costs.

$$WC_P = \frac{WP - (FP + MC_W)}{C_P} \times 100 \text{----------} (7)$$

Where WC_p is the wholesaler's percentage share of the consumer price, WP is the wholesaler's selling price, FP the farm gate price (wholesaler's purchasing price) and MC_w is the wholesaler's average marketing cost.

$$RC_P = \frac{RP - (WP + MC_R)}{C_P} \times 100 \text{----------} (8)$$

Where RC_p is the retailer's percentage share of the consumer price, RP is the retailer's (selling) price, WP the retailer's purchasing price and MC_R is the retailer's average marketing cost.

The producer price is the price of transaction between the itinerant wholesaler and the poultry farmer selling at farm gate. The wholesaler price is the price of transaction between the itinerant wholesaler and the retailer at the destination market, and the retail price which is the same as the consumer price is the price of transaction between the retailer and the final consumer at the destination market.

3.7.2 The Market Integration Model

The model specified in this section which is used to determine the existence, nature and degree of integration of three selected table egg markets in Ghana, namely Sunyani, Kumasi and Accra area markets is adapted from the basic Ravallion model (Ravallion, 1986).

The basic model representing a static pattern of price formation between a system of N markets with N=1 being the destination market is stated as follows:

$$P_1 = f_1(P_2, P_3 \text{---} P_N, X_1) \text{----------} (9)$$

$$P_i = f_i(P_1, X_i) \text{ ----------} (10)$$

Where i=2.....N

P_1 is price of the commodity in the destination market, P_i is price of the commodity in the i^{th} producer market, X_i (i=1,.....N) is a vector of non-price variables influencing demand and supply on local markets and N is the number of physical markets in the study.

The dynamic structure of Equation (10) adopted by this study is given by:

$$R_{1t} = \sum_{j=1}^{n} \alpha_{ij} R_{it-j} + \sum_{j=0}^{n} \beta_{ij} P_{it-j} + \Delta t + \varepsilon_{it} \text{ ----------} (11)$$

Where R_{1t} is the unlagged destination market price; R_{it-j} and P_{it-j}, are lagged destination and producer market prices respectively, ε_{it} constitutes the error terms which are assumed to follow the AR (1) process and α_{ij}, β_{ij} and Δ are the parameters estimated. In addition, a variable t is applied to cater for the trend that should likely change table egg prices over time.

The type and degree of market integration are determined by the statistical significance of the estimated parameters based on the test results of the set hypotheses using the F-statistic of the Wald tests restrictions.

The following restrictions were tested on the OLS estimation of the regression equation (11):

(I) Short-Run Market Integration

H_o: A price increase in the destination market is immediately passed on to the ith producer market if $\beta_{i0} = 1$.

H_A: A price increase in the destination market is not immediately passed on to the producer market if $\beta_{i0} \neq 1$.

(II) Long-Run Market Integration

H_o: Destination market prices are passed on to the producer market i, in the long run if:

$$\sum_{j=1}^{n} \alpha_{ij} + \sum_{j=0}^{n} \beta_{ij} = 1 \text{----------(14)}$$

H_A: Destination market prices are not passed on to the producer market i, even in the long run if:

$$\sum_{j=1}^{n} \alpha_{ij} + \sum_{j=0}^{n} \beta_{ij} \neq 1 \text{----------(15)}$$

3.7.3. The Error Correction Modelling (ECM) to Market Integration Analysis

The regression approach to market integration analysis has deficiencies that render it less appropriate for testing market integration. These include how to test for integration when the price series are not stationary (as usually is the case) and how to reduce the problem of multicolinearity (Palaskas and Harriss, 1993). This is serious because both shortcomings

provide biased estimates and make inference difficult and less reliable. The severity of the above mentioned deficiencies can be reduced by re-specifying the Autoregressive Distributive Lag (ADL) model of Ravallion in an ECM structure with the long-run integration restriction assumed. This accounts for the dynamics of short-run price adjustment in a long-run equilibrium. The ECM model following Palakas and Harriss (1993) is stated as:

$$\Delta R_{it} = C + \alpha\varepsilon_{it} + \sum_{j=1}^{n-1}\gamma\Delta R_{it...j} + \sum_{j=0}^{n-1}\Delta\beta_{ij}\Delta P_{it...j} \text{ ----------(16)}$$

Where the variables are defined as before, C is a constant, ΔR_{it} is the first difference of the price series (R_{it}-R_{it-1}). The term ε_{it} represents the error correction process given by the estimated residual from equation 11. The speed of price adjustment to equilibrium level is denoted by the value of α. The test for the long-run integration is done with co-integration analysis and the ECM is then used to test the short run integration restrictions and the speed of integration.

3.8 Testing the significance of mean prices

To determine if the differences in mean prices of table eggs within years are statistically different, the following hypothesis is examined:

The null hypothesis is that for each year from 2001 to 2004, the mean farm gate prices are not significantly different from mean wholesale and/or consumer (retail) prices. Likewise, the mean wholesale prices are not significantly different from the mean consumer (retail) prices. The alternate hypothesis is that there are significant differences between mean prices.

The hypothesis is stated as below:

H_o: $p_1 = p_2$ ---------- (17)

versus

H_1: $p_1 = p_2$ ---------- (18)

where p_1 denotes the mean price being compared to the other mean price p_2.

The conventional Student t-test assuming equal variances is used to test if there is significant difference between the mean prices and is given as:

$$t = \frac{(\overline{p_1} - \overline{p_2})}{\left(S^2{}_1/N_1 - S_2^2/N_2\right)} \qquad (19)$$

where $\overline{p_1}$ and $\overline{p_2}$ are the respective mean prices of table eggs, $S^2{}_1$ and S_2^2 the respective variances and N_1, N_2 are the respective sample sizes. If t-calculated is greater than t-tabulated, the null hypothesis is rejected.

3.9 Data Requirements and Sampling Procedure

3.9.1 Data Requirements

Both primary and secondary data were used for the analysis. Information on the types of marketing participants, venues and dates of transactions, physical functions performed by each participant, egg prices, marketing costs at each level of the marketing chain, transportation costs, loading and unloading costs, sales tax, rate of commission, other marketing charges, problems of marketing and the perception of participants about solutions to their marketing problems were collected from a survey conducted on participants. The

secondary data used consisted of open market and monthly average prices of the table egg. The monthly time series price data covered the year 2001 to 2004.

3.9.2 Sampling Procedure

Seven markets were selected for the survey. They included four local markets comprising the Sunyani market in the Brong Ahafo Region, Kejetia (Kumasi), Sofoline (Kumasi) and Kumasi Railway Station markets in the Ashanti Region, and three central markets-Kantamanto (Railway Station), Mallam Atta and Kaneshie markets in the Greater Accra Region.

The choice of the markets for the study was purposive and based on the significance of production in the producer market areas and the volume of transactions of table eggs between the producer and destination markets.

Sampling of market participants in each market for interviewing was carried out in three segments, namely, the producer, wholesaler and retailer levels. Intra-segment sampling of the respondents was randomised to eliminate bias in the sampling process. Where a selected participant was unavailable or unwilling to respond, considerations were allowed for the availability and readiness of other respondents to participate in the survey.

A sample size of 60 respondents was drawn from the producer (farmer) segment, 15 from the wholesaler segment and 36 from the retailer segment. Regarding the producer segment, 4 respondents were drawn from the Sunyani area market, 30 from the Kumasi area market and 26 from the Accra area (destination) market. As regards the wholesaler segment, 2

respondents were drawn from the Sunyani area market, 5 from the Kumasi area market and 8 from the Accra area market. Finally, concerning the retailer segment, 6 were drawn from the Sunyani area, 11 from the Kumasi area and 19 from the Accra area.

Conducting the survey at the different market agent category levels minimizes any unreliability of data likely to occur due to the small sample size of each segment level. The sample size was adjusted in a given segment, depending on factors such as the extent of variability and uniformity of responses given in the interviewing process.

3.10 Data Collection Procedure

The key instrument for the collection of primary data was semi-structured questionnaires administered to poultry (table egg) farmers and traders through personal interviews. Copies of the questionnaires are in Appendices 1 and 2 (pages 78 and 84). In addition, a key-informant interview of transporters and market brokers is conducted to verify responses obtained from the semi-structured interviews. The tool for this is a checklist of the relevant issues.

The secondary data of open market monthly prices of table egg over a period of 4 years (2001-2004) was obtained from the data files of the Livestock Planning and Improvement Unit (LPIU) of the Animal Production Department of the Ministry of Food and Agriculture (MOFA), Ghana National Association of Poultry Farmers (GNAPF) and the Large-scale Poultry Farmers Association (LPFA). Weighted averages were computed to account for variations in prices of the different grades of eggs. Extrapolation and the use of moving averages from nearby markets were employed in estimating missing data.

CHAPTER FOUR

ANALYSIS OF DATA, RESULTS AND DISCUSSION

4.1 Introduction

In this chapter, the table egg marketing channels in Ghana are described. Egg marketing at the producer, wholesaler and retailer levels is discussed. The results of the table egg marketing margin computations are presented. The stationary (Unit root) test results on table egg prices in designated markets over the period of the study (2001-2004) are also presented. This is followed by the results for cointegration test and Error Correction Models and Wald tests for market integration. Impediments to table egg marketing at various participant levels are also expounded. Finally, access to table egg market information during the period of the study is discussed.

4.2 Table Egg Marketing Channels in Ghana

The table egg marketing channels in Ghana comprise sets of separate but interdependent participants which operate to ensure that the commodity is made available to the final consumer. This process is executed through one or more channels. The current marketing channels for transferring the table egg from a major producing area like Kumasi area to a major consuming area like the Accra Metropolis are illustrated in Figure 4.1.

