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THE PERFORMANCE OF MAIZE AND *teff*^{*} MARKETING IN SOUTHERN ETHIOPIA

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Abstract: *The paper analyses the functioning of teff and maize marketing system in southern Ethiopia. The methodology follows the industrial organization paradigm: structure, conduct and performance (S-C-P). The results reveal high market concentration, high barriers to entry in terms of capital and credit, evidence of collusion in the rural market, low market integration, high marketing margin, and high seasonal price variation which indicate the inefficiency of the maize and teff marketing system. There are basic constraints such as poor market infrastructure and lack of capital, credit and clear property right law to increase private investment in the food grain marketing sub-sector. In spite of the complex problems after the March 1990 reform, the maize and teff marketing system appears to be improving and working better by market structure standards (S-C-P).*

I. INTRODUCTION

The marketing system in Ethiopia has undergone a series of far-reaching changes in the last 20 years [29, pp.25-65]. Food grain marketing during the era of Derg (or Provisional Military Administrative Council) involved a complex set of institutional arrangements, quotas, and price control which were further complicated by regional disparity in the application of the rules and its stringency [17, p.16]. This resulted in the development of black marketing; lowered competition among traders for non-quota grain, limited the inter-regional trade, and reduced the prices of food grain [9, p. 332], [5, p. 140]. AMC's quota system, fixed AMC prices and the roadblock (*Kella*) reduced farmers' incomes and incentives to use improved inputs [11, pp.351-352], changed the cropping patterns of farmers and distorted the entire organizational system of private marketing. There were vociferous complaints on the marketing policy, particularly from the small farmers [16, p.142]. The institutions of the past, prior to March 1990 market liberalization, did not provide the necessary support to improve the efficiency of the private food grain marketing system. As a result, state efforts to improve food distribution through control of marketing has served neither equity nor efficiency [19, p. 160].

Donors criticized the price policy and quota regulation and provided conditions in order to offer loans [9, p.336-339]. The conditions mainly included narrowing the importance of the Agricultural Marketing Corporation (AMC), expanding the role of the private sector in agriculture, and allowing the market to determine prices. The government was not in a position to accept the conditionalities because (a) it was against the principles of socialist ideology and (b) it reduces the role of the government in controlling the resources in rural areas.

* *Teff* (*Eragrostis tef*) is the most important staple grain only in Ethiopia.

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The ideological and economic policy change in the former U.S.S.R. and East European countries at the beginning of the 1990 coupled with the internal and external pressure in Ethiopia resulted in the introduction of the market liberalization in March 1990. The food grain marketing policy reform basically included: (a) abolishing the fixed price and AMC's quota system on farmers and food grain wholesalers, (b) abolishing the roadblocks "Kella", (c) retaining AMC's purchase in the market by competing with the food grain traders and consumers, and (d) providing incentive to food grain traders [22, p.9-10].

The policy reform of Derg in March 1990 and the economic policy reform of the Transitional Government in November 1991 have attempted to restructure and reorganize the production and distribution system in a market oriented-manner. Trade was left to the private sector; and AMC/ETGE is involved in price stabilization, re-privatization of state farms has already been embarked upon, producers cooperatives were dissolved, bank interest rates increased, the Birr devalued, the political system decentralized, and private investment (domestic and foreign) is encouraged under the new liberalization policy. The policy changes have improved the growth of the economy, and the balance of payment; and increased private-sector investment [29, p.56-65].

The objective of this paper is to analyze the performance of *teff* and maize marketing system using the methodology of industrial market organization paradigm [6]. For the purpose of the study, primary data were gathered through structured (and pre-tested) questionnaire. A total of 33 food traders were sampled by combining purposive sampling with random sampling. Among the 33 traders: 25 were wholesalers, 4 retailers and 4 farmer-traders. The data set for the spatial pricing efficiency (weekly prices of *teff* and maize) were collected for 43 weeks in 12 markets. The time series retail and wholesale prices (free market prices) of *teff* and maize collected by AMC are used to analyze the inter-temporal price efficiency. Moreover, secondary information, both published and unpublished are extensively used in the study (see the details in [29, p.96-112]).

The article begins with brief discussion of how the marketing participants are linked to the complex network of marketing channels of food grain in Southern Ethiopia. This is followed by an examination of the structure and conduct of food grain trade. Finally, an attempt is made to assess the efficiency of *teff* and maize marketing. Concluding remarks are contained in the last section.

II. *Teff* AND MAIZE TRANSACTIONS IN SOUTHERN ETHIOPIA

In this section, an attempt is made to describe the transactions which are taking place in the food grain marketing chain among different agents or participants from the time food grain leaves the villages to the final consumers through a variety of traders. The food grain flow begins with the farmer who, after harvest, decides how much he wants to store for household consumption, seed, and payment in kind and sells the remaining food grain (market supply) to a trader or consumer in order to settle debts and contributions, taxes, and make purchases of consumer goods. The hierarchy of the food grain marketing system from the small rural markets at the top to the terminal urban markets at the bottom consists of

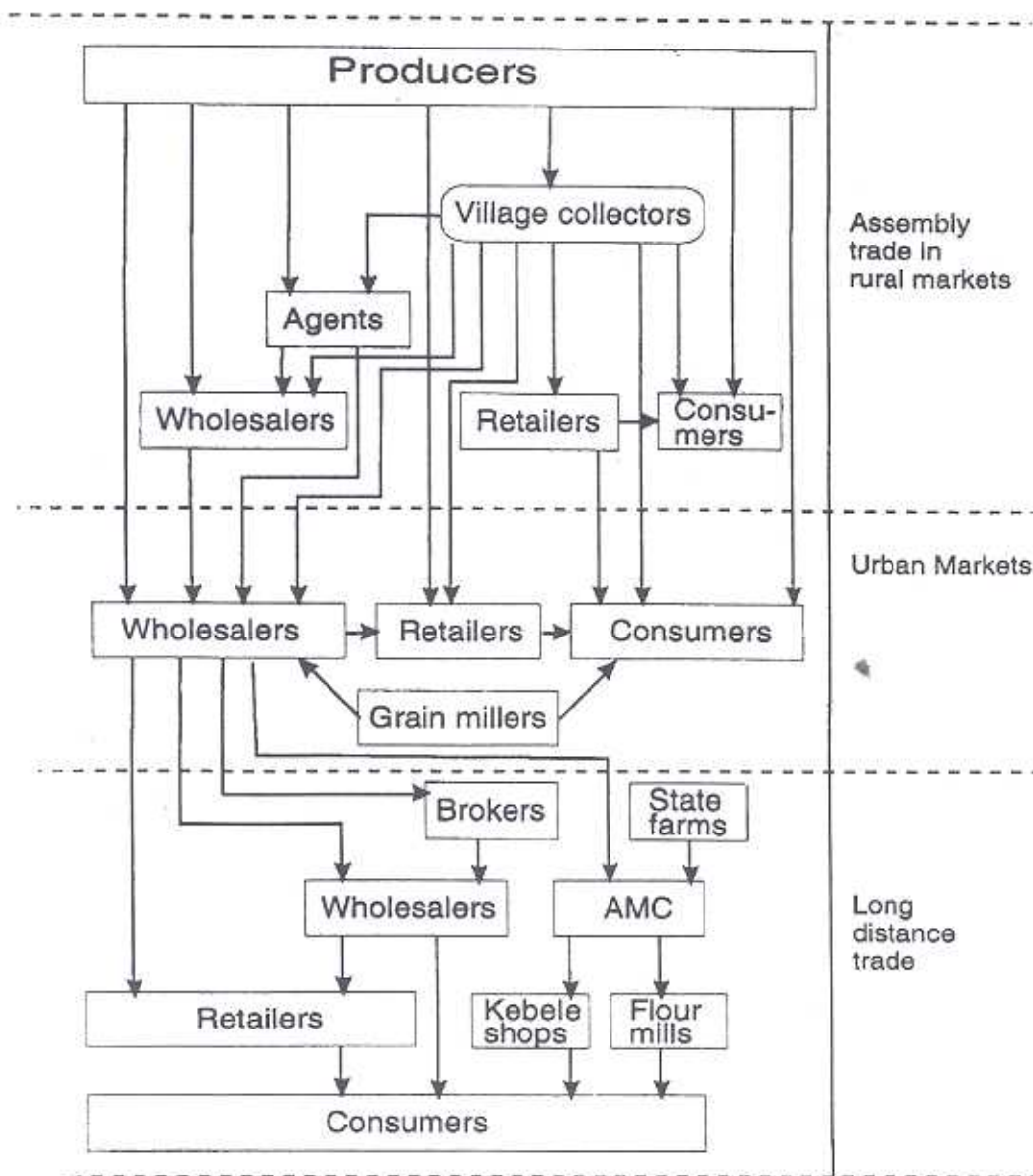
a number of different types of grain traders. Figure 1 illustrates how the various marketing participants were linked to the complex network of marketing channels of food grain in Shashemene market.

