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# **Delinking of Local and International Prices: Exploring Competition in the Bangladesh Rice Market**

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**SANEI WORKING PAPER SERIES**

**No. 12 - 06**

**DELINKING OF LOCAL AND INTERNATIONAL  
PRICES: EXPLORING COMPETITION IN THE  
BANGLADESH RICE MARKET**

**MINHAJ MAHMUD  
SYED NAIMUL WADOOD**



**South Asia Network of Economic Research Institutes**

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## DELINKING OF LOCAL AND INTERNATIONAL PRICES: EXPLORING COMPETITION IN THE BANGLADESH RICE MARKET

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# TABLE OF CONTENTS

ACRONYMS AND GLOSSARY .....	V
ACKNOWLEDGEMENT.....	VII
<b>SECTION 1: INTRODUCTION.....</b>	<b>1</b>
1.1 BACKGROUND.....	1
1.2 ORGANIZATION OF THE PAPER .....	2
<b>SECTION 2: LITERATURE REVIEW .....</b>	<b>3</b>
<b>SECTION 3: METHODOLOGY .....</b>	<b>5</b>
3.1 PRIMARY SURVEY .....	5
3.2 SECONDARY DATA .....	6
<b>SECTION 4: PRIMARY SURVEY ON RICE MARKETS INSTITUTIONS.....</b>	<b>8</b>
4.0 STARTING POINT OF DISCUSSION ON MARKET COMPETITIVENESS.....	8
4.1 MARKET FOR PADDY GROWERS .....	8
4.1.1 EXAMINING THE STATE OF COMPETITIVENESS IN THE PRIMARY GROWER’S MARKET .....	8
4.1.2 BACKGROUND DISCUSSION OF THE SELECTED VILLAGES .....	9
4.1.3 PROFILE AND CROP CULTIVATION RECORDS OF THE PADDY GROWERS .....	10
4.1.4 PRICING DECISIONS AS REPORTED BY THE PADDY GROWERS.....	10
4.2 MARKET FOR WHOLESALERS .....	12
4.2.1 EXAMINING THE STATE OF COMPETITIVENESS IN THE MARKET FOR WHOLESALERS .....	12
4.2.2 BREAKDOWN OF THE SAMPLE ENTERPRISES .....	12
4.2.3 OWNERSHIP AND OWNER PROFILES.....	13
4.2.4 CONNECTEDNESS OF THE WHOLESALER MARKETS .....	14
4.2.5 SIZE OF THE WHOLESALER MARKETS .....	14
4.2.6 INTERNATIONAL TRADE IN THE WHOLESALER MARKETS .....	15
4.2.7 ENTRY AND EXIT OF ENTERPRISES IN THE WHOLESALER MARKETS.....	16
4.2.8 MARKET SHARES OF ENTERPRISES IN THE WHOLESALER MARKET .....	17
4.2.9 BUSINESS ASSOCIATIONS IN THE WHOLESALER MARKETS .....	17
4.2.10 FINANCING OF THE WHOLESALER ENTERPRISES.....	18
4.2.11 STORAGE CAPACITIES OF THE WHOLESALER ENTERPRISES.....	18
4.2.12 PRICING AND BARGAINING IN THE WHOLESALER MARKETS .....	18
4.2.13 OVERALL MARKET TRENDS IN THE WHOLESALER MARKERS .....	19
4.2.14 BASIC FEATURES OF ENTERPRISES IN THE WHOLESALER MARKETS .....	20
4.2.15 EMPLOYMENT ASPECTS OF WHOLESALER ENTERPRISES.....	21
4.2.16 PHYSICAL ASSETS AND TRANSPORT FACILITIES OF THE WHOLESALER ENTERPRISES.....	22
4.2.17 ESTABLISHMENT OF THE WHOLESALER ENTERPRISES .....	23
4.2.18 BUSINESS CONTACTS OF THE WHOLESALER ENTERPRISES.....	24
4.2.19 FINANCING OF THE WHOLESALER ENTERPRISES.....	25
4.2.20 RICE VARIETIES OFFERED BY THE WHOLESALER ENTERPRISES .....	26
4.2.21 PRICE MOVEMENTS OF RICE VARIETIES OF THE WHOLESALER ENTERPRISES .....	27
4.2.22 PROFITABILITY OF THE WHOLESALER ENTERPRISES .....	29
4.2.23 PRICING DECISIONS AS REPORTED BY THE WHOLESALER ENTERPRISES .....	30
4.2.24 MARKET STRUCTURE OF THE MARKET FOR WHOLESALERS.....	30
4.3 THE RETAILER MARKET.....	31
4.3.1 EXAMINING THE STATE OF COMPETITIVENESS IN THE MARKET FOR RETAILERS .....	31
4.3.2 FINDINGS FROM THE SELECTED RETAILER MARKETS .....	31
4.3.3 PRICING AND BARGAINING AS REPORTED BY THE RETAILER ENTERPRISES .....	33
4.4 SUMMARY OF THE PRIMARY SURVEY FINDINGS .....	33
<b>SECTION 5: TRENDS AND RELATIONSHIP BETWEEN PRICES OF LOCAL AND INTERNATIONAL VARIETIES OF RICE .....</b>	<b>36</b>
5.1 COINTEGRATION TEST .....	37
<b>SECTION 6: SUMMARY AND CONCLUSIONS .....</b>	<b>38</b>
REFERENCES.....	40
APPENDIX 1: MAPS AND FIGURES .....	42
APPENDIX 2: ECONOMETRIC TEST RESULTS .....	58

## LIST OF TABLES

TABLE 1: SAMPLE DISTRIBUTION.....	6
TABLE 2: DISTRIBUTION OF THE SAMPLE ENTERPRISES BY DISTRICTS .....	13
TABLE 3: CENSUS INFORMATION OF THE SURVEYED RICE MARKETS.....	15
TABLE 4: OLDEST AND NEWEST ENTERPRISES, ENTRY AND EXIT.....	16
TABLE 5: BASIC FEATURES OF THE SAMPLE ENTERPRISES.....	21
TABLE 6: EMPLOYMENT FEATURES IN THE SAMPLE ENTERPRISES.....	22
TABLE 7: OFFICE AND STORAGE SPACE OF THE SAMPLE WHOLESALER ENTERPRISES.....	22
TABLE 8: TRANSPORT FACILITIES OF THE SAMPLE WHOLESALER ENTERPRISES .....	23
TABLE 9: YEARS OF STAY IN BUSINESS OF THE SAMPLE WHOLESALER ENTERPRISES .....	23
TABLE 10: BUSINESS CONTACTS OF SAMPLE WHOLESALE ENTERPRISES .....	25
TABLE 11: LOAN SITUATION OF THE SAMPLE WHOLESALE ENTERPRISES.....	26
TABLE 12: PRICE MOVEMENTS OF SELECTED RICE VARIETIES ACROSS THE COUNTRY (MAY 2010 TO APRIL 2011) .....	28
TABLE 13: OLS REGRESSION OF REPORTED MONTHLY PROFIT .....	58
TABLE 14: ADF TEST RESULTS .....	60
TABLE 15: JOHANSEN COINTEGRATION TEST RESULTS.....	61