Egg sales within the producing area follow any one of the following general channels:

i. Directly from the producer to the consumer.

ii. From the producer, through the local market retailer to the consumer.

iii. From the producer, through the sedentary wholesaler, to the retailer and to the consumer.

iv. From the producer, through the sedentary wholesaler to the consumer.

Additionally, egg sales from a major producing area to the destination market follow the proceeding channels:

i. From the producer, through the sedentary wholesaler, the itinerant wholesaler, the destination market retailer to the consumer.

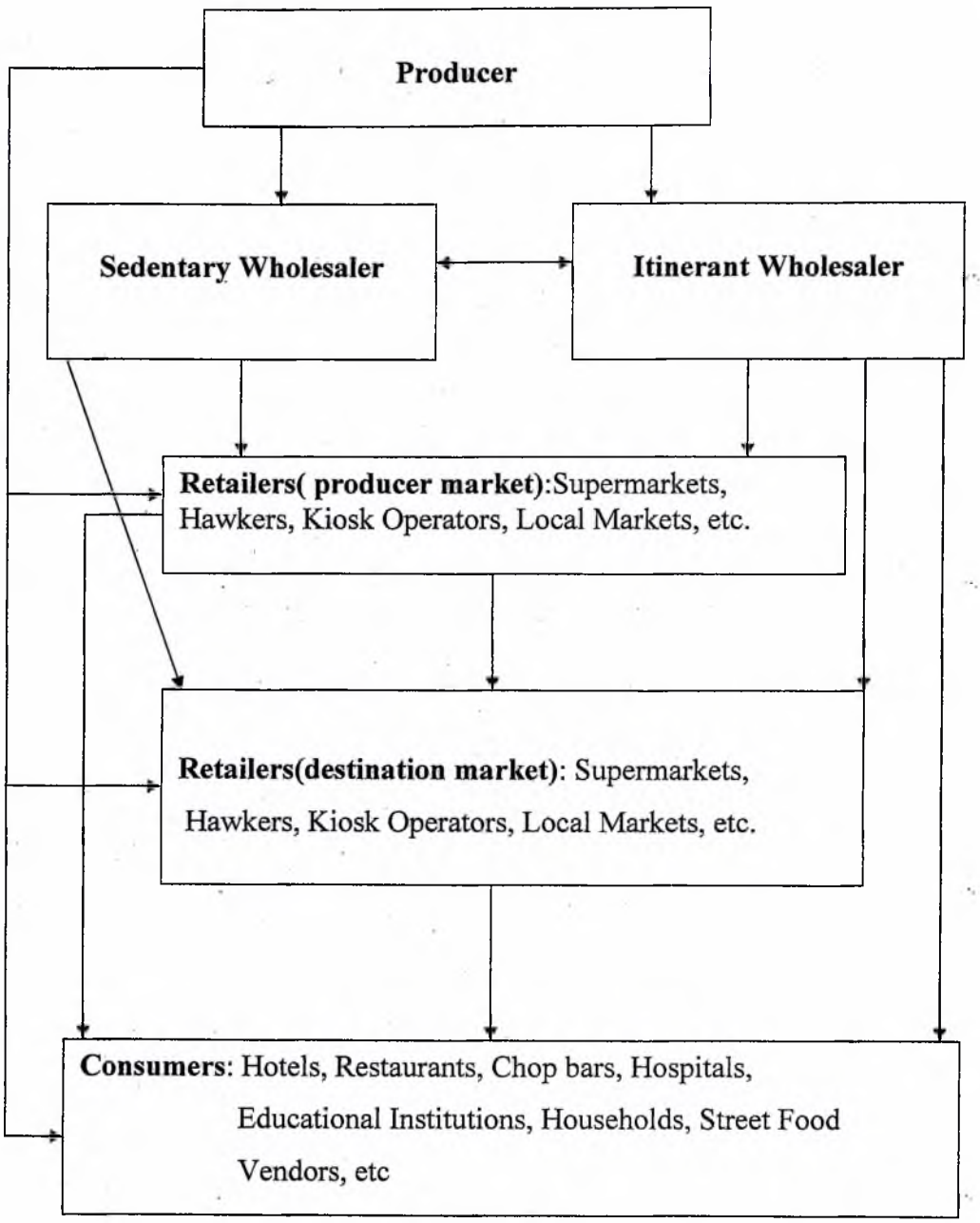
ii. From the producer, through the itinerant wholesaler, the destination market retailer, to the consumer.

iii. From the producer, through the itinerant wholesaler, to the consumer.

Consequently, the number of market participants functioning between the producer and the consumer varies subject to the nature of the producer market in question (in terms of the scale of operation, concentration of the poultry farms and the alternative outlets available to the producer), seasonality and the transportation facilities available between the producer and consuming markets.

The marketing channels are largely competitive, with each participant or group of participants taking advantage of the demand and supply conditions prevailing in both the producer and the destination markets.

Figure 4.1 Marketing Channels for the Table Egg in Ghana



4.2.1 Table Egg Marketing at the Producer Level

The table egg producer is the first in the link of the table egg marketing network. Out of the 60 farmers interviewed, 35 percent had been in the table egg enterprise for the past 10 years whiles 45 percent had been producing table eggs for the last 15 years. The remaining 20 percent had been in the enterprise for more than 20 years.

As regards the scale of production, about 52% were in the small scale category (with production capacity of 1 to 49 crates daily). The medium scale producers (with production capacity of 50 to 150 crates daily) constituted 40% while the large scale farmers (producing more than 150 crates daily) made up 8% of producers interviewed.

All the farms surveyed in the study are in the table egg business for commercial purposes. Irrespective of the scale of production, producers who are located within easy reach of consumers are able to market a considerable proportion of eggs directly to the consumer. Their customers are usually made up of individuals (households), hotels, schools, hospitals and other institutions.

The percentage responses of points of sale of the table egg by producers are shown in Table 4.1. The majority of the table egg producers interviewed in the survey sell the commodity at the farm gate. About 87 percent (52 responses) of producers interviewed reportedly sell at the farm gate, whiles 58 percent (35 responses) sell through the producer's own retail outlet. From the responses obtained, only 5 percent (3 responses) of the respondents sell their eggs in the local market. Concerning inter- regional movement of the commodity, 53 (88 percent) of the table egg producers who responded to the questionnaire in the producing areas sell

within the producing regions. Forty three percent of the respondents (26 responses) also sold the commodity outside the producing region. Categorisation into the various scales of production and their percentage responses are also shown in Table 4.1.

Table 4.1 The Points of Sale of the Table Egg by the Producers: Multiple Responses

Sales Point	Small Scale	**% Responses**	Medium Scale	**% Responses**	Large Scale	**% Responses**	**Total Responses**
Farm gate	31	***100***	18	***75***	3	***60***	52
Local market	2	***7***	1	***4***	0	-	3
Retail Outlet	12	***23***	18	***75***	5	***100***	35
Within Region	31	***100***	18	***75***	4	***80***	53
Outside Region	0	-	21	***88***	4	***80***	26

Source: Survey Data, 2004.

Table 4.2 presents the results of the category of buyers from the table egg producers. All of the producers (60 responses) interviewed sell to the retailer, 63 percent (38 responses) to the wholesaler and 28 percent (28 responses) to the consumer. It can be seen that in terms of the number of responses, the producers deal more with retailers, followed by the wholesaler and then the consumer. The results seem to reveal that unlike most commodity marketing systems there exists a lower role of the wholesaler in the table egg marketing system than that of the retailer. This phenomenon may likely be due to the high risk involved in assembling the commodity due to its fragile and perishable nature, therefore wholesalers who are normally associated with handling large volumes or quantities of a given product may not want to undertake such risky task. The category of producers and their percentage responses are also shown in Table 4.2.

Table 4.2. Category of Buyers from the Table Egg Producer: Multiple Responses

Buyer	Small Scale	% Responses	Medium Scale	% Responses	Large Scale	% Responses	Total Responses
Wholesaler	7	*23*	24	*100*	5	*100*	38
Retailer	31	*100*	24	*100*	5	*100*	60
Consumer	9	*29*	7	*29*	2	*40*	17

Source: Survey Data, 2004.

4.2.2 Table Egg Marketing at the Trader Level

In the table egg marketing system in Ghana, wholesalers and retailers constitute the principal intermediaries occurring between the producer and the final consumer. These intermediaries perform different marketing functions and as a result get a net profit, which represents a reward for the functions they perform. Results of the survey regarding the market functionaries at the trader level in the table egg marketing system are presented.

Wholesalers

Two categories of wholesalers were found to be operating in the table egg marketing system in Ghana. They consist of the itinerant wholesalers who move the commodity between the producer and destination markets, and the sedentary wholesalers who are based in the producer or destination markets. The itinerant wholesalers perform the function of assemblage in the table egg marketing system. They carry out bulking and transportation of the commodity from the farm gate to the local and central markets. The wholesalers hold large stocks of table eggs over periods ranging between one and three weeks. They therefore bear much of the risks associated with the transportation, handling and temporary storage of the commodity in the course of moving it from the point of production to the point of sales.

The survey covered 15 wholesalers- 2 from the Sunyani area, 5 from the Kumasi area and 8 from the Accra area (destination market). Eight (constituting 53 percent) of the wholesalers were itinerant, buying from the producing areas and transporting to the consuming centres for sale. On the other hand the other 7 (47 percent) were sedentary wholesalers, buying and reselling within the producing areas.

Out of the 15 wholesalers interviewed, 7 (47 percent) rely largely on the egg trade as their means of livelihood, and of these, 4 (57 percent) are itinerant and 3 (43 percent) sedentary. Eight (53 percent) of the wholesalers interviewed have other sources of income including trading in other commodities and of these, 6 (75 percent) are itinerant and 2 (25 percent) are sedentary.