Shashemene (250 Km south of Addis Ababa) is the largest town which dominates the food grain trade in southern Ethiopia. The town is connected by all-weather roads with all the administrative regions in the south namely, Sidamo, Bale, Gamugofa, Arsi, and Shoa. Shashemene has become a booming town starting the early 1970s with a widespread expansion of economic activities in commercial farming. The radial model seems to suit well to this study area and Shashemene is selected purposively for this reason as the central market. It must be made clear that there is inter-local market food grain trade but it is the trade with Shashemene which dominates local market price formation.

Although we did not estimate the quantity of food grain flow in each channel, we observed that a smaller portion of the food grain is supplied to the market centres in the region by the village collectors, who themselves are farmers. The village collectors purchase food grain from the inaccessible villages and transport it using pack animals. The village collectors are not involved in trans-shipping the food grain from the rural market to Shashemene. The wholesalers in Shashemene are also involved in long-distance trade to the deficit towns such as Yirgalem, Dilla, Kebremengist, Moyale, Arbaminch, Addis Ababa, Jijiga, Elidar, etc.

In the study area, there were significant number of wholesalers, brokers and retailers involved in food grain marketing indicating the revival of private food grain trading. For example, in Shashemene market alone, there were 40 unlicensed food grain traders [8, p.3] and about 30 licensed food grain trader at the beginning of 1991. The wholesalers vary in the quantity of food grain they purchase in the market (market share) which is mainly determined by the size of working capital they own. Although classifying the food grain wholesalers in the study area is difficult, the traders are grouped into three categories: (a) those who are involved in long-distance trade, (b) those who transport food grain from nearby markets (100 Km radius) to Shashemene, and (c) those who purchased food grain in the rural markets and in town markets and sell the food grain to a larger wholesaler in the same market. It must be noted that the above classification are not mutually exclusive.

Figure 1: Food grain marketing channels in Ethiopia, 1992



The well-off food grain traders collect the food grain purchased by primary wholesalers in small quantities on market-day. Some of the well-off food grain traders disburse working capital to trusted traders and agents early in the morning before the market begins to purchase food grain so that at the end of the market day, the wholesaler collects the food grain at a negotiated price. The wholesaler either negotiates with the agent on the purchasing price of food grain before hand or they would negotiate later after observing the price of the marketplace. The well-off food grain traders employ their agents to purchase food grain from the rural markets. They transport the grain on hired trucks to the terminal markets where they usually find a regular customer (wholesalers or grain millers). There is also a possibility that the wholesalers could sell to another wholesaler at the marketplace and he transports the food grain to Shashemene. They also transport the food grain to the deficit markets and sell it through a broker. Often, the well-off wholesalers sell the food grain after storing it for a short time (2-4 months) and the wholesale and retail function is combined in the study area. The millers are also involved in selling whole grain to consumers and the consumers clean the grain and pay the price of milling.

Some of the middle-level wholesalers in Shashemene operate inside a permanent stall which they rent from the town council. They combine both wholesale and retailing of all types of food grain (including pulses) in their stall. Some use their homes to store and sell food grain. In Shashemene, the chains are short, that is, the number of intermediaries between producers and consumers is small. The chain tends to be longer as food grain moves longer distances. In Shashemene, there appears hardly sales from retailer to retailer and no more than two middlemen existed between producers and consumers. The study reveals that there were not trade barriers that would prevent the producers from bypassing the intermediaries in selling the food grain directly to producers. The food grain retailers in Shashemene sell the food grain in small quantities to consumers in the open market. The retailers purchase the food grain mainly from producers and wholesalers who supply them regularly. Moreover, although the share of AMC at national level declined from 40 percent in 1980 - 1989 to 8 percent in 1990 - 1992 [4, p.124], it was actively involved in purchasing food grain from wholesalers particularly during the harvesting season.

No rigorous traffic survey was undertaken to estimate the net flow of food grain. The description of the outflow of food grain represent a composite of information collected during the field survey through questionnaire. The food grain traders were asked to indicate the origin and destination of shipments of the food grain. We observed during the field work that the food grain which originates from the scattered farmers is transported to the rural markets by pack animals and human portage. Traders in the rural markets transport the food grain using the small-scale trucks (0.5-5 ton capacity) to urban markets. With respect to the long-distance food grain trade, the destination of the flow to the deficit markets varied significantly. The pattern of the flow of food grain in the study area indicates that maize flows to the low lands of Ethiopia while *teff* flows to the towns in Southern Ethiopia. The traders interviewed in the survey area revealed that maize was exported to the deficit towns such as Addis Ababa, Nazret, Jigiga, Awassa, Elidar, Arbaminch, Kebremengist, Moyale, Negele Borena etc. *Teff* was mainly exported to Awassa, Shashemene, Yirgalem, Kebremengist, Borena, Dilla, Moyale, etc.

III. STRUCTURE OF FOOD GRAIN MARKETING

In this section, those characteristics of the organization of the food grain market that seem to exercise a strategic influence on the structure of competition and pricing [7: 7] are systematically examined. The structure of the food grain marketing system is studied in terms of the degree of concentration, barriers to entry (licensing procedure, lack of capital and know-how, and policy barriers), and the degree of market transparency.

In Shashemene market, about 20 percent of the licensed food grain traders (6 traders) controlled about 48 percent of the total quantity of food grain sold in 1990. From the total volume purchased by the licensed traders, four of the first big food grain traders had about a 35 percent market share which is closer to Marion's CR (4) 0.4, a level indicated as the critical point for collusion [18, p.213]. The Gini coefficient for Shashemene was found to be 0.463. Bulbula Tulie [8,p.3] indicated that there were about 40 unlicensed food grain traders in Shashemene with a market share of about 25 percent. These findings imply that a few traders in the town market influence the volume of food grain trade, and food grain trade concentration was significant. This reveals a lopsided market condition where food grain traders may likely influence price formation.

Barriers to market entry reduce the threat of potential competition and therefore impede marketing efficiency. Barriers can result from limited know-how, capital requirement, institutional restrictions and non-competitive reactions of established traders. Retailers and brokers in the study area had no barriers to entry in the food grain trade particularly after the policy reform of March 1990. The main requirement was the possession of a small amount of working capital usually less than 1,000 Birr, availability of a stall to sell food grain (if he is permanent), and some training in pricing and grading food grain. But the easy licensing process in the food grain trade alone does not guarantee any success. In the field survey, the licensed food grain wholesalers complained that there were too many middlemen between the primary producers and the final consumers. According to our discussions with the licensed wholesalers, they reported that these host of unlicensed middlemen perform no useful functions and are the main contributing factor to the increase of food grain prices after the March 1990 reform. Since the licensed traders pay taxes and other fees to the government and increase their fixed cost (compared with the unlicensed traders), they insisted on strict government control of the food grain trade. On the other hand, the new entrants are facing a problem of establishing trade contacts with traders and consumers. The traders complained about the high purchasing prices of the weighing machines (flat scale), high per market day fees for renting the weighing machine, and its inconvenience to transport them to the rural markets every market day.

During the era of Derg, one of the major impediments to enter in the food grain trade was the licensing procedure. Based on the economic policy and the Proclamation No. 76 of 1975 [21], wholesale and retail food grain traders were allowed to trade under strict government control. A licence was issued to a wholesaler and a retailer with a capital not exceeding 300,000 Birr and 200,000 Birr respectively. The Ministry of Domestic Trade changed the licensing procedure and requirements five times between March 1974 and 1990. The three licensing directives were issued by the Ministry of Domestic Trade in

1977, 1978, and 1980. The aim of these directives was to restrict the private trading activities. The fourth directive was issued in 1988 and provided the right of issuing a licence to the administrative and district offices of the Ministry of Domestic Trade which was previously issued by the head office of the Ministry of Domestic Trade in Addis Ababa. The directive removed the prohibition of issuing licences to private food grain traders particularly in the major surplus food grain producing regions of Arsie and Gojam Administrative Regions. As a result, 464 licence applications were received by the government. However, food grain traders were required to deliver a fixed percentage of their purchase to AMC at the fixed price until March 1990.

The fifth directive was issued immediately after the March 1990 reform. The directive removed the capital ceiling and the prohibitions of conducting a business through an agent. The directive also assures the right of selling and transferring a business to another person and to any part of the country. Only very few business activities were reserved for state trading. Thereafter, licences of retail and wholesale food grain trades have been issued without any restriction. Traders have been only required to pay 202 Birr and 51 Birr to the Ministry of Domestic Trade for wholesale and retail trade respectively in order to get a licence. The delivery of food grain to AMC at fixed price was entirely lifted immediately after the March 1990 reform. Although unlicensed food grain trade is illegal at present, we encountered many unlicensed food grain traders during the field survey. All the licensed food grain traders bitterly complained about the new developments. The unlicensed small traders were involved in marketing all types of food grain. The survey reveals that, from the point of view of competition, the licensing procedures at present are not an impediment to market entry. Moreover, licensing should be intended essentially to ensure the existence of certain norms in the marketing system rather than restrict or expand entry into the market.