## LIST OF FIGURES

FIGURE I. EQUILIBRIUM PRICE AND OUTPUT IN A DOMINANT FIRM MODEL WITH COMPETITIVE FRINGE AND UNLIMITED ENTRY.....	34
FIGURE 1: SURVEYED DISTRICTS .....	42
FIGURE 2: MAJOR SOURCES AND DESTINATIONS OF SUPPLY OF RICE IN THE DISTRICT OF BOGRA .....	43
FIGURE 3: MAJOR SOURCES AND DESTINATIONS OF SUPPLY OF RICE IN THE DISTRICT OF CHITTAGONG .....	44
FIGURE 4: MAJOR SOURCES AND DESTINATIONS OF SUPPLY OF RICE IN THE DISTRICT OF DHAKA.....	45
FIGURE 5: MAJOR SOURCES AND DESTINATIONS OF SUPPLY OF RICE IN THE DISTRICT OF DINAJPUR .....	46
FIGURE 6: MAJOR SOURCES AND DESTINATIONS OF SUPPLY OF RICE IN THE DISTRICT OF JESSORE .....	47
FIGURE 7: MAJOR SOURCES AND DESTINATIONS OF SUPPLY OF RICE IN THE DISTRICT OF KUSHTIA .....	48
FIGURE 8: MAJOR SOURCES AND DESTINATIONS OF SUPPLY IN THE DISTRICT OF NAOGAON.....	49
FIGURE 9: PRICE MOVEMENTS OF ENTERPRISES ACROSS THE COUNTRY FOR BR 28 RICE, 2010-11.....	50
FIGURE 10: PRICE MOVEMENTS OF ENTERPRISES ACROSS THE COUNTRY FOR BR 28 RICE, 2010-11.....	51
FIGURE 11: TREND OF AMAN – COARSE (REAL AND NOMINAL).....	52
FIGURE 12: TREND OF AMAN – MEDIUM (REAL AND NOMINAL) .....	52
FIGURE 13: TREND OF AMAN – HYV (REAL AND NOMINAL).....	53
FIGURE 14: TREND OF AUS – LOCAL (REAL AND NOMINAL).....	53
FIGURE 15: TREND OF AUS – HYV (REAL AND NOMINAL).....	54
FIGURE 16: TREND OF BORO – LOCAL (REAL AND NOMINAL) .....	54
FIGURE 17: TREND OF BORO – HYV (REAL AND NOMINAL).....	55
FIGURE 18: TREND OF THAI 5% BROKEN (REAL AND NOMINAL) .....	55
FIGURE 19: TREND OF THAI 5% PARBOILED (REAL AND NOMINAL) .....	56
FIGURE 20: TREND OF THAI 25% (REAL AND NOMINAL) .....	56
FIGURE 21: TREND OF INDIAN 25% (REAL AND NOMINAL).....	57
FIGURE 22: TREND OF VIETNAMESE 25% (REAL AND NOMINAL) .....	57

## ACRONYMS & GLOSSARY

ADF	Augmented Dickey-Fuller Test
<i>Aman</i>	Monsoon season rice crop
<i>Aratdar</i>	Rice trader-broker
<i>Atap</i>	Raw rice (as opposed to parboiled)
<i>Aus</i>	Pre-monsoon season rice crop
<i>Baashfuli</i>	A local rice variety
<i>Bazaar</i>	Marketplace
BBS	Bangladesh Bureau of Statistics
<i>Bepari</i>	Market intermediary
<i>Boro</i>	Winter season rice crop
<i>Borshali Paijira</i>	A local rice variety
BR 11	A local rice variety
BR 28	A local rice variety
BR 30	A local rice variety
BR 32	A local rice variety
Chinese <i>Beti</i>	Imported rice variety
<i>Chinigura</i>	Small-grained, highly aromatic variety of rice
<i>Chandina</i>	A local rice variety
DAM	Department of Agricultural Marketing
DF	Dickey-Fuller Test
FAO	Food and Agriculture Organization
<i>Faria</i>	Market intermediary
FOB	Freight On Board
FPMU	Food Planning and Monitoring Unit
<i>Govindabhog</i>	A local rice variety
<i>Guti</i>	A local rice variety
<i>Haat</i>	Marketplace
<i>Heera</i>	A local rice variety
<i>Hybrid Heera</i>	A local rice variety
HYV	High Yielding Variety
Indian <i>Beti</i>	Imported rice variety
IRRI	International Rice Research Institute
<i>Jirashail</i>	A local rice variety
<i>Kalijira</i>	Small-grained, highly aromatic variety of rice
<i>Kataribhog</i>	A local rice variety
KII	Key Informant Interview
LC	Letter of Credit
<i>Miniket</i>	A local rice variety
MoFDM	Ministry of Food and Disaster Management
<i>Mohajon</i>	Informal money-lender
<i>Najirshail</i>	A local rice variety
NGO	Non-governmental organization



OMS	Open Market Sales
<i>Paijam</i>	A local rice variety
<i>Paikar</i>	Wholesaler
<i>Pakistani Beti</i>	Imported rice variety
<i>Pari</i>	A local rice variety
<i>Parija</i>	A local rice variety
<i>Ranjit</i>	A local rice variety
<i>Sadar</i>	District administrative hub
<i>Samity</i>	Business association
<i>Sharna</i>	A local rice variety
<i>Sharna Thin</i>	A local rice variety
SSC	Secondary School Certificate
<i>Upazilla</i>	Smaller administrative unit compared to district
USDA	United States Department of Agriculture
<i>Vietnamese Beti</i>	Imported rice variety
WFP	World Food Programme

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# DELINKING OF LOCAL AND INTERNATIONAL PRICES: EXPLORING COMPETITION IN THE BANGLADESH RICE MARKET