The wholesaler obtains her stock of eggs from three main sources. All (100 percent) of the wholesalers interviewed obtained their eggs from the producers as well as from other sources: 67 percent getting their eggs from other wholesalers and 13 percent from retailers. The occasion where wholesalers obtained their eggs from retailers arises when there are supply deficits whereby the wholesaler needs stock to keep her customers. The sources of the wholesalers' stock of table eggs are presented in Table 4.3.

Table 4.3 Sources of Wholesaler's Table Egg Stock

Source	Number of Responses	Percentage of Responses
Producers	15	100
Other Wholesalers	7	67
Retailers	2	13

Source: Survey Data, 2004

Table 4.4 presents the category of buyers of the wholesaler's stock of table eggs. It can be seen that all the wholesalers interviewed sell to retailers along with other buyers. That is, 33 percent of the wholesalers also sell to other wholesalers and 60 percent to consumers.

Table 4.4 Category of Buyers of Wholesaler's Stock of Table Eggs

Buyer	Number of Responses	Percentage of Responses
Wholesaler	5	33
Retailer	15	100
Consumer	9	60

Source: Survey Data, 2004

Retailers

Thirty six (36) retailers, made up of 19 retailers in the Accra area (destination market), 11 in the Kumasi area (producer market) and 6 in the Sunyani (producer market) area were covered in survey. All the retailers interviewed operate in their respective local markets. They bought table eggs in units of 10 to 50 crates and retailed them to consumers in their respective markets namely supermarkets, local market stalls and as hawkers and kiosk

operators. About 83 percent of the retailers interviewed rely exclusively on the egg trade as their source of income, whiles 17 percent have other sources of livelihood which include small grocery businesses involving the sale of food and household goods.

The study discovered three main sources of table eggs for the retailer, as shown in Table 4.5. All the retailers interviewed buy the commodity directly from producers located in the same locality as themselves, in addition to other sources. Sixty-seven (67) percent buy from wholesalers, whiles 14 percent source from other retailers as well. Evidently the average retailer prefers to source the commodity from the producer than from any other category of sellers. The dominant reason is that buying the egg directly from the producer guarantees getting the commodity fresh and at a reduced price.

Table 4.5 Sources of Retailer's Stock of Table Eggs

Source	Number of Responses	Percentage of Responses
Producer	36	100
Wholesaler	24	67
Retailer	5	14

Source: Survey Data, 2004

Table 4.6 shows the customers of the retailer's stock of table eggs. All of the 36 retailers interviewed sell to the consumer in addition to other buyers. Nineteen of them (constituting 53 percent) sell to other retailers and 5 (constituting 14 percent) also sell to wholesalers. Retailers who are in a position to source from producers in their locality and take advantage of lower prices sell to these other retailers (the 14 percent). Occasions where retailers sell to wholesalers arise when there exist supply deficits, necessitating strategic purchases of eggs

by the wholesaler from the retailer for purposes of stock maintenance in order not to lose her customers hence maintaining her market share.

Table 4.6 Buyers of the Retailer's Stock of Table Egg

Buyer	Number of Responses	Percentage of Responses
Wholesaler	5	14
Retailer	19	53
Consumer	36	100

Source: Survey Data, 2004

4.3 The Table Egg Marketing Margin

The distribution of the net marketing margin of the table egg and therefore the share of the participants of the consumer price were computed from the mean purchasing and selling prices and the marketing costs per crate of table eggs at three major segments- the producer, wholesaler and retailer levels of the marketing channel. The marketing cost data for the computation were estimated based on the marketing charges collected during the period of the study 2001 to 2004.

Computed Mean Prices of Table Eggs

The computed mean prices of the table egg over the given period (2001-2004) for the three major segments of the table egg marketing channels are summarized in Table 4.7. The table shows that during the first quarter of 2001 (Jan-March 2001), the wholesale price exceeded the producer price by about 22 percent and dropped to about 7 percent during the third quarter of 2002 (July-Sept 2002). A single digit percentage value was maintained throughout

Table 4.7 Quarterly Mean Prices of Table Egg covering 2001 to 2004 for the Producer, Wholesaler and Retailer

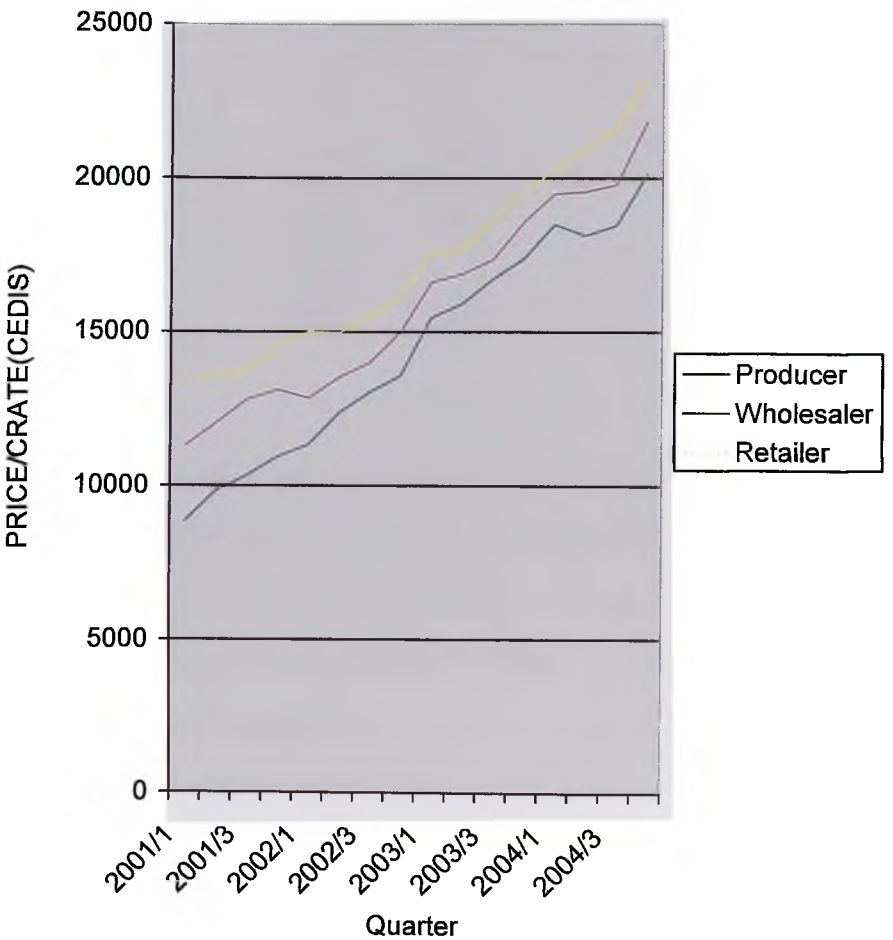
Period	Average Price Per Crate(Cedis)			Percentage Price Difference		
	Producer	Wholesaler	Retailer	Producer/ Wholesaler	Wholesaler/ Retailer	Retailer/ Producer
Jan-Mar-01	8851	11308	13446	22	16	34
April-Jun-01	9818	12037	13606	18	12	28
Jul-Sept-01	10326	12805	13725	19	7	25
Oct-Dec-01	10939	13112	14598	17	10	25
Jan-Mar-02	11337	12849	14999	12	14	24
April-Jun-02	12375	13536	14966	9	10	17
Jul-Sept-02	13047	14006	15510	7	10	16
Oct-Dec-02	13582	15003	16170	9	7	16
Jan-Mar-03	15475	16620	17576	7	5	12
April-Jun-03	15915	16891	17636	6	4	10
Jul-Sept-03	16725	17357	18674	4	7	10
Oct-Dec-03	17387	18583	19506	6	5	11
Jan-Mar-04	18492	19488	20290	5	4	9
April-Jun-04	18137	19561	20966	7	7	13
Jul-Sept-04	18463	19785	21548	7	8	14
Oct-Dec-04	20127	21840	23210	8	6	13

Source: Computed from GNAPF data file

the rest of the period covered in the survey. For the wholesaler/retailer price difference, it can be seen from Table 4.7 that during the first quarter of 2001 (Jan-March 2001), the retail price exceeded the wholesale price by about 16 percent, dropping to 7 percent in the last quarter of 2002 and remained around that level for the rest of the period covered in the study. Regarding the retailer/producer price variation, Table 4.7 shows that the retail price exceeded the producer price by about 34 percent in the first quarter of 2001 (Jan-March

2001) and reduced gradually to about 10 percent in the second quarter of 2003 (April-June 2003) and remained in the same percentile vicinity up to the second quarter of 2004 when it rose marginally to about 14 percent and remained in this neighbourhood up to the fourth quarter of 2004 (Oct-Dec 2004). The trend in pricing of table eggs for the producer, wholesaler and retailer are graphically illustrated in Figure 4.2.

Figure 4.2 Average Quarterly Prices of Table Eggs



Estimated Marketing Costs of the Table Egg

In performing marketing functions, all market participants incur some costs. Table 4.8 shows the estimated average marketing costs of a crate of table eggs for the producer, wholesaler and retailer for the period covered in the survey. Although these calculations are based on the survey data, they are rough estimates derived from simplified and conjectural assumptions of the approved marketing costs and therefore only illustrative.

Table 4.8 Estimated Average Marketing Costs per Crate of Table Egg for the three Segments in the Marketing Channel (2001-2004):

Cost Item	Producer	% Cost	Wholesaler	% Cost	Retailer	% Cost
Packaging	160.00	12.44	140.00	10.93	65.00	15.39
Storage	92.00	7.15	36.75	2.87	10.28	2.43
Handling	50.00	3.89	75.46	5.89	25.00	5.92
Transport	589.05	***45.80***	550.00	***42.95***	200.00	***47.37***
Product Losses	275.15	***21.39***	207.37	***16.19***	80.20	***18.99***
Fees	50.05	3.89	133.25	10.41	16.02	3.79
Unexpected	70.00	5.44	137.65	10.75	25.75	6.10
Total	1286.25	100	1280.48	100	422.25	100

Source: Survey Data

From Table 4.8, it can be seen that transportation constitutes the highest marketing cost item for each of the market functionaries. These are 46 percent, 43 percent and 47 percent for the producer, wholesaler and retailer respectively. On the whole, the cost component of transportation charges constitutes about 45 percent of the total marketing cost. Product losses constitute the next important cost item, taking up about 21 percent for the producer, 16 percent for the wholesaler and 19 percent for the retailer.