One of the major impediments of market entry in the food grain trade is obtaining the initial capital. According to our survey, the starting capital of the food grain wholesalers varied from 900 Birr to 40,000 Birr and the average starting capital was estimated as 7,000 Birr. Although the initial capital requirement in the retail trade is relatively low, the retailers in Shashemene who rented permanent stalls from the town council required relatively higher starting capital.

In the survey, the food grain traders were asked about the main problems in purchasing food grain. About 49 percent indicated lack of capital and credit, 36 percent revealed inadequate market supply, 3 percent reported high prices and 9 percent answered that there were too many traders in the market. Moreover, the credit policy of the government in pre-reform (March 1990) disfavoured the private sector as a whole. The interest rate for short-term commercial investment charged by the commercial banks was about 9.5 percent for the private sector and 8 percent for the state and co-operative sectors. Food grain traders were required by the Commercial Bank of Ethiopia (CBE) to bring collateral to prove their credit worthiness through a person owning a property 50 percent higher than the principal credit and who would sign an agreement to pay the principal and the interest, if the trader fails to repay the loan. This mainly affected the small traders who own little real property to mortgage. Improving the accessibility of bank credit even to the

small traders is expected in order to improve the efficiency of the food grain marketing. The Agricultural and Industrial Development Bank (AIDB) has been mainly involved in extending credit to the co-operative and state sector giving less emphasis for the private sector as a whole. The credit policy of the banks remained intact during the era of the transitional government until October 1992 where bank interest rates were adjusted by the national bank of Ethiopia. The interest rate in the non-institutional credit is estimated to be very high varying between 60 and 200 percent per annum [16, p.84]. Moreover, Ekub or rotating savings were reported to be important source of informal credit.

The information from the field survey indicates that about 23 percent of the interviewed food grain traders took credit from banks, 46 percent from relatives and friends, 15 percent from individual money lenders, 15 percent from food grain traders, and 4 percent from other sources. Although many traders had access to the short-term loans of commercial banks, they showed reluctance to take bank credit. They did not intend to take loans from the banks because they have seen the unfortunate experience of their colleagues who took credit and became bankrupt and finally, the traders were forced to sell their property to repay the loan. Such tragic experiences of traders were the results of the legal monopoly of food grain trade by AMC which forced many of the food grain traders to close down their business and shift to other types of activities where state monopoly does not exist (example, red pepper trade in Alaba Siraro district). About 46 percent of the interviewed traders reported that they provided credit to producers and traders. Out of these traders, 6 traders advanced credit to producers while 3 supplied credit to food grain traders and 6 disbursed credit to traders and producers.

Although no special training is required to enter into the food grain trade, experience and level of education play an important role in the food grain marketing practice. Many of the traders indicated that they learned food grain trading by doing it. The average age of the food grain traders was 41 years and the range is 22 to 60 years. About 64 percent of the food grain traders were over 40 years of age. Food grain trade in the study area has not been dominated by self-perpetuating family businesses. The family background of the 82 percent of the sample food grain traders was farming. About 15 percent inherited the business from their parents. Entry into the occupation usually started as an assistant of a food grain trader. The average age to enter food grain trade is about 29 years with a range of age from 17 to 49 years. If we take the experience variable, the food grain traders could be clearly classified into two groups, the highly experienced (above 11 years of experience) which accounted for about 58 percent and the less experienced (below 5 years of experience) which accounted for about 33 percent. This shows the gap of experience in between, which is a result of the prohibition of private trade during this time.

The sample traders revealed that they were involved in trading all types of food grain. Most traders trade on a full-time basis except for the village collectors who trade only during the off-season and return to farming with the onset of rain (planting). About 76 percent of the food grain traders operate alone without partners. The rest reported that they had one or more partners who were based on close friendship or kinship. Women were involved in the unlicensed retailing by selling small quantities of food grain in the weekly markets and in the daily petty markets of towns know as 'Gulit'. In our frequent visits of

the open markets in the study area, we encountered only one woman unlicensed food grain wholesaler. With this exception, all the licensed food grain wholesalers in the study area were men.

Inquiries during the survey revealed that the food grain traders consisted of migrants (about 55 percent) and non-migrants (about 45 percent). About 48 percent of the sample traders originated from the Oromo tribe. This was followed by the Amhara tribe which accounted for about 21 percent. The Gurage tribe (believed to dominate the commercial activities particularly in Addis Ababa) accounted for about 12 percent in the sample. The food grain traders of Alaba tribe were only involved in rural assembly trade. The survey results indicate no tendency for members of one tribal group dominating the food grain trade. The multi-tribal characteristics of food grain trade is found as a barrier to collusion. The traders were almost divided into two important religions i.e., the Christians (orthodox) traders who accounted for about 52 percent and the Muslims accounted for 48 percent. Only about 6 percent were illiterate, about 85 percent attended elementary school and the remainder, about 9 percent, had reached secondary education. The food grain traders had not received any education or training on how to improve their marketing activities neither from the Ministry of Domestic Trade nor Chamber of Commerce.

The social barriers such as religion and ethnic origin were not strong barriers to entry into the food grain trade. The traders practicing different religions, both migrants and non-migrants, did not accentuate the social barrier between them and the rural people with whom they interact. Unlike in the food grain trade, the social factors mainly ethnic origin was an important barrier in the red pepper trade in the rural markets of Alaba Siraro district. In the food grain trade, the social barrier did not reduce the entry to the food grain trade and there was no evidence to prove the accumulation of wealth by a specific ethnic minority which hinder other ethnic groups from entering the market.

Although the time required to acquire the skill of food grain trade is relatively short, many of the traders revealed that they had started the job together with someone who had the experience. The interviewed traders indicated that they were trained by their employers and some were sons, relatives, or friends of food grain traders and they did the apprenticeship by working as assistants and/or labourers. Experience is needed to learn pricing food grain, predicting price fluctuations and assessing its quality (grading) and to establish contacts. The food grain traders were involved in activities such as farming, coffee trading, honey marketing, driving a car, renting bicycle, teaching, selling chicken, selling kerosene, bookkeeping, etc. before they enter in the food grain trade.

Traders were accused of hoarding, speculation, and unfair trading practices during the Derg era (1974-1990) [1, p.107]. The food grain traders indicated that they were dissatisfied with the pre-March 1990 agricultural marketing policy, particularly with AMC's legal monopoly. Some also reported that they had abandoned food grain trade and switched to other types of trade, like red pepper trade, where there was not any marketing institution which had a legal monopoly. Some even returned their licences to the Ministry of Domestic Trade due to the non-profitability of food grain trade. The licences of some food grain traders were taken by the government in order to reduce their number. Some food grain

traders were also suspended for failing to fulfil AMC quota.

In March 1990, the policy assumed that private food grain traders would respond quickly to the reform and fill the vacuum left by AMC after the reform. Traders reported a lack of capital and credit and the deregulation of the freight transport as important areas where the government should intervene to improve food grain marketing efficiency. The food grain traders also indicated that urban land proclamation which prohibited buying and selling land restricted the building of warehouses. During our survey, all the well-off and long distance wholesale traders stored large quantity of food grain in their residences in open air (covered with canvas and plastic sheet) during the harvesting season. The grain was exposed to rain, weevils, rodents, moisture, fungi, and bacteria which increased the losses and reduced the quality of food grain. They indicated that they intend to sell it within the coming four months before it is seriously damaged by weevils.

In order to estimate the degree of market information flow from the remote markets, traders were asked if they were informed about the price of food grain in Addis Ababa market. About 46 percent indicated that they knew the prices at Addis Ababa market. About 36 percent of the traders revealed that they were not informed and the remaining, 18 percent reported that they were not interested in the price information of Addis Ababa market. Traders were also questioned about the method of obtaining price information. Many traders reported that personal communication and observation were the main source of information, the former being more important than the latter. Moreover, equally important means of collecting long-distance price information, particularly for the well-off wholesalers, is through telephone. Although market information flowing to the markets of remote regions is limited, the degree of market information exchange among the food grain traders for adjacent markets is relatively higher. From the field survey, wholesalers are better informed about the prices in the remote markets. Most wholesalers in the rural markets manage to minimise the lack of market information by creating a permanent symbiotic relationship with a distant wholesaler at Shashemene.

IV. MARKET CONDUCT OF THE FOOD GRAIN TRADE

Market conduct generally refers to the act, practices, and policies pursued by firms in markets as they strive for profit [7, p.7]. Market conduct influences the market structure and performance of the food grain marketing system but getting information on market conduct is difficult.