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SYED NAIMUL WADOOD

## SECTION 1 INTRODUCTION

### 1.1 Background

Although global grain prices have declined during 2009, domestic food prices in South Asian countries sharply increased in early 2010. For instance, rice prices have increased by 27 percent in Dhaka, Bangladesh between October 2009 and February 2010. On the other hand, rice prices in the international market have decreased by 6 percent between February and March 2010 due to increased supply from Vietnam and Thailand (World Bank, 2010). This divergence of domestic and international prices is somewhat surprising given the presumption that prices of tradable goods of small open economies are supposed to be set in between their respective export parity prices and import parity prices. Accordingly domestic prices should adjust close to their import parity price levels at least after a brief time period required to transport the goods from abroad. How do we explain this price increase in local markets? Murshid et al. (2009), for example, concludes that the recent increases in rice prices was not related to domestic production per se and that such price increase might be explained by international prices, market forces and other unobservable factors. This implies one should closely examine structure of the rice market. We take a broader perspective on the issue of recent price increases in the domestic rice market in Bangladesh. The query that follows is that: *what exactly is the nature of competition at different stages of the domestic rice market of Bangladesh?* This can be addressed only if we examine the agents, their strategies and incentives at different stages of the rice market value chain. The structure of rice markets in Bangladesh is generally considered to be competitive (Murshid et al., 2009; Minten et al., 2010). However, such conclusion is not based on rigorous assessments of incentives and behaviors of diverge groups of agents operating in the market and unless the incentives and behaviors of agents at different stages of markets are closely examined, it would not be convincing to conclude about the state of competitiveness of the market (Timmer et al 1983). Moreover, it is entirely possible that market operates quite competitively within one stage, whereas competition is much restricted within another stage. Instead of analyzing competition in the entire market as a single entity, it would be appropriate to analyze competition in each and every stage of the market. Therefore, this study focuses on particular aspects of *market competitiveness* by explaining incentives and behaviors of different agents in the market, particularly those of large firms operating in the middle of the rice market supply chain. We have examined pricing decisions and bargaining by agents at different stages of the market. We have also studied scope for collusive behavior among large firms in setting prices. In addition, we examined the relationships between the international prices of rice and the domestic wholesale prices.

## **1.2 Organization of the Paper**

Section 2 provides a brief review of the existing literature on rice markets agents and institutions in Bangladesh. Section 3 discusses about the methodology used in the present study. Section 4 illustrates the findings of the primary survey conducted in seven major rice trading centers of the country. In Section 5, we present the analysis on relationship between local and international prices of different varieties of rice. Summary and conclusions are presented in Section 6. Additional background materials are presented in the Appendix.

## SECTION 2 LITERATURE REVIEW

Being a crucially important component of the rural economy of Bangladesh, the food and agriculture sector of the country has been extensively researched and analyzed over the years. These two policy areas have consistently been considered as a high priority by the Government of Bangladesh. Furthermore, food grains – especially rice, is a major staple of the Bangladeshi people's diet, thus food grain supply and price stabilization were key issues of overall food security. In retrospect, a very few studies have systematically studied the rice market of Bangladesh. Only a handful of past researches have specifically explored different agents operating in the paddy-rice trade circuit in Bangladesh (see Chowdhury, 1992; Crow and Murshid, 1994; Baulch et al., 1998; Murshid, 2001; Murshid et al., 2009).<sup>1</sup> As concerns for food security diminished, the theme eventually received less attention.

Earlier works focused initially on technology adoption constraints during the Green Revolution of the 1970s and 1980s. The subsequent researches emphasized on reforms in agriculture and the food system, criticizing the Public Food Distribution System, input and output subsidies for farmers, market and trade liberalization. In the mean time, a number of studies on market integration were done, primarily focusing on rice markets. Using data from 1988 to 1996, Baulch et al. (1998) showed that wholesale markets are integrated spatially. Citing Baulch et al. (1998), Dorosh et al. (2004) noted that over 80 % of price changes are transmitted between pairs of markets within two weeks. Using data from 1989-90 to 1991-92, Goletti (1994) also demonstrated that the markets were moderately integrated. A few have explored the structure, conduct and performance of the market (e.g. Chowdhury, 1992; Baulch et al., 1998).

All of the spatial integration studies agree that some price transmission exists between Dhaka and other major rice markets, i.e. the markets are not totally segmented. Some of the early researches (Ravallion 1986, 1987; Chowdhury, 1992) suggest that rice markets in Bangladesh were highly competitive. Dorosh (1999) pointed that there were little scope for a small group of traders to significantly affect market supply and prices. Contrary results were observed by Osmani and Quasem (1990) and Crow and Murshid (1994), however these findings were given small attention.

Chowdhury and Haggblade (2000) mentioned intense competition among the traders and suggested that most market participants behaved like competitive profit-makers. Due to increased use of HYV, improved infrastructure, less tied credit, more information-efficient markets and increasing number of market participants, the competitiveness can only have increased.

Murshid et al. (2009) is one of the recent studies that discuss food insecurity, instability of food production and prices, nature of food markets, policies, etc. Referring to previous studies (Ravallion, 1986, 1987; Dawson and Dey, 2002), their paper indicates that the common perception is that the rice market in Bangladesh is sufficiently competitive, and therefore there was little room for public interventions. The authors found that the rice

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<sup>1</sup> For a broad overview of rice markets see Murshid (2001) and Murshid et al. (2009).

markets in Bangladesh were well integrated except for some specific locations. This observation contradicts with previous studies which demonstrated that there is limited integration in the rice markets. In addition to analyzing local markets, they also compared the rice markets of Dhaka, the capital of Bangladesh, and Kolkata, the capital of West Bengal, India. They found that the two markets are less than perfectly integrated, implying that the markets only partially consider price signals of each other. Moreover, the authors discussed the linkages between various market participants involved in the paddy-rice trade circuit in Bangladesh, and the marketing margins among the market operators – where they found that the growers' share in the final consumer price was 70% percent and that the shares of market operators were evenly distributed in the case of rice markets. They commented that the market participants follow the open bargaining method for determining the price during transactions. They underscored trust-building and personalized transactions to be the means to achieve successful exchange relations. Overall, they noted that markets all over Bangladesh are efficient and well functional.

In a recent study, Minten et al. (2010) discuss the issue of agricultural marketing, price stabilization, value chain and international trade. The paper discusses various aspects of the food grain market in Bangladesh and mentions that these markets seem to have become well integrated over time and space. Hence, the food grain market of Bangladesh function quite efficiently in the well connected areas. The authors comment that the possible reasons are large investments in road infrastructure by the government and donor agencies, and wider availability of mobile phones. The explanation put forth is that information flows rapidly in the markets and food grains flow from surplus to deficit areas whenever the need arises. The study also noted that there appears to be little collusion between traders to fix prices, except for short periods. A brief note itself, the paper did not elaborate on the later comments.

Among other recent studies, Chowdhury (2010) confirms the observations of Murshid et al. (2009), showing that 74% of the market links demonstrate strong co-integration and the rest demonstrate segmentation. Since conclusions reached by most of the past researches are not based on rigorous assessments of incentives and behaviors of diverse group of agents operating in the market, this study is specifically targeted toward the issue of fundamental strengths and weaknesses of “real” markets.