The Distribution of the Marketing Margin

The computed mean per crate prices and costs outlined in the preceding sections were employed in determining the distribution of marketing margins for the market participants. These are shown in Table 4.9.

Table 4.9 The Marketing Margin Distribution (yearly) to the Producer, Wholesaler and Retailer over the period covered in the survey (2001-2004) [Cedis/ crate]

Item	2001	2002	2003	2004
FP	9984	12585	16376	18805
Wp	12316	14849	19363	22169
C_P	13833	17411	21840	26504
TMC_P	850	1020	1525	1750
TMC_W	925	950	1450	1797
TMC_R	324	405	407	553
PC_P(%)	**12**	**17**	**16**	**17**
WC_P(%)	**10**	**8**	7	**6**
RC_P(%)	**9**	**12**	**9**	**14**
TMC(¢)	2099	2375	3382	4100
TMCCp(%)	28	22	18	15
TMC_T(%)	35	35	35	35
TM(%)	**31**	**37**	**32**	**37**
Price Spread	3860	4826	5465	7699
CPI (food)	179.4	213.2	264.4	308.4
Л value	**21.52**	**22.64**	**20.67**	**24.96**

Source: Survey Data

Where:

FP= Farm gate Price

Cp= Consumer Price

Wp= Wholesaler Price

TMCp= Total Marketing Cost (Producer)

TMCw= Total Marketing Cost (Wholesaler)

TMC_R= Total Marketing Cost (Retailer)

PCp(%)= Producer's Share of the Consumer Price

WCp(%)= Wholesaler's Share of the Consumer Price

RCp(%)= Retailer's Share of the Consumer Price

TMC(%)= Total Marketing Costs

TMCCp(%)= Share of the Consumer Price to Total Marketing Costs

TMC_T = The Proportion of TMC constituting Transport Charges

TM= Total Margin

CPI (food)= Consumer Price Index for food

JI value = Price spread / CPI (food)

Table 4.9 shows that during 2001, the consumer price of ¢13,844 was distributed as 12 percent, 10 percent, 9 percent and 28 percent respectively to the producer, wholesaler, retailer and to marketing costs. In year 2002, the consumer price of ¢17,411 was distributed as 17 percent to the producer, 8 percent to the wholesaler, 12 percent to the retailer and 22 percent to marketing costs. The consumer price of ¢21,840 per crate of table eggs in year 2003 was also distribute as 16 percent to the producer, 7 percent to the wholesaler, 9 percent to the retailer and 18 percent to marketing costs. In year 2004, out of the ¢26,504 paid for a

crate of eggs by the consumer, 17 percent went to the producer, 6 percent to the wholesaler, 14 percent went to the retailer whiles marketing costs absorbed 15 percent. The largest component of the total margin is due to the producer. Mendoza (1993) noted that the uniformity of the marketing margin among the various agents is evidence of proximity to an efficient marketing system with a competitive market structure. That is not evident from the result of this survey presented in Table 4.9.

A close examination of Table 4.9 clearly shows that during the period covered in the survey, there was a sharp increase in the producer's share of the consumer price, rising from 12 percent in 2001 to 17 percent in 2004. Regarding the total margin, it rose from 31 percent in 2001 to 37 percent in 2002, dropping again to 32 percent in 2003 but climbing again to 37 percent in 2004. These values translate into an average total margin of 34.25 percent, implying that only about 34.25 percent of the consumer price is shared by the market participants giving the indication that about 65.75 percent (100 less 34.25) of the consumer price is taken up principally by marketing costs. This result is a clear indication of the lack of efficiency in the table egg marketing system in Ghana.

One can infer a non-competitive market structure and an inefficient table egg marketing system. This is due to the producer earning net profits above the wholesaler and the retailer and the marketing costs forming upwards of 28 percent of the consumer price in year 2001 albeit reducing to 15 percent in 2004.

The results decidedly do not harmonize with what is expected in a competitive market. In economic theory, a competitive marketing system has low marketing costs, prevents the

market agents in the marketing channels from gaining abnormal profits and ensures the maximization of returns to the producer and intermediaries on the one hand, and consumer satisfaction on the other hand.

The price spread is the difference between the price paid by the consumer and the price received by the producer. Theoretically, the lower the price spread in a marketing system, the more efficient it is (McKenzie, 1996). From Table 4.9, the price spread is lowest in year 2001 at ¢3860 and highest in year 2004 at ¢7699. In order to establish a basis for comparing the price spreads for the given periods, one needs to factor in the rate of inflation which is represented by the Consumer Price Index for food (CPI_{food}). Dividing each year's price spread by its CPI gives values denoted by Л. Theoretically, the lower the Л value of a marketing system, the more efficient it is. Comparing the Л values, one can deduce that efficiency in the table egg marketing system was higher in year 2003 ($Л_{2003}$ = 20.67) and lowest in 2004 ($Л_{2004}$ =24.96).

4.4 Testing for differences between Mean Egg Prices within years

. In order to establish a basis for comparing the mean prices for the given periods, one needs to establish that statistically, the differences in the mean prices are significant. Tables 4.10 shows the Student's t-test results for determining if there exist any significant differences between mean egg prices within each of the years covered in the survey

Table 4.10 Results of t-test of mean Table Egg Prices within years (2001 to 2004)

Year	Mean prices being compared	Observations	df	t-statistic
2001	Farm gate Price/ Wholesale Price	36	60	-8.001920546*
	Farm gate Price/ Consumer Price	36	60	-14.9571641*
	Wholesale Price/ Consumer Price	36	60	-4.786446911*
2002	Farm gate Price/ Wholesale Price	36	60	-2.948289906*
	Farm gate Price/ Consumer Price	36	60	-6.517780858*
	Wholesale Price/ Consumer Price	36	60	-3.742322115*
2003	Farm gate Price/ Wholesale Price	36	60	-1.315902522**
	Farm gate Price/ Consumer Price	36	60	-2.445883828*
	Wholesale Price/ Consumer Price	36	60	-1.220949882*
2004	Farm gate Price/ Wholesale Price	36	60	-1.79263496*
	Farm gate Price/ Consumer Price	36	60	-2.991400063*
	Wholesale Price/ Consumer Price	36	60	-1.361624468**

* Significant at the 5% level
** Significant at the 10% level
Tabulated value at 5% significant level for a two-tailed test is 2.000
Tabulated value at 10% significant level for a two-tailed test is 1.671

Results as shown in Table 4.10 indicate that there is significant difference between mean egg prices within years as shown by the t-statistic calculated values being compared with the tabulated values.

4.5 Determination of the Extent of Integration of the Table Egg Marketing System

4.5.1 Stationarity (Unit Root) Test Results: The Augmented Dicky-Fuller (ADF) Test Results

Before undertaking the econometric estimations, unit root tests using the Augmented Dicky-Fuller (ADF) tests were constructed to determine if the variables are characterized by stationarity (or non-stationarity) and also determine their order of integration. From Table 4.10, Sunyani Wholesale Price was integrated of order two, I (2), implying that the variable became stationary after its second differencing. All the other explanatory variables namely, Accra Farm gate Price, Accra Wholesale Price, Accra Consumer Price, Kumasi Farm gate Price, Kumasi Wholesale Price, Kumasi Consumer Price, Sunyani Farm gate Price, and

Sunyani consumer Price were integrated of order one I (1). All the variables have intercepts while some require trend as presented in Table 4.11.

Table 4.11 Unit Root Test Results

Variable	Intercept	Trend	Order of Integration
Accra Farm gate Price	Yes	Yes/No	1
Accra Wholesale Price	Yes	Yes/No	1
Accra Consumer Price	Yes	Yes/No	1
Kumasi Farm gate Price	Yes	Yes/No	1
Kumasi Wholesale Price	Yes	Yes/No	1
Kumasi Consumer Price	Yes	Yes/No	1
Sunyani Farm gate Price	Yes	Yes	1
Sunyani Wholesale Price	Yes	Yes/No	2
Sunyani Consumer Price	Yes	Yes	1

Source: Author's computation

4.5.2 Cointegration Test Results

Unit root tests are performed on the residuals of the current study's econometric models as specified in equations 9 and 10 to find out whether the variables in each of the models are cointegrated. Testing for the stationarity of the residuals in order to establish whether the relevant variables are cointegrated provides a way to determine whether there is a long run equilibrium relationship between these variables (Johnston and DiNardo, 1997).

Table 4.12 Cointegration Equation: Model 1

Dependent Variable: ACCRA WHOLESALE PRICE

Method: Least Squares

Sample(adjusted): 2001:03 2004:12
Included observations: 46 after adjusting endpoints
Convergence achieved after 8 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ACCRA WHOLESALE PRICE(-1)	0.565465	0.149100	3.792527	0.0005
KUMASI WHOLESALE PRICE	-0.053100	0.188491	-0.281710	0.7797
KUMASI WHOLESALE PRICE(-1)	0.303690	0.181348	1.674632	0.1022
SUNYANI WHOLESALE PRICE	0.226176	0.215258	1.050717	0.3000
SUNYANI WHOLESALE(-1)	0.338322	0.290323	1.165328	0.2511
CONSTANT (C)	-3053.722	1208.186	-2.527528	0.0158
@SEASON(FOURTH QUARTER)	232.2254	350.3724	0.662796	0.5115
AR(1)	0.350944	0.233214	1.504819	0.1406
R-squared	0.980740	Mean dependent var		19172.36
Adjusted R-squared	0.977192	S.D. dependent var		4494.772
S.E. of regression	678.8105	Akaike info criterion		16.03533
Sum squared resid	17509781	Schwarz criterion		16.35336
Log likelihood	-360.8126	F-statistic		276.4310
Durbin-Watson stat	2.039619	Prob(F-statistic)		0.000000
Inverted AR Roots	.35			
ADF Test Statistic	-4.0607	1%Critical Value*	-3.5850	
		5% Critical Value	-2.9286	
		10% Critical Value	-2.6021	

*MacKinnon critical values for rejection of hypothesis of a unit root.
Source: Author's computation.