The traders in the study area are interested in making sales so that they repurchase and purchase enough food grain depending on the size of their working capital. The price at which they purchase and sale is the focus of competition. The small farmers who bring their food grain to the market have no firm ideas about the expected market price. Even the relatively well-informed food grain traders have difficulty in setting the purchasing price when they start buying food grain early in the morning in the open air markets. According to our sample survey, the starting point to determine the price of food grain in a given market is the closing price on the preceding market day, and make changes during the rest

of the day based on supply and demand. Here various factors such as the number of food grain traders arriving at the market, the quantity of grain in the market at the time when serious bidding starts, and the price information of adjacent markets play an important role in deciding the purchasing and selling price of food grain. The food grain traders revealed that they also observed and checked the price at which other traders were offering through indirect methods. Usually, the assistant of the trader approaches the farmer (who already sold his food grain at the marketplace) to ask him the price at which he sold his food grain. Once an individual trader has approached the producer and started bidding, it is considered as indecent for another food grain trader to enter the discussion until the final bids have been made. However, minor disputes exist among the traders, assistants, and brokers claiming a producer who was intending to come and bid with them was forcefully taken by another trader or assistant.

If food grain traders attempt to manipulate prices for mutual benefit, they could store their food grain in a co-ordinated manner (collusive behaviour). From our discussion with the food grain wholesalers, they openly argued that it would be better for the food grain traders and consumers if they agree on the purchasing price of the food grain in the open markets. When we asked them whether they practiced it or not, they replied yes. "Few of us who were friends (relatives) attempted to fix the purchasing price, but, because of the heterogeneous nature of the food grain traders, we failed. Moreover, it is too difficult to implement such a fixed price particularly after the reform when the number of unlicensed food grain traders has increased significantly".

Although it was difficult to systematically prove the collusive action of the traders, we observed a higher level of collusion in the rural markets. In some of the rural markets, particularly in the remote ones, where limited wholesalers visited the weekly markets, there were occasions where traders agreed on the purchasing price when they were sure that they were the only food grain buyers in the market. On the other hand, we observed a well-off wholesaler offering a higher price in a rural market while the rest of the food grain traders failed to purchase food grain because of the high price offered in the marketplace. Unlike in the rural markets, there were sufficient numbers of traders in town markets which improved the level of competition in the food grain trade.

The farmers usually demand cash payments from the market intermediaries or the consumers when they sell their food grain, but, the village collectors or farmer-traders provided cash before harvest and received grain in repayment of loans or from forward purchases. The condition of the loan (interest rate and the duration of the loan) or forward grain purchase and the price of the food grain varies from one producer to another [2: 138]. The capital of the farmer-traders has been built up from previous trading activities or borrowed from friends or relatives.

The food grain traders had considerable economic and social relations among themselves. These mainly included credit relationships (providing working capital) and exchanging information. The food grain traders exchange price information among themselves. According to our discussion with the sample traders, about 50 percent of the sample food grain traders indicated that they had close contact with other food grain traders

based on kinship and constant trade relationships (regular customer) established over a long period of time. The objective of such a relationship is to obtain credit usually during the market day, share market information, and arrange transport means together.

V. THE EFFICIENCY OF *Teff* AND MAIZE MARKETING

Although marketing efficiency in the study is measured in terms of operational and pricing efficiency, these measures do not provide an absolute measure of marketing efficiency [23, p.1]. The institutional or organizational efficiency dimension of the marketing system needs to be incorporated in order to provide the whole picture of efficiency. Gross margins, marketing costs, storage costs are estimated in order to provide the level of operational efficiency. The relationships between prices in different markets and seasonal movement of prices are measured to indicate the level of spatial and inter-temporal pricing efficiency.

5.1. Marketing margin

The difference between the price received by producers and that paid by consumers or the price of the collection of marketing services which is the outcome of the demand for and supply of such services is the marketing margin [28, p.120]. If we assume competitive markets, the marketing margin should include the cost of hired assistants, rent, transportation, interest on capital, transaction costs, and normal profit. In the assumption of the neo-classical model, an efficient marketing system is where the marketing costs are expected to be closer to transfer costs and the net margins are near to normal or reasonable profits. High marketing costs and excessive profits are signs of marketing inefficiencies. Analysing the price spreads in this study starts by the simple computations of the share of consumer's price obtained by the producer and the traders at each stage in the marketing process.

Marketing margins are affected by a number of factors: distance to be covered, adequacy of transport, effectiveness with which the various separate activities (weighing, grading, bulking, etc.) are carried out and services are provided [10, p.100]. The transaction costs which include cost of evading government prohibitions or laws, permits at the check points and arbitrary assessment of product quality [2, p.114] are also part of the margin which requires due consideration. When production is more scattered, supply is confined to one major crop season, distances are much longer and the whole marketing infrastructure is less developed; the marketing margin is then likely to be high.

In this study, the producer prices are collected every week from the rural market where the food grain traders or their agents weekly visit these markets. The prices of the producers from the rural markets minus the corresponding retail prices of the central market (Shashemene) is the retail-farm gate margin or gross marketing margin of traders. The difference between the producer prices from the rural markets and the wholesale price of the central market is the wholesale-producer price margin.

Table 1
The marketing margins/qt of food grain trade between Bonosha and Shashemene
(1991/92)

Item	Margin (Birr/Qt)	% of the retail price
(a) <i>Teff</i>		
Retail-farm gate margin	37.05	19.28
Wholesale-farm gate margin	29.26	15.22
Retail-wholesale margin	7.81	4.06
(b) Maize		
Retail-farm gate margin	21.19	22.31
Wholesale-farm gate margin	15.19	15.99
Retail-wholesale margin	5.97	6.27

Table 1 shows that, in absolute terms, the marketing margin of *teff* is higher than maize. The cost of production and consumer preference reflected higher prices of *teff* than maize which required higher working capital for *teff* compared with maize. Although the transfer cost structures are similar, traders who were involved in *teff* trade received a higher net margin (profit) than those who trade maize. The net margin per unit of capital, which is the percentage share of the margins with respect to the average prices of both crops (*teff* and maize) in Shashemene, is found to be almost similar, i.e., for the white *teff* 37.07 Birr (margin) divided by 192.50 Birr (average price) is about 19 percent, while for maize 19.28 Birr (margin) divided by 90.90 Birr (average price) is about 21 percent. This indicates that there is equal profit for an equivalent amount of capital invested in different enterprises (maize and *teff*).

5.2. Marketing cost

Data on various marketing costs such as cost of transport, labour, twine, sacks, and taxes and licence fees were collected from the sample traders in order to examine whether the marketing margins between the local markets and the central markets appear to be excessive in relation to the costs of performing the associated marketing services. It was difficult to collect information on costs and profits of food grain traders through a cross-sectional questionnaire. The costs and profits vary from month to month. Some sample household heads who had received credit before harvest receive prices lower than the producer prices collected from the rural markets. Therefore, estimating a uniform marketing cost structure for all traders is found to be difficult. The cost varies with type of traders and level of marketing channels. The major marketing costs that we incorporated include:

transport cost, labour cost to fill and stitch the bags at the marketplace, cost of brokers (when buying the grain), loading cost, marketing fee per month when purchasing grain in the open market, municipality tax when selling the food grain, rent of weighing machine (flat scale) per market day and transporting it to the market and back home, cost of brokers when selling the food grain, payments for the assistants who bring the farmer to the trader during the market day, licence fees, government taxes (annual), municipality taxes (annual), unloading cost when selling the food grain, and spillage cost when transporting the food grain.

The magnitude of marketing cost by individual traders varies with the distance of the markets. For example, a secondary wholesaler may purchase all the food grain of a primary wholesaler at the market or the primary wholesaler may himself transport the food grain to the central market such as Shashemene or store it until he accumulates enough food grain for a full load of truck. Moreover, it was difficult to estimate overhead cost of taxes and fees, monthly municipality and weekly labour and weighing machine rent in the absence of sales record of traders for a year. In spite of the above difficulties, an attempt was made to estimate the average marketing margin of wholesalers/qt (Table 2).

The study of Price Studies and Policy Institute (PSPI) in 1989/90, showed that the transport cost of the private traders is higher than that of AMC. This is due to the fact that private food grain traders purchased food grain from the remote rural markets and paid higher transport costs. AMC, on the other hand, purchased food grain from the collecting centres which were relatively accessible and near to Shashemene. If the transport cost of the private traders is subtracted, the remaining marketing cost of the private traders 4.46 Birr was much lower than the marketing cost of AMC, which was 9.3 Birr. The same study conducted by PSPI indicated that the marketing cost of AMC in Addis Ababa was 17.05 Birr (including transport cost). The estimated marketing cost of the private food grain traders in Addis Ababa was 15.00 Birr [20, pp.37-38].