## SECTION 3 METHODOLOGY

### 3.1 Primary Survey

The first subtheme of the current study examines the market structure and nature of competition prevailing in the rice markets of Bangladesh. This part involves a detailed exploration of different agents of the overall paddy-rice trade in major rice trading centers of Bangladesh using comprehensive questionnaires and key informant interviews (KII).

Primary data was collected in seven districts, namely Dinajpur, Naogaon, Bogra, Kushtia, Jessore, Chittagong and Dhaka. The locations were selected as per previous researches. The idea was to study major rice trading hubs of the country so that the overall state of the supply chain is reflected. Hence, in addition to the major supply points (Dinajpur, Naogaon, Bogra, Kushtia and Jessore), major urban destinations (Chittagong and Dhaka) were also covered. The survey plan included growers (the very first node of the supply chain), millers, rice *arats* (brokers, also known as commission agents), rice wholesalers and retailers (the last point of the chain from whom consumers buy rice)<sup>2</sup>. Moreover, key community persons of selected villages and key informants of surveyed markets were interviewed to gather details of rice trading in their respective areas/markets. The survey instruments focused on various firm- and market specific information, particularly details of pricing decisions and bargaining, employing open ended questions for the large part. Hence, the primary data will mostly utilize qualitative analysis. The instruments that were used are described as follows:

- (a) **Enterprise questionnaires** (for millers, wholesalers, *arats* and retailers) inquiring about firm specific information on ownership, employees, assets, establishment, involvements in the business associations (*samity*), business relations, financing, credit situation, suppliers and customers, costs and revenues and details of pricing decisions and bargaining. In addition market specific information i.e. market shares, entry and exit, exports and imports and storage were also covered. Furthermore, the rice traders were asked to recall prices of different rice varieties sold during the last one year at an average monthly frequency. This part of the questionnaires was used for quantitative assessment of individual firms' responses to different prices.
- (b) **KII** (for millers, wholesalers, *arats* and retailers) in each of the markets interviewing knowledgeable paddy/rice traders who have been active in the market for at least 5 years in the respective market. The KIIs questioned about market specific information such as market shares, entry and exit, exports and imports, storage, business financing and details of pricing decisions and bargaining.
- (c) **Farmer questionnaires** (for paddy growers) addressing information on agricultural land use, paddy/rice crops, business relations, financing, loan situation, customers and details of pricing decisions and bargaining.

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<sup>2</sup> See Murshid et al. (2009) for details of various market operators in the paddy-rice market.



(d) **Community questionnaires** (for key persons in the surveyed villages) focusing on general information on the village/locality, sources of credit in the area, production information and distances to/from major destinations/locations.

(e) **Price List** (in each of the surveyed locations) exhibiting local retail and wholesale prices of various agricultural products, enterprise and agricultural inputs, cost of transporting goods and consumer goods.

Overall, the survey employed 5 field officers to collect data in the given locations. 5 days were needed to survey each district. The distribution of questionnaire in each location is summarized in Table 1 below.

TABLE 1  
Sample Distribution

District	KII	Enterprise Questionnaires		Farmer Questionnaires	Community Questionnaires	Prices List
		Millers, wholesalers and <i>aratdars</i>	Retailers			
Bogra & Naogaon	7	16	-	6	2	3
Chittagong	10	20	10	-	-	5
Dhaka	9	24	11	-	-	4
Dinajpur	6	16	-	8	2	5
Jessore	10	20	-	-	-	5
Kushtia	10	20	-	-	-	5
<b>TOTAL</b>	<b>52</b>	<b>116</b>	<b>21</b>	<b>14</b>	<b>4</b>	<b>27</b>

### 3.2 Secondary Data

The second subtheme studies the relationship between the international and the domestic wholesale prices of rice as well as examines if domestic prices are dictated by export and import parity prices. Secondary data on domestic and international prices of various rice varieties, were compiled for this purpose. Wholesale prices of major seasonal rice varieties, namely, *Aman*, *Aus* and *Boro* including their classifications i.e. coarse, medium and High Yielding Variety (HYV) have been collected from DAM's (Department of Agricultural Marketing) records. The local price dataset consists of monthly prices for the years 1997 to May 2011. In case of data unavailability for some time periods, linear interpolation was done through weighted averages. The different varieties considered are as follows:

- *Aman*: coarse, medium, HYV
- *Aus*: local, HYV
- *Boro*: local, HYV

Likewise, international rice export prices for the years 2002 to 2011 were collated from various issues of *Rice Market Monitor*, published by FAO (Food and Agriculture Organization (FAO) of the United Nations), which provides an analysis of the most recent developments in the global rice market. The international price dataset consists of monthly prices (in US Dollars per ton, Freight On Board (FOB)) for the period of 1997 to 2011. The following varieties were considered:

- Thai: 5% broken, 5% parboiled, 25%
- Vietnamese: 25%
- Indian: 25%

Note that, for the years 1997 to 1999, the price data were available as yearly averages. In order to maintain consistency of the dataset, these yearly averages have been considered as the monthly averages for those years.

All prices were converted to Taka per quintal to ensure comparability. We ensured to analyze both nominal and real prices (adjusted for inflation using non-food price index collected from Bangladesh Bank). Finally, the trends and volatility of rice prices were examined using time series estimation techniques such as descriptive analysis, unit root tests, cointegration tests, time series estimation techniques of examining volatility.

## SECTION 4 PRIMARY SURVEY ON RICE MARKETS INSTITUTIONS

This section discusses the first subtheme of the study, namely, *examining the market structure and nature of competition in the rice markets of Bangladesh*.

The primary survey was conducted during the months of March and April of 2011, covering a number of regions within the country. In terms of directions the survey covered the northern, western, southern and the central regions (Figure 1). The survey covered three districts in the northern region, and these are the districts of Bogra (Dupchanchiya upazilla), Dinajpur (Bochaganj and Dinajpur sadar upazillas) and Naogaon (Naogaon sadar upazilla). The northern region is major rice producing as well as surplus region, so we covered some of these northern regions. In the west the survey covered the districts of Jessore (Abhaynagar, Jhikargacha and Sharsha upazillas) and Kushtia (Kushtia sadar upazilla). These areas are major hubs of rice marketing chain, and points through which rice imports from India reach different destinations. The survey also covered Dhaka and Chittagong metropolitan cities as the final consumer location areas. Dhaka is the capital city and Chittagong is a port city from which imported rice is transported to all other locations.