From Table 4.12, the variables in Model 1 are cointegrated. Model 1 shows the relevant long run equilibrium relationship between Accra Wholesale Price and the explanatory variables presented in Table 4.12. The relevant ADF statistic of negative 4.06 is significant at the 1 percent level, implying a rejection of the null hypothesis of non-stationarity in favour of the alternative hypothesis of stationarity of the estimated residuals in Model 1. The coefficient of determination (R^2) is approximately 98 percent, meaning that the model explains 98 percent of the variations in the Accra Wholesale Price. The F-statistic with a probability

value of zero shows that the explanatory variables jointly explain variation in the Accra Wholesale Price. A corrected autocorrelation AR (1) model has been estimated.

The coefficient of lagged (previous month's) Accra Wholesale Price shows a positive sign, indicating that higher wholesale price in Accra in the previous month would reflect in higher Accra wholesale price during the current month. This effect agrees with a priori expectation and is significant at 1 percent significant level. The current period's Kumasi Wholesale Price, for a crate of eggs has a negative coefficient and this does not agree with a priori expectation. Additionally it is not significant. The lagged Kumasi Wholesale Price, Sunyani Wholesale Price and lagged Sunyani Wholesale Price (of a crate of table eggs) all have positive effects on the Accra Wholesale Price, but these effects are not significant. Seasonality has an effect on the dependent variable. Demand for the table egg is perceived to be highest during the fourth quarter of each year, hence it being factored into Model 1 as Fourth Quarter Season (October-December). It shows a very high positive coefficient of 232.23, implying that during the third quarter of the year (seasonality) wholesale price of the table egg in Accra is very high, though this is not significant. The magnitude of the coefficients of the explanatory variables in Model 1 are equal to their elasticities.

From Table 4.13, the variables in Model 2 are cointegrated. Model 2 shows the relevant long run equilibrium relationship between Accra Wholesale Price and the explanatory variables presented in Table 4.13. The relevant ADF statistic of negative 4.50 is significant at the 1 percent level, implying a rejection of the null hypothesis of non-stationarity in favour of the alternative hypothesis of stationarity of the estimated residuals in Model 2. The coefficient of determination (R^2) is approximately 98 percent, meaning that the model explains 98

percent of the variations in the Accra Wholesale Price. The F-statistic with a probability value of zero shows that the explanatory variables jointly explain variation in the Accra Wholesale Price. A corrected autocorrelation AR(1) has been estimated.

The coefficient of lagged (previous two months) Accra and Kumasi wholesale prices show negative signs, indicating that higher wholesale prices in Accra and Kumasi in the previous two months would reflect in lower Accra wholesale price during the current month. These effects do not agree with a priori expectation, yet are significant at 5 percent and 10 percent significant levels for Accra and Kumasi respectively.

Table 4.13 Cointegration Equation: Model 2

Dependent Variable: ACCRA WHOLESALE PRICE
Method: Least Squares
Sample(adjusted): 2001:04 2004:12
Included observations: 45 after adjusting endpoints
Convergence achieved after 10 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ACCRA WHOLESALE PRICE(-1)	1.267374	0.190200	6.663380	0.0000
ACCRA WHOLESALE PRICE(-2)	-0.468390	0.179093	-2.615350	0.0131
KUMASI WHOLESALE PRICE	0.032327	0.207756	0.155600	0.8772
KUMASI WHOLESALE PRICE(-1)	0.466455	0.256341	1.819667	0.0774
KUMASI WHOLESALE PRICE(-2)	-0.343071	0.174578	-1.965139	0.0574
SUNYANI WHOLESALE PRICE	0.007971	0.249983	0.031884	0.9747
SUNYANI WHOLESALE PRICE(-1)	0.329108	0.374778	0.878140	0.3859
SUNYANI WHOLESALE PRICE(-2)	-0.097814	0.271815	-0.359853	0.7211
CONSTANT	-1770.268	794.7164	-2.227547	0.0324
AR(1)	-0.392707	0.193047	-2.034256	0.0496
R-squared	0.982492	Mean dependent var		19296.19
Adjusted R-squared	0.977991	S.D. dependent var		4465.506
S.E. of regression	662.4841	Akaike info criterion		16.02300
Sum squared resid	15360980	Schwarz criterion		16.42448
Log likelihood	-350.5175	F-statistic		218.2377
Durbin-Watson stat	1.979010	Prob(F-statistic)		0.000000
Inverted AR Roots	-.39			

*MacKinnon critical values for rejection of hypothesis of a unit root.

Table 4.14 Cointegration Equation: Model 3

Dependent Variable: ACCRA FARM GATE PRICE
Method: Least Squares
Sample(adjusted): 2001:03 2004:12
Included observations: 46 after adjusting endpoints
Convergence achieved after 11 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ACCRA FARMGATE PRICE(-1)	0.509968	0.314773	1.620112	0.1133
KUMASI FARMGATE PRICE	1.153729	0.403503	2.859281	0.0068
KUMASI FARMGATE PRICE(-1)	-0.209363	0.695099	-0.301198	0.7649
SUNYANI FARMGATE PRICE	-0.473409	0.311502	-1.519764	0.1366
SUNYANI FARMGATE(-1)	0.392791	0.409102	0.960130	0.3429
CONSTANT (C)	-3097.038	2135.907	-1.449987	0.1551
AR(1)	0.422314	0.364893	1.157363	0.2542
R-squared	0.974145	Mean dependent var		17505.87
Adjusted R-squared	0.970167	S.D. dependent var		4982.737
S.E. of regression	860.6265	Akaike info criterion		16.49247
Sum squared resid	28886438	Schwarz criterion		16.77074
Log likelihood	-372.3267	F-statistic		244.9014
Durbin-Watson stat	1.832904	Prob(F-statistic)		0.000000
Inverted AR Roots	.42			
ADF Test Statistic -4.603159	1% Critical Value*		-3.5850	
	5% Critical Value		-2.9286	
	10% Critical Value		-2.6021	

*MacKinnon critical values for rejection of hypothesis of a unit root.

Table 4.14 presents the estimated results for the Accra Farm gate Price Model (Model 3) with the explanatory variables shown in Table 4.14. The relevant ADF statistic of negative 4.60 is significant at 1 percent level, implying a rejection of the null hypothesis of non-stationarity in favour of the alternative hypothesis of stationarity of the estimated residuals in Model 2. The coefficient of determination (R^2) is about 97 percent, meaning that the estimated model explains 97 percent of the variations in the Accra Farm gate Price. The F-statistic with a probability value of zero percent shows that the explanatory variables jointly explain variation in the Accra farm gate price of a crate of table eggs. A corrected autocorrelation AR (1) model has been estimated.

The coefficients of the lagged Accra farm gate price and Kumasi and Sunyani farm gate prices in Model 3 are seen to be positive. However, only the Kumasi farm gate price coefficient is significant at the 1 percent level. The results for lagged Accra farm gate and Sunyani farm gate prices are however not significant. These results suggest that a higher farm gate price in Accra of the previous month, and higher farm gate prices in Kumasi would reflect in higher farm gate prices in the Accra but only the Kumasi result is significant.

Table 4.15 Cointegration Equation: Model 4

Dependent Variable: ACCRA FARM GATE PRICE
Method: Least Squares
Sample(adjusted): 2001:04 2004:12
Included observations: 45 after adjusting endpoints
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ACCRA FARM GATE PRICE(-1)	1.059727	0.386453	2.742185	0.0093
ACCRA FARM GATE PRICE(-2)	-0.425943	0.338160	-1.259591	0.2155
KUMASI FARM GATE PRICE	0.920094	0.285331	3.224650	0.0026
KUMASI FARM GATE PRICE(-1)	-0.570815	0.613869	-0.929865	0.3583
KUMASI FARM GATE PRICE(-2)	0.304921	0.442700	0.688775	0.4951
CONSTANT (C)	-2428.339	1092.654	-2.222423	0.0323
AR(1)	-0.056422	0.410693	-0.137383	0.8915

R-squared	0.971246	Mean dependent var	17682.88
Adjusted R-squared	0.966706	S.D. dependent var	4890.606
S.E. of regression	892.3701	Akaike info criterion	16.56767
Sum squared resid	30260326	Schwarz criterion	16.84871
Log likelihood	-365.7727	F-statistic	213.9272
Durbin-Watson stat	1.984444	Prob(F-statistic)	0.000000

Inverted AR Roots	-.06

ADF Test Statistic	-4.101688	1% Critical Value*	-3.5889
		5% Critical Value	-2.9303
		10% Critical Value	-2.6030

*MacKinnon critical values for rejection of hypothesis of a unit root.

Table 4.15 presents the estimated results for another form of the Accra Farm gate Price model where Accra Farm gate Price and Kumasi Farm gate Price are double lagged (the previous two months' prices). The relevant ADF statistic of negative 4.10 is significant at the 1 percent level, implying a rejection of the null hypothesis of non-stationarity in favour of the alternative hypothesis of stationarity of the estimated residuals in Model 4. The coefficient of determination (R^2) is about 97 percent, meaning that the estimated model explains 97 percent of the variations in the Accra Farm gate Price. The F-statistic with a probability value of zero percent shows that the explanatory variables jointly explain variation in the Accra farm gate price of a crate of table eggs. A corrected autocorrelation AR (1) model has been estimated.