5.3. Food grain transportation cost

The freight transport regulation of 1976 (amended Legal Notice No. 48 of 1976) established pan-territorial tariffs for asphalt roads, that is, 0.02049 Birr/qt/Km for trucks without trailers, 0.0125 Birr/qt/Km for trucks with trailers and 35 percent of the above rates for empty haulage. The tariffs for the gravel and dirt roads were not fixed at a central level. It was the *Ketena* (Zone) offices who estimate and set the tariffs for such types of roads. After the market oriented economic policy was announced by the transitional government, new road transport tariffs were introduced by the Council of Ministers (Regulation No. 2/1992). The tariff for trucks without trailers is 0.03483 Birr/qt/ Km for flat area (0.03688 Birr/qt/Km for hilly area). For trucks with trailers, the tariff is 0.02125 Birr/qt/Km for flat area (0.02250 Birr/qt/Km for hilly areas) [20, p.60].

Table 2
Average marketing cost of food grain marketing (Bonosha to Shashemene), 1991

Item	Birr/qt	Percentage
Transport charge from bonsha to Shashemene ^d	8.00	65.74
Cost of brokers	1.19	9.78
Labour cost to fill and stitch the bags	0.62	5.09
Twiners	0.10	0.82
Unloading	0.61	5.01
Municipality tax for selling at Shashemene	0.50	4.11
Spillage ^a	1.00	8.22
Government taxes and licence fees ^b	0.05	0.41
Municipality tax (annual) ^c	0.10	0.82
Total transfer cost	12.17	100

Notes:

^aEstimates of spillage were based on the traders estimates and AMC. AMC estimated 0.50 Birr before the reform and since prices of food grain doubled after the reform, the previous value was multiplied by the price increase. Traders also reported one kilogram of food grain spillage in transporting grain from Bonosha (rural market) to Shashemene.

^bPer quintal taxes were estimated from the records in the Ministry of Finance office at Shashemene. The annual taxes and licence fees of the wholesalers were divided by the estimated yearly sales of food grain.

^cEstimates of AMC were used

^dthe transport cost of one quintal of grain from Bonosha to Alaba was 4.00 Birr and from Alaba to Shashemene was 4.00 Birr.

Given the estimated average marketing cost 12.17 Birr/qt in Table 2, the net margin of wholesalers i.e., retail-wholesale price margin (Table 1) minus marketing cost (Table 2) for one quintal of *teff* and maize is 24.90 (37.07 the margin minus 12.17 the marketing cost) and 7.11 (19.28 the margin minus 12.17 the marketing cost), respectively. This net margin with respect to the average price of *teff* (192.50) and maize (90.90) in percentage terms is 12.98 and 7.80 percent, respectively. The high retail farm-gate margins of food grain were partly the result of the poor feeder road network between Bonosha (rural market) and Alaba (town market). This reduced the frequency and efficiency of transport services and flow of market information which resulted in high transport cost between the rural market and the central market.

The Ethiopian Freight Transport Corporation (EFTC) is a transport parastatal which runs state-owned freight vehicles and coordinates the private transport by assigning them routes and scheduling their movements. EFTC was entitled to a five percent commission from the total freight charges of the private truck owners. The *Ketena (Zone)* system was implemented in 1976 to assign privately owned trucks to the diverse destinations. According to EFTC (1990), the whole country was divided into 5 zones and a total of 6,435 trucks were assigned in these Zones (88 percent private and 12 percent public). *Ketena 3*, with its head office at Shashemene, co-ordinates the freight transport of 1,459 trucks operating only within this zone. The implementation of this freight transport regulation was enforced by the check points (*Kella*) established by EFTC along the roads of the major towns.

In our sample survey, 14 traders transported food grain using hired trucks with a capacity of above 5 tons. One trader transported with his own truck and also hired trucks to ship the food grain. Seven traders indicated that they used smaller trucks with a capacity of 0.5-5 tones to move their food grain. The farmer-traders used mainly pack animals to transport food grain from the village to the rural and town markets. Ten of the 33 sample traders revealed that they faced problems of transporting the food grain to the market centre.

The wholesale food grain traders reported that the regulation and control of the movement of large trucks (with a capacity of above 5 tons) by the *Ketena (Zone)* offices of Ethiopian Freight Transport Corporation (EFTC) impedes the supply of transport at the disposal of the private truck owners. Priority of hiring a truck from the *Ketena* office was given to AMCs food grain, Ethiopian Domestic Distribution Corporation (EDDC), Relief and Rehabilitation Commission (RRC), Service Co-operatives, and goods of mass organization such as Youth Association, Women Association, etc. The sample wholesale food grain traders indicated that the office of *Ketena 3* is corrupt. In our informal discussions with the wholesalers, they reported that they have to wait a longer time, sometimes four weeks, unless they bribe the officials in the *Ketena*. Despite the high transport charges, traders preferred to use the medium size and smaller trucks since they were more readily available in the market. The smaller trucks (0.5-5 tons) were the only vehicles which were used to transport food grain from the rural markets to urban markets. These small trucks were also the only means of passenger transport from Alaba town to the rural markets during the market days.

To examine the relationship between distance and transfer cost, we fitted linear functions for both small-scale trucks (0.5-5 tons), where assigning their trips were not strictly controlled by the *Ketena (Zone)*, the medium-scale trucks (5-9 tons), and large-scale trucks with a capacity of above 9 tons which handle long-distance freight registered by the *Ketena (Zone)* office.

$$STC = a + b_1D$$

$$LTC = a + b_2D$$

Where STC = charges of transfer per quintal for medium size trucks

LTC = charges of transfer per quintal for large trucks

D = distance in Km.

The estimated transfer cost functions are as follows:

$$\begin{aligned} \text{STC} &= 0.5383 + 0.04762 D \\ &\quad (2,1078) \quad (0.00255) \\ R^2 &= 0.92 \quad N = 32 \end{aligned}$$

$$\begin{aligned} \text{LTC} &= -0.3838 + 0.035873D \\ &\quad (2.8107) \quad (0.00379) \\ R^2 &= 0.86 \quad N = 17 \end{aligned}$$

In both functions, distance is found to be significant at a one percent level. If distance increases by one Km for the small-scale trucks, the transport cost per quintal will increase by about 0.0476 Birr. One Km increase for the large-scale trucks resulted in 0.0359 Birr/qt increase in transport cost. Distance explains about 92 percent of the variation in transport cost for the small-scale trucks. It also explains about 86 percent of the variation in the transport cost of the large trucks. The long hauls over all-weather roads for large trucks have lower per kilometre cost compared with the smaller ones but not as low as the freight tariff fixed by the government.

The cost of transporting food grain is one factor which determines the flow of food grain from the rural markets to the market centre. In the field survey, the average transport charge per Km of moving food grain from the rural markets to urban markets 0.1835 Birr/Km/qt is far higher than the transport charge of the all-weather roads which is 0.0585 Birr/Km/ qt for medium scale trucks and 0.0328 Birr/Km/qt for large trucks. The high freight rates of the rural roads is transferred to the producers in the form of low producer prices. Moreover, it is difficult to transport food grain from the rural markets to town markets particularly during the rainy season. Hence, the construction of all-weather roads to the rural markets would significantly decrease the transport charge and improve the level of competition and marketing efficiency.

When the large truck owners were assigned to transport food grain of AMC or goods of EDDC, they received the centrally set tariffs (0.0205 Birr/Km/quintal for trucks without trailers and 0.0125 Birr/Km/quintal for trucks with trailers for asphalt roads). This factor has discouraged owning larger trucks while the profits for the non-regulated small- and medium-size trucks were significantly higher. Moreover, the medium- and large-size trucks were frequently assigned by the government to the war zones (North) in order to fulfil "the national obligation of the truck owners". This has aggravated the corruption and bribery in *Ketena* (Zone) offices. During the field survey, although the war in north Ethiopia was over, the medium- and large-size truck owners who offered bribes were assigned to transport the goods of private traders where the tariffs were decided through negotiation between the owner of the trucks and the private traders alone.

The truck owners had high costs for maintaining vehicles because of the relatively poor roads which increased the frequency of breakdown, lack of spare parts in the shops, and old age of the vehicles (new trucks were not imported and sold to the private sector). The fuel rationing system which was introduced in 1983/84 to minimise the need for scarce foreign exchange affected the efficiency of food grain transport. Before the reform, the

truck owners receive fuel when the *Ketena* offices provide the permit which mainly depended on the length of the trip and the type of vehicle. Those who need additional fuel should give bribe to the officials who authorize the fuel permits or the workers or owners of the fuel station. After the March 1990 reform, we observed a high degree of competitiveness in the transport sector, reflecting relatively higher level of efficiency among the small-scale truck owners in the region in order to attract the traders through fair prices and non-price variables such as social relationship.

5.4. Inter-temporal price efficiency

To adequately describe the variations in the price series, detailed price decomposing techniques are used subsequently. The monthly *teff* and maize retail prices at Shashemene (central market) are first plotted for an overview of the data. Figures 2 illustrates the simple plot of the 59 average monthly nominal retail prices of *teff* (mixed) and maize at Shashemene market.