Our objective was to examine the *state of competitiveness in different segments of the paddy-rice market*; it was thereby required that we cover the entire supply chain in our primary survey. Hence the survey plan included growers (the very first node of the supply chain), millers, rice *arats* (brokers, also function as commission agents), rice wholesalers and retailers (the last point of the chain from whom consumers buy rice). In addition to studying different agents of the chain, the survey included interviews of key informants of selected villages and markets to gather details of the paddy-rice production, value addition and trading in their respective areas/markets. The survey instruments used were as follows:

- (a) *Enterprise Questionnaire* (for millers, wholesalers, *arats* and retailers),
- (b) *Key Informant Interview* (for key informant millers, wholesalers, *arats* and retailers),
- (c) *Farmer Questionnaire* (for paddy growers),
- (d) *Community Questionnaire* (for key informants in the selected villages), and
- (e) *Price List* (of different consumer goods, and agricultural and industrial inputs).

The instruments included various firm and market specific information, particularly details of pricing decisions and bargaining. For a systematic discussion, we separately discuss three different points of the supply chain; namely, the market for paddy growers, the market for millers and wholesalers, and the retail market (see Farid and Rahman (2002) for a detailed discussion on the market structure of the rice markets in Bangladesh).

### **4.0 Starting Point of Discussion on Market Competitiveness**

A starting point of discussion on *market competitiveness* can be the idealized, textbook version of perfect competition. We can define *perfect competition* as a market outcome in which all firms produce homogenous, perfectly divisible output and face no barriers to entry

or exit; producers and consumers have full information, incur no transaction costs, and are price takers, and there are no externalities (Carlton and Perloff (2000)). We can examine these basic conditions in detail here.

**Homogeneous goods:** all firms sell an identical product, and at the same time consumers view the products of various firms as the same and are indifferent between them.

**Perfect information:** buyers and sellers have all the required information about the market, including the price and quality of the product.

**Price taking:** buyers and sellers cannot individually influence the price at which the product can be purchased or sold.

**No transaction costs:** neither buyers nor sellers incur costs or fees to participate in the market.

**No externalities:** each firm bears the full costs of its production process. This implies, the firm does not impose externalities, or uncompensated costs, on others.

**Free entry and exit:** firms can enter and exit the market quickly at any time without having to incur special expense, this implies, firm does not face barriers to entry or exit.

**Perfect divisibility of output:** firms can produce and consumers can buy a small fraction of a unit of output. As a result, the amount of output demanded or supplied varies continuously with price. This technical assumption avoids problems caused by large discrete changes in either supply or demand in response to small price changes.

Few markets in the world would meet the demand of the above definitions of perfect competition. Some economists use the term *competition* to refer to a market in which a few price-setting firms compete vigorously for sales. According to this interpretation, competition is used to describe rivalry between firms that can affect market price.

We can consider some industries as reasonably *competitive* if they have certain characteristics. Price-taking behavior, many firms and free entry and exit are often used as criteria to judge the *competitiveness of a market*.

From the point of view of public policy, the term *competitive* implies a market that requires no intervention to improve its performance. Yet there are often some confusion regarding the usage of this term in public policy since, the failure of a market to satisfy all the assumptions of perfect competition does not necessarily mean that some intervention can improve market performance (op. cit. (2000)).

We examine components of the rice market in detail, and the wholesaler market in particular, to assess deviations of these markets from the perfectly competitive ones (see Section 4.2.24 for discussion of market structure of the market for wholesalers).

## 4.1 Market for Paddy Growers

### 4.1.1 Examining the State of Competitiveness in the Primary Grower's Market

In order to investigate the *state of competitiveness* in the primary grower's market, first we point out some basic features or testable implications that are expected to be present in this segment of the market if it were competitive. First we expect a large number of buyers and sellers within this segment, and that no individual agent has control over the market prices. This condition is fulfilled in the primary growers' market segment since there are a very large number of sellers (primary growers) and an arguably large number of millers, *farias* and *paddy aratdars* who function as buyers and sure that no single agent can dictate the market

prices. Second we expect free entry and exit. This condition is also met in this segment since we do not find any significant barriers for entry into paddy farming or the intermediary functions. Third we expect bargains among the agents to settle the price, where no particular agent is constrained in any way to settle bargains. Constrained bargaining may lead to economic losses for the agent who faces this problem and thereby the opposite party in the transaction may gain out of this situation. A market cannot be considered sufficiently “competitive” where some agents are faced with restricted bargaining capacity due to problems that they face, for example, credit or cash constraints, lack of storage capacity, limited information, etc. It is in the case of this third condition, that we find some problems related to *competitiveness* for the primary grower segment of the rice market.

#### **4.1.2 Background Discussion of the Selected Villages**

The primary survey covered a total of four villages in two districts. The villages are *Harish Chandrapur* in Bochaganj upazilla and *Korimullahpur* mohalla within Dinajpur sadar area in Dinajpur district; *Kadowa* and *Debipur* villages within Naogaon sadar area in Naogaon district. Our survey team collected community information from selected key informants, verified those with a larger group of audience, and completed face-to-face questionnaire interview of a total of fourteen farmers, of medium and small farm holdings. Four farmers in *Harishchandrapur*, four in *Korimullahpur*, three in *Kadowa* and three in *Debipur* participated in the interview process.

The selected villages are located within a five kilometer radius of some of the rice wholesaler markets that we have surveyed. We concentrated on only the geographically proximate regions of the selected markets. The objective was to investigate primary growers’ market within closely located areas and where distance was not a major issue. These survey areas were found to be well connected with important locations and establishments such as roads, haats and bazaars and are within three to five kilometer distance from union or upazilla parishad headquarters, police stations and haat/bazaars. Number of households varied across villages-- the highest of 700 in *Korimullahpur* and lowest of 200 in *Debipur* and the remaining two were around 350. Key informants reported that Bochaganj is the closest main upazilla/city/town for *Harishchandrapur* village, Dinajpur sadar town is the closest for *Korimullahpur*, and Naogaon sadar town for both *Kadowa* and *Debipur* villages. Land prices, on an average, were TK. 5,000 and TK. 8,000 per decimal in *Harishchandrapur* and *Debipur* and TK. 27,000 and TK. 24,000 per decimal in *Korimullahpur* and *Kadowa*, respectively. The differences in land prices might have been associated with gradual expansion of the cities into neighboring formerly village locations. All four villages had electricity connections. Crop agriculture and daily agricultural wage labor were found to be the two most important economic activities of all of them, whereas business/hotel/restaurant activities were mentioned in the third place. Mobile phones were mentioned as principal means of information communication in all of these places. Rickshaw vans, rickshaws and bicycles were mentioned as principal means of physical communication. All of the selected areas had some NGO programs currently running, most prominently education and health programs run by BRAC, microcredit programs, *Barendra Bahumukhi Pani Shech Prokolpa*, etc. Agricultural credits were available from both NGOs (at 15% nominal interest rate) and Krishi Bank (at 10% rate) in two locations, whereas one location (*Korimullahpur*) mentioned only NGOs and the remaining location *Harishchandrapur* mentioned NGOs, Krishi Bank, *mohajons* (at 20% rate) and Sonali Bank (at 13% rate). Insurance was also available in these locations; common one was life insurance.