The coefficient of lagged Accra Farm gate Price in Model 4 is seen to be positive and significant. The coefficient of Kumasi Farm gate Price is also positive and significant at 1 percent level. This suggests, as in Model 3, that a higher current farm gate price in Accra would reflect in a higher current farm gate price in Kumasi. This effect agrees with a priori expectation. The coefficient of lagged (previous two months) Accra Farm gate Price and lagged (previous month) Kumasi Farm gate Price are both negative and insignificant. The coefficient of double-lagged Kumasi Farm gate Price is positive but insignificant.

4.5.3 Error Correction Model (ECM) Results

The Error Correction Model (ECM) provides a useful link between long run equilibrium relationships and short run dynamics (Gujarati, 1995). The results of the ECM capture short run relationships. The specification of the ECM for cointegration Model 1 involves expressing the first difference of the Accra Wholesale Price of a crate of table eggs as a

function of the first difference of the independent variables in the cointegrating equation. Specifically, it implies Kumasi Wholesale Price is one period lagged of the Accra Wholesale Price, Kumasi Wholesale Price and Sunyani Wholesale Price, two periods lagged of the Accra Wholesale Price, Kumasi Wholesale Price and Sunyani Wholesale Price and three periods lagged of the Accra Wholesale Price and residual value for the for the cointegrated Model 1. This residual term is called the Error Correction Term (ECT). It re-states the levels, and hence the long run considerations into the different specifications that describe the short-run relationships between the variables (Dittman, 2004).

The general performance of the Error Correction Model 1 can be seen among others, from the coefficient of determination (R^2) and the F-statistic. The F-statistic of 158.90 shows the joint significance of the explanatory variables in explaining the variation in the Accra Wholesale Price in the model. (Table 4.16). The R^2 value of 0.98 means that the model explains about 98 percent of the total variation in the short run Accra Wholesale Price dynamics.

Table 4.16 Error Correction: Model 2

Dependent Variable: 1st diff ACCRA WHOLESALE PRICE
Method: Least Squares
Sample(adjusted): 2001:06 2004:12
Included observations: 43 after adjusting endpoints
Convergence achieved after 19 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
1st diff ACCRA WHOLESALE PRICE(-1)	0.029829	0.030704	0.971498	0.3388
1st diff ACCRA WHOLE ALE PRICE(-2)	0.114211	0.031751	3.597089	0.0011
1st diff ACCRA WHOLESALE PRICE(-3)	-0.043496	0.026498	-1.641513	0.1108
1st diff KUMASI WHOLESALE PRICE	-0.000980	0.026965	-0.036339	0.9712
1st diff KUMASI WHOLESALE PRICE(-1)	0.481298	0.034527	13.93996	0.0000
1st diff KUMASI WHOLESALE PRICE(-2)	0.230991	0.027799	8.309384	0.0000
1st diff SUNYANI WHOLESALE PRICE	-0.011340	0.041708	-0.271886	0.7875
1st diff SUNYANI WHOLESALE PRICE(-1)	0.260175	0.047519	5.475176	0.0000
1st diff SUNYANI WHOLESALE PRICE(-2)	0.155879	0.036370	4.285968	0.0002
RESIDUAL TERM	1.078455	0.028384	37.99552	0.0000
CONSTANT	2884.013	31300.47	0.092140	0.9272
AR(1)	0.992732	0.079656	12.46280	0.0000

R-squared	0.982573	Mean dependent var	350.9695
Adjusted R-squared	0.976389	S.D. dependent var	796.2120
S.E. of regression	122.3443	Akaike info criterion	12.68248
Sum squared resid	464012.0	Schwarz criterion	13.17398
Log likelihood	-260.6734	F-statistic	158.8954
Durbin-Watson stat	0.906402	Prob(F-statistic)	0.000000

Inverted AR Roots	.99

RESIDUAL TERM denotes the error correcting term

The adjustment coefficient of two periods lagged of the Accra Wholesale Price has a positive sign, suggesting that any previous disequilibrium in the long run Accra Wholesale Price would not be corrected in the short run. The short run effects of Kumasi and Sunyani Wholesale Prices are both negative and insignificant. However, the adjustment coefficients of the one and two periods lagged of the Kumasi and Sunyani wholesale prices have positive signs, suggesting that any previous disequilibrium in the long run Accra Wholesale Price would not be corrected in the short run. The residual error correction term has a positive

coefficient and is significant at 1% significant level, implying that the speed of price adjustment is positive at 1.078 and significant at 1 % level.

The ECM for cointegrated Model 3 is presented in Table 4.17. The R^2 value is 0.991523, meaning that the model explains about 99 percent of the variation in the Accra Farm gate Price in the short run. The F-statistic is significantly different from zero. This confirms the view that increase in the previous month's Accra Farm gate Price tends to raise the current Accra Farm gate Price in the short run. It also confirms the view that two periods lagged Accra Farm gate Price and one period lagged Sunyani Farm gate Price are negative and significant in the short run. The rest of the explanatory variables as shown in Table 4.16, have positive coefficients and are also significant in the short run. The coefficient for the residual term (representing the speed of price adjustment) is positive and has magnitude greater than one. It is also significant at 1 percent significant level.

Table 4.17 Error Correction: Model 3
Dependent Variable: 1st diff ACCRA FARMGATE PRICE
Method: Least Squares
Sample(adjusted): 2001:06 2004:12
Included observations: 43 after adjusting endpoints
Convergence achieved after 58 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
1ST diff ACCRA FARMGATE PRICE(-1)	0.098080	0.022554	4.348629	0.0001
1ST diff ACCRA FARMGATE PRICE (-2)	-0.052366	0.015094	-3.469309	0.0015
1ST diff KUMASI FARMGATE PRICE	1.067259	0.030621	34.85398	0.0000
1ST diff KUMASI FARMGATE PRICE(-1)	0.100411	0.032060	3.131961	0.0036
1ST diff SUNYANI FARMGATE PRICE	-0.511453	0.024630	-20.76520	0.0000
1ST diff SUNYANI FARMGATE PRICE(-1)	0.155592	0.026255	5.926075	0.0000
RESIDUAL TERM	1.076366	0.018211	59.10594	0.0000
CONSTANT	148.0849	127.0073	1.165956	0.2520
AR(1)	1.686469	0.154893	10.88795	0.0000
AR(2)	-0.837032	0.163758	-5.111383	0.0000
R-squared	0.991523	Mean dependent var		377.5206
Adjusted R-squared	0.989211	S.D. dependent var		1139.818
S.E. of regression	118.3938	Akaike info criterion		12.58633
Sum squared resid	462564.0	Schwarz criterion		12.99591
Log likelihood	-260.6062	F-statistic		428.8673
Durbin-Watson stat	1.173499	Prob(F-statistic)		0.000000
Inverted AR Roots	.84+.35i	.84 -.35i		

RESIDUAL TERM denotes the error correction term.
Source: Author's computation

4.5.4 Wald Tests for Market Integration

The Wald tests restriction of the F- statistic and Chi-square were applied to the two main hypotheses concerning short run and long run market integration to examine the nature of market integration of the table egg market.

In Table 4.18, the short run restriction of $\beta_{ij}=1$ is shown in the Wald test. The F statistic value of 21.69 which differs significantly from one, with a probability value of 0.000045 shows it is significant at the one percent level. The null hypothesis can therefore be rejected, meaning there exists no short run market integration in the producer market.

Table 4.18 Short Run Market Integration Results for the Producer Market

Null Hypothesis	C(3) = 1		
F-statistic	21.69460	Probability	0.000045
Chi-square	21.69460	Probability	0.000003

In Table 4.19, the short run restriction of βij=1 is shown in the Wald test. The F statistic value of 16.75 which differs significantly from one, with a probability value of 0.000342 shows it is significant at the one percent level. The null hypothesis can therefore be rejected, meaning there exists no short run market integration in the wholesale market.

Table 4.19 Short Run Market Integration Results for the Wholesale Market

Null Hypothesis	C(6) = 1		
F-statistic	16.74806	Probability	0.000342
Chi-square	15.74806	Probability	0.000072

From Table 4.20, the long run market integration for Model 4 is shown. The F statistic value is positive at 6.35 and the probability is significant at 5 percent level. We can therefore reject the null hypothesis that there is long run market integration in the producer market.

Table 4.20 Long – run market integration Results for the Producer Market

Null Hypothesis	C(1) + C(2) + C(3) + C(4) + C(5) = 1		
F-statistic	6.347051	Probability	0.016083
Chi-square	6.347051	Probability	0.011758

From Table 4.21, the long run market integration for Model 2 is shown. The F statistic value is positive at 5.97 which differs significantly from 1 and the probability is significant at 5 percent level. We can therefore reject the null hypothesis that there is long run market integration in the wholesale market, implying that given time, price changes in the destination wholesale market would not cause prices in the producer wholesale markets to adjust. This seems spurious and cannot be logically accepted, and a conclusion to this end may be hard to draw.

Table 4.21 Long – run market integration Results for the Wholesale Market

Null Hypothesis: C(1)+ C(2)+ C(3)+C(4)+C(5)+C(6)+C(7)+C(8)= 1			
F-statistic	5.972350	Probability	0.019714
Chi-square	5.972350	Probability	0.014532

4.6 Impediments to the Efficient Marketing of the Table Egg in Ghana

On the basis of the results of the marketing margins computation and market integration analysis obtained from the evaluation of the performance of the table egg marketing system, the conclusion can be drawn that the table egg marketing system is not efficient. Impediments to table egg marketing efficiency are evaluated in this section.