Teff is the most expensive food grain in the market. The differentiation of *teff* is mainly with the colours. The higher prices of *teff* is a result of high consumer preference particularly in urban areas where a light "*Injera*" is made. Three sets of regression equations are estimated to observe the trends during (a) the whole period (pooled data), (b) pre-March 1990 reform, and (c) after the reform. The Chow test method [12, pp.443-446] is used to test the differences between the pre-reform and after the reform trend regressions. The Chow test results show that the computed F's are significant for all food grains in the study, which means that the two separate regressions (pre-and post-reform) for each food grain are different at a one percent level.

Figure 2: Monthly retail prices of teff and maize at Shashemene market (1987-1992)

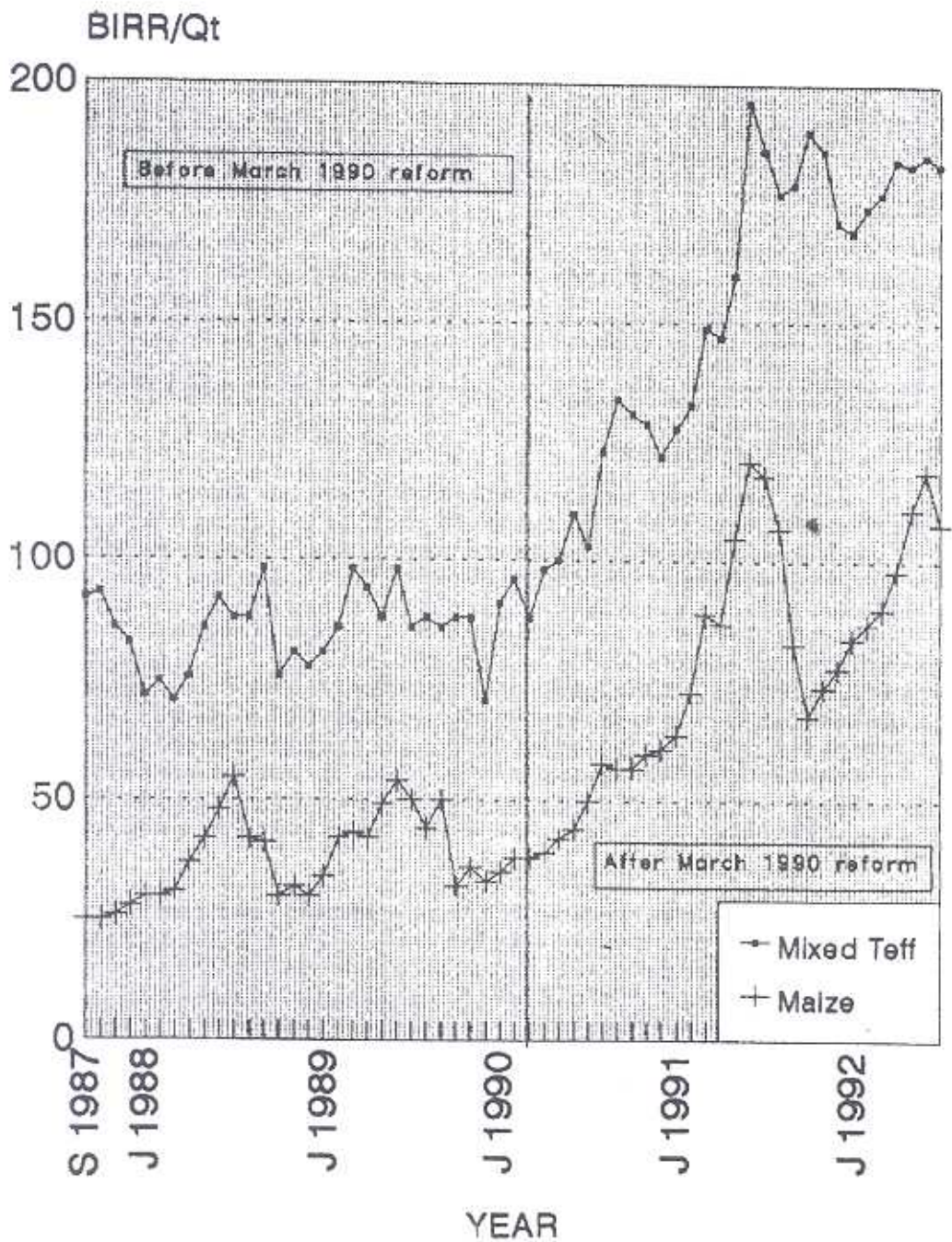


Table 3
Results of the linear trend model of Teff and Maize prices at Shashemene
before and after the March 1990 reform (September 1987-July 1992)

Type of grain	Pooled			Before reform			After the reform		
	Constant	Coeffi-	R ²	Constant	Coeffi -	R ²	Constant	Coeffi	R ²
White teff	63.617 ^a (5.44)	2.237 ^a (14.19)	0.78	92.276 ^a (3.49)	0.376 ^c (0.19)	0.11	-25.160 (15.22)	4.214 ^a (12.67)	0.86
Mixed teff	54.542 ^a (4.88)	2.119 ^a (0.14)	0.80	84.441 ^a (27.85)	0.217 (0.17)	0.06	-7411 (14.44) ^c	3.533 (0.32) ^c	0.82
Red teff	41.554 ^a (4.80)	2.069 ^a (0.14)	0.80	68.533 ^a (2.12)	0.258 ^a (0.12)	0.14	-26.251 ^a (14.89)	3.601 (0.33) ^a	0.82
Maize	16.587 ^b (3.92)	1.372 ^a (0.11)	0.72	31.193 ^a (3.00)	0.426 (0.17)	0.18	-29.443 ^a (15.99)	2.396 ^a (0.35)	0.63

Figures in parentheses are standard errors

Note: a = Significant at 1 percent

c = Significant at 10 percent

Table 3 presents the coefficients of the trend variable, the constant, and the R² of the pooled, pre-March 1990 reform, and after the reform for the nominal price data. Since we proved, using the Chow test, that the pre- and post-reform regressions are different, it is not worth interpreting the pooled regression results. The results in Table 3, show that the coefficient of determination in all regressions after the reform are significantly higher than the pre-reform. The t-values are also higher for the coefficient of time variable after the reform compared with the t-values in pre-March 1990 reform. The coefficients for the trend variable (time) show positive values in all regressions. Moreover, the coefficients of independent variable time in the equations after the March 1990 reform are much higher compared with pre-reform. This implies that prices of food grain increased significantly after the March 1990 reform compared to the pre-reform. The results also reveal that there is a consistent increasing trend in the prices of the food grain after the market liberalization of March 1990. In pre-March 1990 reform, the free market prices were inconsistent with no trend.

The price variability in the nominal series is higher in maize compared with all varieties of *teff*. The relative stability of the trend series of *teff* may be due to (a) the lower susceptibility of *teff* to weevils which makes it easier to be stored for a longer period and farmers tend to sell maize immediately after harvest due to fears of high storage loss; and (b) the stable demand of *teff* by relatively well-off urban dwellers throughout the year. The principal factor for the price variability is a change in domestic supply and demand which is influenced by a change in the production system (erratic and unreliable rainfall), import and food aid. Moreover, non-economic factors such as the civil war resulted in high price variability.

5.5. Seasonality

Seasonal price behaviour is a regularly repeated price pattern that is completed once every twelve months. Such a regular pattern arises from seasonality in demand, supply, and marketing or a combination of the two. Most agricultural products are characterised by some seasonality in production and marketing pattern [28, p.170]. Although the current supply and demand forces bring an equilibrium price, expectation concerning supply and demand conditions in the future also resulted in the seasonal price fluctuation. The seasonality in food grain prices in the study area arises from climatic factors and the biological growth process of plants (supply seasonality).

The seasonal variabilities in the price series are lower in *teff* compared with maize. The seasonality effect is higher in maize which is consumed by the lower income group compared with *teff*. The relative stability of the seasonal series of *teff* is that it can be stored without fumigation for a long period of time compared with other food grains.

The seasonal curves of Figure 3 show that the month of highest prices is June for *teff* and July for maize. The seasonal lows for white *teff*, red *teff* was January which is the immediate post-harvest period. However, the seasonality curves of maize and mixed *teff* show the lowest price in December. The lowest average monthly prices of maize and *teff* in Shashemene (December and January) are consistent with the end of the peak harvest which occur between October and December when the farmers' sales are particularly heavy. After harvest, the supply of food grain decreases steadily while prices moved in the opposite direction. The slight variations in the timing of high and low monthly prices between maize and *teff* are also a result of the difference in harvesting time (e.g. *teff* being harvested relatively earlier than maize). The high average monthly food grain prices in June tend to fall in the three months interval preceding harvest (October). Some of the reasons for a significant seasonal price variations are poor inter-market integration, lack of long-term investment to build storage facilities by private traders, and farmers sales of food grain to pay taxes and debt being concentrated immediately after harvest.