Aman and Boro paddy crops dominated crop agriculture in these villages-- around three-fourths of all agricultural land was allocated for these crops during the respective crop

seasons. The average amount of paddy yields did not differ much among these villages either-- the average yield during the *Boro* season was 64 tons per acre across all villages with the highest of 75 in *Korimullahpur* and the corresponding value for *Aman* is 37 tons per acre with the highest of 45 for Naogaon locations. All the locations reported two-crop lands to be the most common ones, followed by three-crop lands, with one-crop lands the least common ones. Land tilling was mechanized. More than three-fourths of agricultural land in each of the locations was under irrigation. The irrigation method consisted of shallow machines and low lift pumps. There were some cases of sharecropping, whereas leasing agreements were also available for Aus or Aman or the entire year. Chemical fertilizers were available at the prevailing market prices, which did not differ across villages-- urea at TK. 650, M.P. at TK. 850 and T.S.P. at TK. 1,200 per 50 Kg bag. Hired labor employment became more expensive in recent times, as it was reported. Across the surveyed villages, while male agricultural daily wage rates (without food) were in the range of TK. 200 to 250 during the peak season, this rate was in the range of TK. 150 to 200 during the lean season. The corresponding figures for female labor were TK. 100 to 200 for peak season and TK. 80 to 150 for lean season. The two villages of Naogaon registered higher wage rates compared to the two villages of Dinajpur-- yet the difference is small.

#### 4.1.3 Profile and Crop Cultivation Records of the Paddy Growers

In the Dinajpur locations, the four surveyed farmers in the village *Harishchandrapur* had on an average 350 decimals of crop land, three of them are classified as “medium” sized farmers and one as a “small” farmer. The four farmers in the village *Korimullahpur* had an average of 120 decimals of crop land, three of them were “small” categories and one was a “landless, sharecropper” category. On the other hand, in the Naogaon locations, three *Kadowa* farmers had on an average 295 decimals (one “medium” and two “small”) and three *Debipur* farmers had 110 decimals (one “medium”, one “small” and one “marginal”). Thus we surveyed five “medium”, seven “small”, one “marginal” and one “landless” category farmers. The median amount of crop land owned across the villages is 159 decimals of land-- we understand a typical respondent is a “small” farmer. The median amount of homestead land is only 10 decimals.

Median age of the surveyed farmers is 53 years and median number of years of schooling is only 6 years, with a maximum value of 12 years. All the respondents are male. Farmers have reported to be intensely involved in crop agriculture in the months of April, May, and June, and again in November, December and January, whereas they involve in other activities during the other months. All the four locations have reported to have planted BR 28 and BR 29 categories of paddy during the last one year, whereas Dinajpur farmers have also reported about BR 34 and Naogaon farmers have reported to have planted Jirashail.

#### 4.1.4 Pricing Decisions as Reported by the Paddy Growers

The surveyed farmers have reported about both their crop returns and local harvest period price of paddy. We find that harvest prices vary across villages, for example, for the same BR 28 variety paddy, *Harishchandrapur* farmers reported harvest period prices to be TK. 12.5 per kg (cost of production is reported at TK. 8.6 per kg) and *Korimullahpur* farmers reported TK. 13 per kg (cost of production at TK. 11.8). We find higher prices in Naogaon villages-- both *Kadowa* and *Debipur* farmers report TK. 15 (cost of production is TK. 12.5 or less in both cases). Harvest period prices to be received by the farmers are settled in the local markets and this depends on local demand and supply conditions. We note that each individual grower bargains to settle with *beparis* or *farias*, so the price they finally settle at depends largely on

the individual-level bargain. The surveyed farmers do not have any collective bargaining agency or cooperative associations in order to negotiate prices on a collective basis.

The surveyed farmers reported that returns from crop production was not satisfactory, and that they found themselves in disadvantageous position in both of the crop seasons, *Aman* and *Boro*. In the *Boro* season, yield amount is high and at the same time production cost is high, whereas the harvest period prices are low. On the other hand, in the *Aman* season, production cost is slightly lower, and the harvest period prices are generally slightly higher as compared to those of *Boro*, but yield amount is low.

The paddy growers have contacts with *beparis* and *farias*, and sell paddy to them, most of the cases during the harvest period. On an average, a paddy grower has 13 business contacts (the maximum value found is 35 and the minimum is only one); these contacts are with *bepari*, miller, paddy *aratdar*, *farias*. All the business transactions with them are informal, so nowhere there is anything legally documented. The transactions are in both cash and credit. Taking credits from millers, *beparis* or *farias* is quite common among the paddy growers during the crop season, most commonly for purchase of inputs. We find that the number of business contacts a paddy grower has is statistically significantly positively associated with the amount of his landholdings at 10% significance level (p-value=0.068). This implies a larger farmer tends to have larger number of business contacts (and therefore larger set of options to choose from) whereas the situation tends to worsen for a small farmer with fewer number of business contacts. In addition to that, paddy growers do not have many reliable sources of credit, only family or friends, NGOs, *mohajons* or miller/*beparis/farias*; they have little access to formal banking sources.

A summary from the farmer questionnaire illustrates the pattern of transactions that takes place. In Harishchandrapur, out of 12 cases of crop production, 6 cases were there of more than 80% sale immediately after the harvest. In addition to that, 6 cases were there of tied transactions-- advances were taken against production expenses. In Korimullahpur, out of 13 cases, 7 cases were there of immediate sale of more than 80%, and 3 cases of advance credit. The Naogaon farmers have reported better records of transactions, out of a total of 15 cases in two villages, only one case of immediate sale of more than 80% and 7 cases of advance credit being taken implying tied transaction.

The surveyed farmers reported that *beparis* and *farias* visit their places during the harvest time and collect samples. Most of these intermediaries are representatives from millers. The intermediaries examine the quality of the paddy and then they offer some rates. The rate often has a maximum offer, beyond which *beparis* and *farias* rarely want to settle. Once the farmer agrees, the intermediaries arrange for transport and send it to the miller.

When asked how the bargaining with *farias* and *beparis* are settled, farmers invariably mention two points, market price and quality of paddy. Upon closer examination, farmers admit that, even though both they and the counterpart intermediaries come up with price quotations, invariably this is the price quoted by the intermediaries that matter, not theirs. This happens because farmers lack sufficient facilities for storage of paddy; and thus keeping paddy for long is most often not a viable option. This implies that the surveyed farmers lack bargaining power and have to accept the price that is set by the millers or their representatives.