The responses were drawn from interviews based on semi-structured and open-ended questionnaires administered to both egg producers and traders in the in the marketing channel. Participants identified the following as impediments to efficient table egg marketing in Ghana: transportation difficulties, poor road network, poor market conditions, inadequate storage facilities, product losses, credit sales, inadequate capital and low prices.

The relative importance of the impediments at the producer level, the wholesaler level and the retailer level is presented in Figure 4.3.

Producer Level Impediments

Low prices (reported by 100 percent of producers interviewed), credit sales (100 percent), inadequate capital (86.7 percent), inadequate storage facilities (70 percent) and product losses (70 percent), constitute the most important impediments to the table egg producer. Other producer level impediments include transportation difficulties (20 percent response), poor road network (18.3 percent response) and poor market conditions (8.3 percent response).

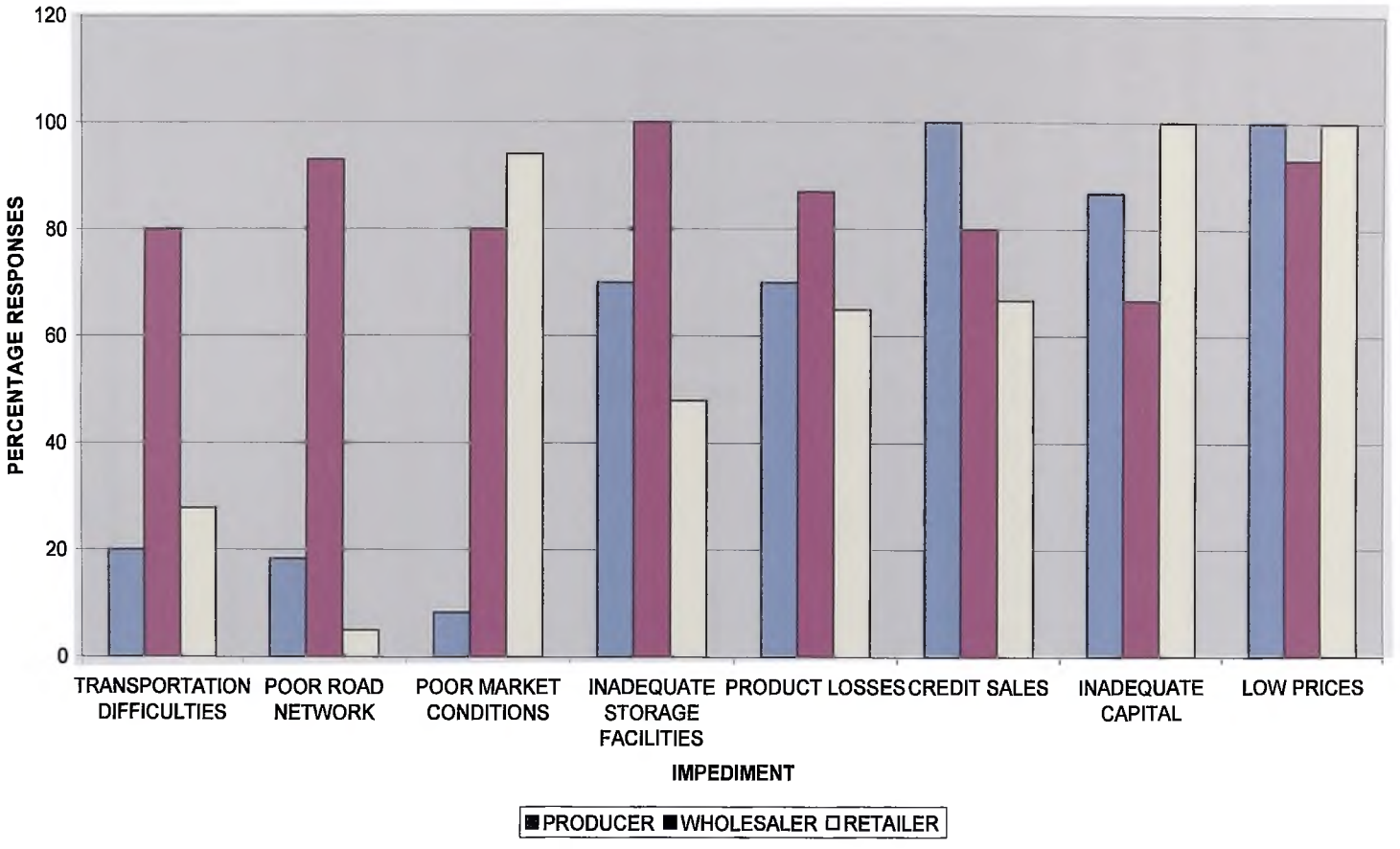
The levels show that most of the impediments are important to a majority of the producers. The issue of low prices presupposes that the producer of the table egg is generally dissatisfied with the price received for the commodity given the high production and marketing costs. Selling the commodity on credit with given terms of payment which are generally not honoured by traders is viewed by all the producers interviewed as an impediment to marketing efficiency as it foments cash flow problems. Inadequacy of operational capital prevents table egg producers to take advantage of economies of scale. Due to the perishable nature (average shelf life being three weeks) and fragility of the table egg, product losses constitute a key impediment at the producer level even as it makes up about 16 percent of marketing costs (see Table 4.8). Apparently, although transportation costs are high for the producer, the average table egg producer does not count transportation difficulties as an impediment. The possible reason could be that most producers generally sell the commodity at the farm gate.

Wholesale Level Impediments

At the wholesale level, the most critical problem is that of inadequate storage facilities, which was reported by 100 percent of the 15 wholesalers interviewed. The problem of inadequate storage facilities is followed by poor road network (93 percent responses), low prices (93 percent responses), product losses (87 percent responses), transportation difficulties, poor market conditions and credit sales (80 percent responses each) and inadequate capital (67 percent responses).

Weighing wholesale level impediments against the producer level and the retailer level impediments presented below, the wholesale level impediments are more pronounced in almost all the cases mentioned. Although transportation difficulties does not constitute the most critical problem, some of the other problems including physical losses result from transportation difficulties, which is itself due to the poor road network connecting the farms and the physical markets.

Figure 4.3 COMPARISON OF FACTORS IMPEDING EFFICIENCY OF TABLE EGG MARKETING AT DIFFERENT PARTICIPANT LEVELS



In the destination market the wholesaler endeavours to dispose of the stock of eggs as quickly as possible in order to avoid more physical losses and spoilage. This suggests that storage inadequacy is an important constraint in table egg marketing.

Retail Level Impediments

Unlike at the producer and wholesale levels, the problems of transportation and poor road network are of very low importance at the retail level, reported by 28 percent and 5 percent respectively of the retailers interviewed. The retailer's most critical impediments are inadequate capital and low prices, both were indicated by all the respondents.

The other impediments in order of importance are poor market conditions (94 percent of the respondents), credit sales (67 percent of the respondents), product losses (65 percent of the respondents), and inadequate storage facilities (48 percent of the respondents).

Access to Market Information

Market information on the table egg provides the means of increasing the efficiency of the marketing system and promoting improved price formation. It enables the egg producer to plan his production more in line with market demand, scheduling increased output at the most profitable times and negotiate on a more even footing with other participants (traders) in the market. Traders also benefit from market information by way of increased profitable movement of the commodity from a surplus to a deficit market and to make decisions about the viability of carrying out storage and other marketing functions, where technically possible (Shepherd, 1997).

The types of information considered in this study include the supply conditions of the table egg, transport charges and government policy regarding the marketing of the table egg. Results of the survey show that about 90 percent of the producers interviewed received market information from other individual producers, 55 percent from traders and 25 percent from producer associations. Only 6 percent of the producers interviewed obtained market information by personal observation and analysis of market trends, the electronic and/or print media. It can therefore be deduced that the information flow to the table egg producer is largely non-formal.

About 75 percent of the wholesalers interviewed obtained market information from other traders, 40 percent from transporters and 60 percent from producers. On the hand, about 80 percent of the retailers interviewed obtained market information from other traders and 57 percent from the producer.

By and large, market information flow to various market functionaries has been informal. Information on prices, supply and demand conditions, transport charges and other market charges is gotten from informal sources comprising of farmers (producers), traders, and transporters.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The study evaluated the performance of the table egg marketing system in Ghana. This included market structure analysis involving the identification of the existing marketing channels and the determination of the share of the marketing margin for three key participants of table egg marketing system, namely the producer, the wholesaler and the retailer. Particular emphasis of the evaluation was based on pricing and inter-market arbitrage, using market integration analysis.

The present chapter is divided into three sections. In the second section, a summary of the findings, implications and conclusion is presented. In the third section, the recommendations drawn from the implication of the study are presented.

5.2 Summary of Findings and Conclusion

The market structure analysis employed the commodity sub-systems approach. About eight marketing channels were identified. These channels were noted to be moderately unorganised with few itinerant wholesalers and a large number of retailers. The dominant channel was found to be the producer-retailer path.

The distribution of the net marketing margin seemed to favour the producer more than the wholesaler and retailer and this could be attributed to the dominance of the producer- retailer channel whereby the producer is able to take advantage of the wholesaler's absence and therefore draws from the wholesaler's share of the consumer price. The total margin for the

period covered in the study is less than 40 percent, implying that over 60 percent of the distribution is taken up by other costs, particularly marketing costs.

The results of the market integration analysis obtained by employing the Cointegration analysis and Error Correction Model (ECM) show that price signals in the destination market Accra, are not transmitted instantly to the producer markets Sunyani and Kumasi in the short run. The same results show that in the long run, the producer and destination wholesale markets appear not to be integrated. The implications of these findings are that, at least, the marketing system exists and is operational even as a significant price change in the destination (Accra wholesale) market may be transmitted to producer prices in the producer markets. Results of the Wald tests for market integration show that both short run and long run market integration do not exist in the producer and wholesaler markets.