Figure 3 : Seasonality pattern of maize and Teff prices in Shashemene 1988 - 1991

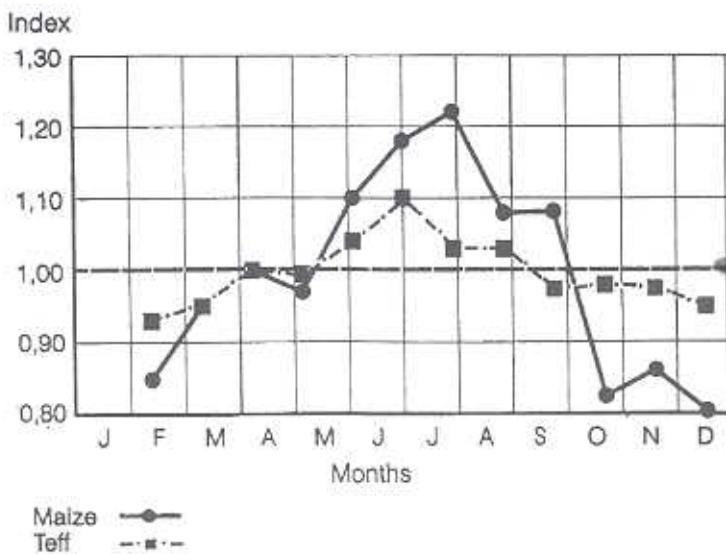


Table 4
Seasonal price increase of food grain at Shashemene market, 1991

Item	White <i>Teff</i>	Mixed <i>Teff</i>	Red <i>Teff</i>	Maize
Price of low month (Birr/qt)	142	128	96	94
Price of high month (Birr/qt)	208	196	178	121
Range of price increase (Birr/qt)	66	68	82	57
Range as % of the low	44.5	53.1	85.4	89.1
Month in range	4	4	5	4

Table 4 shows the estimated magnitude of seasonal price spreads in the retail prices of food grain. Prices of white *teff*, mixed *teff*, red *teff*, and maize increased by 45%, 53%, 85%, and 89% respectively between January and June 1991. The seasonal price increases were far higher compared with the study of Thodey by 1969 which was 21.7 percent for grain in five of the major towns including Addis Ababa [26, p.232]. The estimates of the lowest price as percentage of highest price for Nigeria, Malawi, Tanzania, and Kenya (1975-1980) was 70, 55, 51, and 49 percent, respectively, which were lower than the result of this study in Table 4. The seasonal price increase of wheat in the Sudan (71 percent) [3, p.73] was also lower than the result of this study (97 percent).

5.6. Storage efficiency of maize and *teff*

The storage cost is mainly divided into those which do not change with storage time (fixed) and those which vary with storage time (variable). The fixed costs include overhead expenses associated with the physical facilities plus certain handling costs such as placing and removing the product. The variable costs include continuing items such as protection expenses, handling expenses related to storage time, fuel and power expenses. In addition to the direct costs of storage, changes in product characteristic during storage must be considered as a cost in terms of depreciated product values. The items of food grain storage cost included in this study are as follows:

(a) weight and quality loss: The traders in the study area indicated high dry weight losses for maize and lower losses for *teff*. Traders were asked to estimate the average food grain loss during storing the food grain. According to the reports of the sample food grain traders, the average storage loss for maize which includes dry weight loss, damage by rodents and insects, and spillage was 2.44 Kg per quintal in 1992. This does not include quality deterioration.

(b) godown rent: It is very difficult to obtain a correct assessment of either the opportunity cost of godown in the study area or costs on repairs and maintenance. We asked the grain traders for the cost of building their store or how much they pay for a monthly rent of their store. The sum of the monthly rents were divided by the amount of grain stored by traders.

In our survey, this was estimated to be 0.45 Birr per quintal in 5 months time (0.10 Birr/month/qt).

(c) depreciation of sacks: This was estimated by AMC, 0.90 Birr for one season.

(d) interest rate on investment: Since the interest rate varied from 9 percent in the Commercial Bank of Ethiopia to 60-200 percent in the informal credit market [16: 84], we preferred to estimate the storage cost of maize and *teff* using four scenarios i.e.,

Scenario I = 9 percent interest rate per year for the bank credit system

Scenario II = 60 percent interest rate per year in the informal credit market

Scenario III = 100 percent interest rate per year in the informal credit market

Scenario IV = 200 percent interest rate per year in the informal credit market. The major labour component of storing food grain in the study area is guarding. Since traders used family labour to guard the stored food grain, detailed estimates of labour cost were not included in the model.

Table 5 indicates the estimates of storage cost using Hays and McCoy approach [14, p.182] i.e.

$$P_s = P_h + t(R+I+L+D)$$

where P_s = expected price of stored grain; P_h = price of grain stored at harvest; R = rent per month per quintal of grain; I = interest on capital per quintal; L = amount of losses over time;

D = depreciation of sacks in the time of storing one quintal; and t = number of months.

Table 5
Estimates of storage cost of maize and teff at Shashemene Market, 1991

	Ph	R	I	L	D	t	Ps	Ph-Ps
Scenario I								
Maize	64.0	0.10	0.64	1.56	0.90	4	76.80	12.80
<i>teff</i>	142.0	0.10	1.42	3.46	0.90	4	165.52	23.52
Scenario II								
Maize	64.0	0.10	3.20	1.56	0.90	4	84.04	23.04
<i>teff</i>	142.0	0.10	7.10	3.46	0.90	4	174.54	32.54
Scenario III								
Maize	64.00	0.10	5.33	1.56	0.90	4	94.00	30.36
<i>teff</i>	142.0	0.10	11.83	3.46	0.90	4	207.16	65.16
Scenario IV								
Maize	64.0	0.10	10.67	1.56	0.90	4	116.92	52.92
<i>teff</i>	142.0	0.10	23.67	1.46	0.90	4	254.52	112.52

Table 5 shows that the storage cost of maize in Shashemene was 12.80, 23.04, 30.36, and 52.92 Birr for Scenario I, II, III and IV, respectively. The price increase of maize in Shashemene market 57 Birr (Table 4) from January to June is higher than the estimated storage cost 12.80, 23.03, 30.36, and 52.92 in Scenario I, II, III and IV, respectively. The storage costs for *teff* were 23.52, 32.54, 65.16, and 112.52 Birr in Scenario I, II, III and IV, respectively. In the case of *teff*, the storage cost is lower than the seasonal price increase (66.0 Birr between January and June 1991) only in the first three scenarios (I, II, and III). This indicates that if the interest rate in the informal credit market is higher than 100 percent; storing *teff* is thus unprofitable in the short-run.

The findings reveal that the seasonal price increases that arise from seasonality in supply and marketing exceeds the cost of storing food grain (namely storage loss, interest on inventory, depreciation of sack, and rent of godown) significantly implying high profit margin for the traders, particularly when the interest rate is less than 100 percent. The high margin of difference between the seasonal price spread and costs of storage partly reflects the fact that the food grain traders exploit the weak bargaining power of farmers by purchasing the food grain during the harvesting period when the prices were low. Farmers are forced to sell their food grain immediately after harvest because they are in need of hard cash which they can not postpone in order to pay debts and taxes, purchase consumer goods, and cover the cost of social commitments.

Avoiding the risk of the losses and storage cost by farmers, particularly for maize, increases the arrival of food grain after harvest which directly increases the seasonal price spread. The non-competitive market structure has also allowed the food grain traders to extract large inter-temporal storage profits. Such a high profit margin attracts even well-to-do individuals, who were not directly involved in food grain trading activities in the study area, to be involved in seasonal food grain storage. It is not surprising to observe such high seasonal price spread when there is a relatively high rate of returns to a scarce capital in a subsistence economy like Ethiopia.

5.7. Spatial price efficiency

Spatial market integration is the extent to which changes in prices in one market lead to changes in price in the other markets. Spatial market integration is measured in this study using the correlation coefficients among markets and Timmer's Index of Market Connection (IMC) [26, pp.113-123] which is based on the Ravallion's dynamic model [24, p.103]. Despite the limitations [13, pp.204-206], the correlation coefficients provide a good initial measure of market integration when quick results are required [30, p.27]. In this study, the correlation coefficients of maize and *teff* prices are computed only for markets which have direct trade link with the central market. Timmer's Index of Market Connection indicates the degree to which local markets are connected to the reference market (Shashemene) in the short and long-run [26, pp.220-223]. The results of the Timmer's Index of Market Connection (IMC) and the correlation coefficients are presented in Tables 6 and 7.