Even though interconnectedness of the market should have benefitted the farmers as well, the survey responses indicate a gloomy scenario where their lack of credit sources, and cash constraints as well as lack of storage facilities force them to take suboptimal decisions, i.e., selling paddy immediately after the harvest to repay already incurred credits.

We can summarize that even though the paddy growers' segment may look "competitive", the very nature of *competitiveness* is cast in doubt due to the constrained pattern of bargaining on behalf of the primary growers in this segment.

## **4.2 Market for Wholesalers**

### **4.2.1 Examining the State of Competitiveness in the Market for Wholesalers**

In order to investigate the *state of competitiveness* in the rice wholesaler market, we point out some basic features or testable implications that are expected to be present in this market. First we point out that a *competitive market* is one which contains a large number of buyers and sellers. Second we can expect free entry and exit of firms into this market. These are the minimum requirements in order for the market to be considered *competitive*. We find that the rice wholesaler market easily meets the first condition; that is it covers a large of buyers (end-point wholesalers or retailers) and sellers (millers, commission agents or wholesalers). With regards to the issue of free entry, we find that entry into this market is not free in the sense that enterprises that operate in this market segment have long years of operation as background and they require solid business contacts with their counterparts. We also find that operations in a small rice wholesaler market requires sufficient amount of local knowledge and familiarity with the surrounding environment, which a non-local wholesaler enterprise most often may not be able to meet. Therefore a local wholesaler market typically covers only the local enterprises, not the non-local ones. With regards to price bargaining, we also find that larger size enterprises have advantage since their price quotations are often regarded as indicative market prices, and smaller enterprises do not have much choice but to follow prices quoted by the larger ones. Even though market prices are determined by interactions of large numbers of buyers and sellers, it is typically the prices quoted by the larger enterprises that dictate the direction of price movements. Here we remind ourselves of price-leadership models in the oligopoly market structures (set in a small size market). There are indications that the rice wholesaler market segment operates to some extent like a price-leadership oligopoly or a dominant firm oligopoly model (we discuss in detail this pattern of behavior in some subsections below).

### **4.2.2 Breakdown of the Sample Enterprises**

We have covered a total of 116 wholesaler enterprises in our survey over a total of twelve rice wholesale markets across seven districts (Table 2). More specifically we covered five districts (Bogra, Dinajpur, Jessore, Kushtia and Naogaon) and two metropolitan city areas (Dhaka and Chittagong). A total of 52 key informant interviews were also taken to assess the *state of competitiveness* of these twelve markets (here by the term "market", we mean small rice wholesaler centers).



TABLE 2  
Distribution of the Sample Enterprises by Districts

Survey District	Upazilla/Sadar	KII	Wholesaler
Bogra	Dupchanchiya	2	9
Chittagong	Chittagong City Corporation	10	20
Dhaka	Babubazaar <i>aka</i> Badamtoli	5	10
	Kochukhet	2	6
	Mohammadpur Krishi Market	2	8
Dinajpur	Bochaganj <i>aka</i> Shetabganj	3	6
	Dinajpur Sadar	3	10
Jessore	Abhaynagar	5	9
	Jhikargacha	3	5
	Sharsha	2	6
Kushtia	Kushtia Sadar	10	20
Naogaon	Naogaon Sadar	5	7
<b>Total</b>	<b>Bangladesh</b>	<b>52</b>	<b>116</b>

#### 4.2.3 Ownership and Owner Profiles

A large majority of the sample enterprises (69 percent) are owned by single owners. Of the remaining 36 jointly owned enterprises, on an average a total of 2.72 owners own an enterprise. The maximum average number of joint owners is found in Chittagong area markets, with a number of 3.44 owners per enterprise (maximum value of 6). We see sole ownership is most common throughout the country; whereas even when the enterprise is jointly owned, the maximum number of owners rarely cross three.

Out of 179 owners recorded in the wholesaler module, only one is a female. Women are rarely found to be involved, even in the form of partnership. Average age of the owners is 44 years of age, with a maximum value of 48.18 years in Naogaon, and a minimum value of 38 years in Kushtia. Age of owners varies widely, from a low 24 years to a high 70 years. In terms of years of education, the average number of years of education of the owners has been found to be 10 years (SSC level). There are four cases where the owners are illiterate and thirty cases where the owners are at least graduates. A total of 73 percent of owners have completed secondary school certificate level or higher. The average number of years of education did not differ much in terms of market locations. We notice that the owners have on an average a high number of years of experience in the rice market, the average number is 15 years. The owners of enterprises of some traditional rice markets such as Dinajpur and Naogaon have reported very high number of years of experience in the market, average value being 21 years for Dinajpur enterprise owners and 27 years for Naogaon enterprise owners. We can infer that long many years of experience in the rice market is a common feature among enterprise owners while most of them have completed at least secondary level of formal education.

In terms of occupation before establishing/inheriting the enterprise, a total of 77 owners have reported to have been students (43 percent) and an additional 43 owners were involved in some other businesses (24 percent). A few of them moved in from other businesses, mostly in other related areas. On an average each owner has claimed to have around 64 percent of

ownership of the enterprise, with owners of Chittagong recording the lowest of 48 percent each and Dinajpur recording the highest of 94 percent each, this matching with the average number of owners per enterprise in these areas. When asked whether the owners have ownership over some other enterprises, only 11 owners have claimed to have such, whereas 105 responded in the negative, whilst no response was recorded for the remaining 63 owners.

#### 4.2.4 Connectedness of the Wholesaler Markets

In terms of operations of the rice market, the survey locations are intricately connected to each other. Figures 2 to 8 show the major sources and destinations of supply in the surveyed districts.