Adopting measures to improve the performance of the table egg marketing system cannot be exhaustively carried out on the basis of market structure and market integration analyses alone. Consequently, the study also examined the intrinsic factors impeding the efficient trade of table eggs between the markets studied. The study revealed that the wholesaler bears the brunt of the multiplicity of factors impeding the efficiency of egg marketing, with the most important ones being inadequate storage facilities, low prices, product losses, poor road network and transportation difficulties.

Finally therefore, the study concludes that, a defined table egg marketing system is in operation in Ghana. However in the short run, the performance of the system is hampered by

pricing inefficiency in that there is delayed price transmission between the producer markets and the destination market..

5.3 Recommendations

From the preceding evaluation, the lack of marketing efficiency in the short run may largely be blamed on poor information flow, product losses and transportation difficulties between the producer and the destination markets. Markets with good infrastructure linked to other markets by good roads and possess effective information systems should have efficient inter-market arbitrage and prices which show less divergence. Ideally therefore, a fair price is assigned to the producer, an adequate profit margin to the trader and the satisfaction of the consumer is assured.

Some policy implications can be drawn regarding measures towards improving efficiency in the marketing system. The measures advocate the removal of barriers that hamper the table egg trade to improve pricing efficiency and improve arbitrage. These barriers may include a) lack of swift and reliable market information flow between the producer and destination markets, b) absence of high quality regulatory framework, c) inadequate capital, d) storage inadequacy, e) transportation difficulties and f) low prices. It is expected that these recommendations will provide key inputs to government policy towards improving agricultural marketing in general and table egg marketing efficiency in particular.

Firstly, with the assistance of a duly instituted government agency, table egg producers should strengthen the base of their farmer associations to promote their participation in the marketing process to enhance its performance. This may require the application of

appropriate technology in sections of the marketing process (e.g. buildings and equipment for storage and value addition). This derives from the fact that table egg marketing is heavily powered by producers' individual initiatives and not by the instrumentality of any central marketing body providing information on product prices and volumes.

Secondly, investors should be encouraged to add value to the product. The table egg may be marketed in a form that makes it more valuable (added value created), or the marketing chain may be shortened to increase the value realised by the producer, while the product remains in its natural form i.e. as fresh egg (recovered added value). As regards creating value addition producers should invest in processing fresh table eggs into dried egg products and frozen egg products. Presently egg processing is limited to its use as an ingredient (in the fresh form) in confectionaries. These value-added products have long shelf-life, stability and functionality. They are used as ingredients in the commercial food processing industry. Hence egg processing is key to improving the shelf life of the commodity, hence the reduction of product losses.

Thirdly, an increase in the access of market participants to market information is also useful. Accurate information on prices, production levels, demand and supply, should be freely, accurately and timely disseminated to help link up the various markets (market integration). In order to improve information flow, the Animal Production Department of MOFA should be revitalized to publish reliable table egg market information to producers, traders and consumers to help in decision rationalization.

Finally, financial institutions should be encouraged by government to develop credit schemes that best suit the needs of table egg producers in the acquisition of inputs to reduce the effect of production costs on the final consumer price. It is expected that these recommendations would enhance the integration of the table egg marketing system and would help reduce price variance among individual market centres, thus enhancing competition.

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APPENDICES

APPENDIX 1

QUESTIONNAIRE FOR PRODUCERS

1. GENERAL INFORMATION

i) Date.....

ii) Location of farm.....

iii) Name of farm.....

iv) Name of farm owner.....

v) Name of respondent.....

vi) Profile of respondent: a) Age_____ b) Sex_____

c) Education_____

vii) Number of years in table egg production. (mark)

1-5 ___ 6- 10___ 11-15___ 16-20___ 21-25___ 26-30___ 31+___

viii) Is the farm operation part-time or full-time? (mark)

1. Yes _____ 2. No_____

2. PRODUCTION AND MARKETING ACTIVITIES

i) How many crates of eggs do you produce per day?.....

ii) What proportion of brown eggs (birds) to white eggs (birds) do you produce (keep)?.....

iii) Assign reasons for your response to (ii) above: .....

iv) Where do you sell the eggs and why do you sell at these points?

Sale Point	Response 1.Yes 2.No	Rank	Reason
1.Farm gate 2.Home 3.Market outlet 4.Within region 5.Outside region 6.Other			

v) Who buys your eggs and why do you sell to this person (rank customers in order of importance).

Buyer	Response Yes=1 No=2	Rank	Reason
1.Wholesaler 2.Retailer 3.Consumer 4.Processor 5.Other			

3. MARKETING COSTS

i) What are the costs you incur in marketing the commodity?

Cost Item	**Cost per unit volume (1 crate)**
Transportation	
Storage	
Commission	
Handling	
Loading	
Unloading	
Packaging	
Spoilage	
Others(Specify)	

4. PRICING AND PRICE INFORMATION

i) What were your average prices last year (2004)?

Period	Price per crate			Quantity sold (crates)		
	Grade 1	Grade 2	Grade 3	G1	G2	G3
January						
February						
March						
April						
May						
June						
July						

August						
September						
October						
November						
December						

ii) How pleased are you with the price you receive for the commodity?

a. Not at all pleased___ b. Sometimes pleased___ c. Always pleased___

Explain.....

.....

iii) Who determines the price you receive and why?.....

.....

.....

.....

iv) What do you do when prices are low?.....

.....

.....

.....

What are your sources of information about the following?(Rank)

Type of information	Response 1.Yes 2.No	Source(farmers,traders,family,media,etc)	Information Cost
1.Availability of eggs 2.Egg prices 3.Demand conditions 4.Supply conditions 5.Transport charges 6.Road condition 7.Gov't policy 8.Other market charges			

5. IMPEDIMENTS TO MARKETING EFFICIENCY

i) What problems do you encounter in selling your eggs?(Rank)

Problems	Response 1.Yes 2.No	Rank	Coping Strategies
1.Storage difficulties 2.Transportation difficulties 3.Few customers 4.Inadequate capital 5.Price instability 6.Spoilage 7.Credit sales 8.Poor road conditions 9.Other			

ii) What steps do you think should be taken to alleviate these problems?

a. By yourself.....
.....

b. By your association.....
.....
.....

c. By government.....
.....
.....

d. By your customers.....
.....

APPENDIX 2

QUESTIONNAIRE FOR TRADERS (WHOLESALERS AND RETAILERS)

A. PROFILE OF RESPONDENT:

1. Code No.....
2. Date of interview.....
3. Name.....
4. Gender.....
5. Type of trader.....
6. Category of trader (Itinerant....; Sedentary....; Other.....)
7. Location of business.....
8. Major occupation.....
9. Other occupation.....

B. TRADING ACTIVITIES

1. What commodities do you trade in apart from the table egg?

.....

.....

2. Which times of the year are your peak trading seasons for eggs?

.....

.....

3. Which times of the year are your minor trading seasons for eggs?

.....

.....

4. From whom do you buy your eggs? (Rank source in order of importance)

Source of eggs	Response 1.Yes 2.No	Rank
1.Farmer(s) 2.Wholesaler(s) 3.Assembler(s) 4.Retailer(s) 5.Others		

5. How do you obtain your eggs?

a. Goes to buy yourself **b.** Assembled for you **c.** Brought to you

d. Other.

6. Do you often get the quantities you want to buy? Yes=1, No=2

Explain the above.....

.....

.....

7. Where do you sell the commodity? (Rank in order of importance)

Sales point	Response Yes=1 No=2	Rank
Households Local markets Other markets in the district Other markets in the region Markets in other regions Others.....		

8. Who buys your eggs? (Rank the buyers in the order of who buys most).

Buyer	Rank 1.Yes 2. No	Reason
1. Wholesale 2. Retailer 3. Consumer 4. Other		

9. How much did you buy and sell your eggs during the following

given periods last year?

Period	Quantity	Purchasing price/unit quantity (100crates)min./max	Selling price/unit quantity (100 crates) min/max
January February March April May June July August September October November December			

10. What factors are responsible for the price differences? (Rank the factors)

Factors affecting price differences	Rank

11. How pleased are you with the profit you make?

a. Not at all pleased
b. Quite pleased
c. Very pleased

C. MARKETING COSTS

1. What costs do you incur in trading in table eggs?

Cost Item	Cost per unit quantity(100 crates)
Transportation	
Storage	
Taxation	
Commission	
Handling	
Loading	
Unloading	
Packaging	
Spoilage	
Others	

D. PRICING AND PRICE INFORMATION

1. How are the purchasing and selling prices of the commodity determined?

.....
.....

2. What are the sources of information about the following? (Rank in terms of importance)

Type of Information	Response Yes=1 No=2	Rank	Sources
1.Availability of eggs			
2.Price of eggs			
3.Supply condition			
4.Transport charges			
5.Road condition			
6.Government policy			
7Other marketing charges			
8Other information			

3 Do you incur any costs in obtaining any of these pieces of information?.....

4. How long does it take you to sell a batch (10 crates) of the commodity?

.....
.....

E. IMPEDIMENTS TO MARKETING OF TABLE EGG

1. Do you encounter problems in marketing your eggs?

2. If yes, what are they? (Rank in order of importance).

Problem	Response Yes=1 No=2	Rank
1.Transportation		
2.Poor storage facilities		
3.Poor market condition		
4.Poor road network		
5.Poor road condition		
6.Inadequate capital		
7.redit sales		
8.Low prices		
9.Spoilage		
10.Others		

3 How do you cope with these problems?.....
.....
.....
.....

4 What, in your opinion can be done to alleviate these problems?

a. By yourself.....

b. By the farmer.....

c. By the local authority.....

d. By other traders.....

e. By others (specify).....