Table 6
Timmer's Index of market connection (IMC) and R² for maize

Markets	b ²	IMC	R ²	Test of b ₁ and b ₂
Alaba	0.534*	2.534	0.85	b ₁ , b ₂ *
Alemgebeya	0.788*	2.324	0.87	b ₁ *
Adelo	0.055	7.645	0.72	b ₁ ***, b ₂ ***
Bonosha	-0.027	1.509	0.78	b ₂ , b ₂ *
Goba	0.008	35.975	0.76	
Zeway	0.638*	0.358	0.90	b ₁ *
Mekie	0.550***	-0.096	0.85	b ₁ *
Ajie	-0.236	-29.917	0.68	b ₂ *
Wolaita Sodo	0.040	-10.676	0.45	b ₂ **
Arsie Negele	0.476*	1.259	0.94	b ₁ *
Addis Ababa	0.28***	0.737	0.87	b ₁ *, b ₂ *

Table 7
Timmer's index of market connection (IMC), and R₁ for teff

Markets	b ₂	IMC	R ²	Test of b ₁ and b ₃
Alaba	-0.086	-1.089	0.12	b ₁ *, b ₃ *
Alemgebeya	0.154	1.397	0.26	b ₁ *, b ₃ *
Adelo	-0.194	1.809	0.42	b ₁ *
Bonosha	0.033	5.523	0.22	b ₁ *, b ₃ *
Zeway	0.055	1.704	0.58	b ₁ *
Mekie	-0.202	9.692	0.42	b ₁ *
Ajie	0.272	4.235	0.07	b ₁ *
Wolaita Sodo	0.239	4.235	0.22	b ₁ ***
Arsie Negele	-0.278	-3.777	0.21	
Addis Ababa	-0.065	1.198	0.10	b ₁ *

Notes: * = significant at 1% level
 ** = significant at 5% level
 *** = significant at 10% level

The following general comments are required to interpret the results: (a) the data used in this section are 43 weekly retail prices for different markets. The price data was mainly collected by the author during the field research. Relatively the recording process was reliable but there can be a recording error particularly in *teff* where different varieties may be recorded as if they were of the same variety. It must be noted that weekly data are more appropriate to the model than monthly data [15, p.39] and the analysis of market integration which is restricted to 43 weeks and about 12 markets is sufficient to suggest certain imperfections in the marketing system. (b) since initially it was planned to study the market integration of the central markets with the rural markets, the data set does not include all the major consuming centres of the food grain. (c) during the survey, there was no government intervention at any level which hinders the flow of food grain but there were civil unrest or fear of unrest in May 1991 (when Mengistus' regime collapsed) where producers withhold their stocks only for a short period. (d) the difference in modelling

obviously resulted in a difference in the empirical results, i.e. R^2 correlates the untrended weekly food grain prices between markets, and Timmer's index relates the price of the local market with the lagged prices of the local market itself, the price of the central market, and the lagged prices of the central market.

The b_2 coefficients in Timmer's index, indicate whether the changes in prices of Shashemene are fully reflected in the rest of the local markets or not and they are used as an alternative to measure market integration if IMC fails to show any indication. These coefficients are used to test long-run market integration. According to Heytens [15, p.31], the b_2 coefficient measures much of the same thing as the simple bivariate coefficient. This is true in the maize market (Table 6) where the b_2 coefficients are found to be significant for Alaba, Alemgebeya, Arsie Negele (at one percent level), Mekie and Addis Ababa (at 10 percent level) and the bivariate correlations are also high. While on the other hand, the b_2 coefficients are found to be insignificant for *teff* (Table 7). The b_2 coefficients indicate that the spatial prices of maize are integrated in the long-run while the rest of the markets are rarely integrated with the central market.

The hypothesis of market segmentation is rejected, i.e., the changes of prices in Shashemene market (the immediate or lagged) influences the prices in all the local markets for all types of food grain in our study. As a result of computing IMC to test for spatial short-run market connection, we found Bonosha and Addis Ababa relatively integrated with the central market in the maize market. In the *teff* markets (Table 7), only Alaba and Alemgebeya are integrated with Shashemene market. The *teff* markets in the study area are not integrated with the central market in the short-run.

We found poor spatial price integration in the study area except with Addis Ababa market which is connected to the central market by tarmac road. The central market is not integrated with closer markets such as Ajje, Alaba, Zeway, etc. Therefore, the village markets and town markets were thinly integrated with the Shashemene market (central market). This appear to be largely a result of poor transport facilities and information flow.

Although the *teff* markets under study were not integrated with the central market using correlation coefficient and b_2 coefficient, some markets such as Alemgebeya, Adelo, and Zeway are found to be integrated using IMC test. This indicates that the IMC and b_2 provide broader results than the correlation coefficients. Moreover, the model is not susceptible to trend factors and other common factors between markets which distort the real picture of market integration.

In spite of the limitations of the coefficient of variation approach, it produced useful results which approximate the market integration with the real marketing situation in the study area. One of the main problems of correlation coefficient and index of market connection is the cut-off point to decide whether markets are integrated or not. The challenge of interpreting the empirical results is that the *teff* markets are poorly integrated compared with the maize markets using the correlation coefficient and b_2 coefficient. The low price variability and seasonality index and a small upward secular trend behaviour of price of *teff* influence the size of the coefficients. The weekly price fluctuations are smaller

in *teff* compared with maize since the demand of high income group for *teff* is relatively insensitive to price change. Heytens [15, p.34] also reported that the empirical results of Ravallions' model for Gari (processed cassava) in Nigeria were in sharp contrast to those shown by the correlation coefficients.

It is not surprising that the central market is found to be more integrated with remote markets compared with the nearby markets since traders always set the base of their price setting in the central market (Shashemene) on the price of the final markets. The main reason for the poor integration between the central and the nearby markets in the study area is the poor transport facilities which limited the size of the competition. Moreover, from our observation of the rural markets, the price of food grain in a rural market is determined by the number of wholesalers visiting the weekly rural markets from the central market. As indicated earlier collusion and barriers to entry are the main features of the market conduct of food grain traders in the rural markets. This imperfect correspondence of price changes among markets is also a consequence of defective market information which reduced the flexibility of price changes and permit the traders to make appropriate adjustments in prices and in their buying and selling practices. Although there is no trade between the rural markets, we expected that the higher inter-rural market integration via the price and trading relationship of the central market (joint destination market). Again, the same reason of weak competition in the rural markets is one of the main factors for the poor integration among the markets in the study area.

VI. CONCLUSION

The results show that market concentration for the licensed food grain traders is high but the size of the unlicensed food grain traders has increased significantly which, on the other hand, improved competition among the food grain traders. The licensing procedure has improved after the March 1990 reform. It appears that licensing is no more a barrier to entry into the food grain wholesaling and retailing. After the reform, although the number of private traders has increased, the high concentration ratio indicates the beginning of a process to replace the state monopoly of food grain trade by private monopoly. The field survey revealed that there was a lack of working capital and credit to improve the efficiency of food grain marketing. The social variables such as religion, ethnic origin and education and experience were not important barriers to enter in the food grain trade. Institutional variables such as the urban land nationalization and lack of long-term and soft credit affected the investment on godown by food grain traders.

The behaviour of most of the food grain traders in Shashemene and Alaba markets appears to be competitive. But, in the rural market, the wholesalers colluded and this resulted in a decline in producer prices. On the other hand, there were occasions in the rural markets where a well-off wholesaler offered a relatively higher price in a market day and the rest of the traders failed to buy food grain at that price. Non-price inducements such as credit before harvest were offered to farmers mainly by farmer-traders.

Improving the licensing procedure alone cannot remove the problems and imperfections in the food grain marketing system. This is partially explained by the findings on the operational and pricing efficiencies. The transport charges of the small-scale trucks transporting food grain from the rural markets to the town markets are found to be very high. The food grain marketing margin is also found to be higher compared to the estimated transfer costs. The seasonal price spread of maize and *teff* in Shashemene market is higher than the estimated storage cost implying inter-temporal price inefficiency. The dynamic spatial integration models and the coefficient of variations among the markets showed mixed results. The maize markets are more integrated than the *teff*. There is also a high seasonal price variability particularly in the maize market.

The high market concentration, barriers to entry in terms of capital and credit, evidence of collusion in the rural market, low market integration, high marketing margin, and high seasonal price variation in the study area reveal the inefficiency of the food grain marketing after the reform. But, there were positive improvement in developing new marketing institutions, removing the licensing barriers and the elimination of AMC's trade monopoly which resulted in an increase in the number of food grain traders after the March 1990 market liberalization.

The reorganization of AMC as a private trading institution to stabilize the food grain price and macroeconomic stabilization after the March 1990 are important steps in the restructuring process. New institutions such as a new co-operative system, land market, wholesale market development and rules governing contracts between buyers and sellers, new trading arrangements and new information systems need to be developed which uniquely suit the situation in Ethiopia. In spite of the complex problems after the reform, the food grain marketing system appears to be improving and working better by market structure standards (S-C-P).

Finally, given the brief period after the reform, I do not attempt to address the issue of the impact of market reform on the performance of the marketing system and draw strong conclusions for the results. Much more (and more rigorous) empirical evidence is required to guide policy effectively in this area. This case study provides a starting point for further detailed study of food grain marketing in Ethiopia.

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