We consider the case of *Dupchanchiya* upazilla location in Bogra district, for example. The major supplier locations for this market are Bogra (own and other upazillas), Dinajpur, Gaibandha, Joypurhat, Naogaon, Netrokona, Porsha, Rangpur, Shapahar and Sirajganj. On the other hand, the major destination locations are Comilla, Chittagong, Dhaka, Feni, Gazipur, Savar, Munshiganj and Narayanganj. Thereby even a small rice center like *Dupchanchiya* operates as a collection point in the northern region and it sends rice to all the major rice demand locations in the country. As for another example we consider the case of rice centers in the Chittagong metropolitan area. Rice reaches Chittagong wholesale centers from a large number of locations such as Naogaon, Ashuganj, Brahman Baria, Bogra, Chapai Nawabganj, Dinajpur, Gaibandha, Habiganj, Jamalpur, Kishoreganj, Mymensingh, Narsingdi, Pabna, Rajshahi, Syedpur, Sherpur, Sirajganj, Sylhet and Thakurgaon. Consequently rice is distributed to all the upazillas of Chittagong, Cox's Bazaar, Khagrachari, Bandarban and Rangamati from these centers. Some rice is also transported to Sylhet, particularly the imported *atap* (non-parboiled) rice which is demanded only in Chittagong and Sylhet districts of the country. Thus the rice centers in Chittagong metropolitan area are major locations for rice demand which collects rice from all over the country and then forwards it to all the smaller locations within greater Chittagong and Chittagong Hill Tracts districts. Another point to notice is that connections between rice centers are sometimes two-way, not always unidirectional. For example rice is transported from Sylhet to Chittagong and at the same time rice is also transported from Chittagong to Sylhet. The rice wholesaler locations within Dhaka metropolitan area have reported to receive most of their supplies from mostly the northern locations such as Bogra, Dinajpur, Gaibandha, Chapai Nawabganj, Pabna, Natore and Naogaon, western locations such as Jessore and Kushtia, and locations in the nearby districts such as Tangail, Jamalpur, Mymensingh and Sherpur.

We have found that all the rice centers throughout the country have become heavily interconnected by this time and this has become possible due to the rapidly expanding mobile phone network and increasingly developed road transportation. The Jamuna Bridge has been instrumental in bringing the northern regions into close communication with the capital city of Dhaka, and other major rice demand centers – particularly Chittagong.

#### 4.2.5 Size of the Wholesaler Markets

The survey locations clearly differ in terms of number of enterprises operating there (Table 3). The rice wholesale markets studied in Dinajpur sadar (Dinajpur) and Kushtia sadar (Kushtia) are very large; around 250 enterprises or more in each of these locations. Compared to these, markets located at *Dupchanchiya* (Bogra), *Jhikargacha* (Jessore) and *Sharsha* (Jessore) are very small, with number of enterprises less than 20.

We propose to categorize markets with more than 200 enterprises as “large” markets, with in between 40 to 200 enterprises as “medium” sized markets and with less than 40 enterprises as “small” sized markets. According to this categorization it turns out that we have covered four “large” markets, three “medium” markets as well as five “small” markets. On the other hand we have used indicators for the size of enterprises, such as “large”, “medium” and the “small” (this is based on each respondent’s self-reported assessment of the size of his respective enterprise as compared to the other enterprises within the same market). Within the surveyed rice markets, on an average, around 20 percent of enterprises classified themselves as “large”, 35 percent as “medium” and the remaining 45 percent as “small” enterprises.

TABLE 3  
**Census Information of the Surveyed Rice Markets**

District	Market	Types of Trade Wholesale/ararat = 1 Import = 2 Retail = 3 Milling = 4	No. of Rice Trading Enterprises and Market Size	No. of Enterprises by Size		
				Large	Medium	Small
Bogra	C.O. Office Road Bazaar	1	15 (Small)	5	4	6
Chittagong	Chaktai Bazaar	1, 3	275 (Large)	60	115	100
	Shah Amanat Bazaar (Bera Bazaar)	3	18 (Small)	5	7	6
	Bohodardarhat Bazaar	3	12 (Small)	3	4	5
Dhaka	Ray Shaheb Bazaar	3	10 (Small)	2	2	6
	Babubazaar (Badamtoli)	1, 3	280 (Large)	90	140	50
	Kochukhet Rajanigandha Market	1, 3	72 (Medium)	15	25	32
	Mohammadpur Krishi Market	1, 3	180 (Medium)	40	90	50
Dinajpur	Pulhat Bazaar	1	70 (Medium)	20	30	20
Jessore	Benapole Bazaar	1, 3	4 (Small)	2	2	
	Jhikargacha Bazaar	1	9 (Small)	2	3	4
	Navaron Bazaar (Sharsha)	1, 3, 4	6 (Small)	2	2	2
	Nowapara Bazaar (Abhaynagar)	1, 4	24 (Small)	6	8	10
Kushtia	Khajanagar	1, 4	310 (Large)	10	30	270
Naogaon	Par Naogaon	1, 3	82 (Medium)	10	20	52
<b>All Markets</b>		-	<b>1367</b>	<b>272</b>	<b>482</b>	<b>613</b>

#### 4.2.6 International Trade in the Wholesaler Markets

Private imports have dried up in the rice centers in recent years. None of the seven survey locations has any current transaction in the international markets. Only the Chittagong traders have reported to be taking preparations for selling some small amount of imported rice that was a part of assignment shipped late, but no recent import during the last one year or so. They mentioned about imported varieties from Vietnam, Pakistan, Myanmar and Thailand. Imported varieties from these countries, according to them, are of lower quality compared to local varieties, usually cheaper by Taka 3 or 4 per kilogram of rice, and are generally purchased by lower income households. Naogaon traders mentioned a number of rice varieties from India and their opinion is the same, i.e. the imported varieties are of inferior quality and sold at around Taka 3 or 4 per kilogram less than the local varieties. It takes about

a month or two to import by rail, whereas by road (trucks) it takes around 10 to 15 days. Since the current gap between prices of local varieties and international varieties is not much high, the traders do not have incentives to obtain Letters of Credit (LC) for importing rice from the international market as the profit margin is not significant.

#### 4.2.7 Entry and Exit of Enterprises in the Wholesaler Markets

A number of rice wholesaler markets are relatively old, with enterprises' establishments dating back to the 1950s. Entry is continuing in all the locations till this point of time. Some markets such as Chittagong City Corporation areas have been quite active, with as many as 40 firms entering and another 35 firms exiting during the last 5 years. On the other hand, some locations such as *Dupchanchiya* have actually seen a reduction in market size with five firms exiting during the last 5 years.

TABLE 4  
Oldest and newest enterprises, entry and exit

District/City	Upazilla	Oldest Enterprise	Newest Enterprise	Entry –last 5 yrs	Exit –last 5 yrs
Bogra	Dupchanchiya	1980	n.a.	0	5
Chittagong	Chittagong City Corporation	1970	2009	40	35
Dhaka	Babubazaar <i>aka</i> Badamtoli	1950	2011	35	32
	Kochukhet	1978	2009	4	2
	Mohammadpur Krishi Market	1984	2010	25	20
Dinajpur	Bochaganj <i>aka</i> Shetabganj	1950	2008	4	3
	Dinajpur Sadar	1965	2009	35	0
Jessore	Abhaynagar	1960	2010	4	2
	Jhikargacha	1961	2010	1	0
	Sharsha	1980	2010	1	1
Kushtia	Kushtia Sadar	1978	2010	30	0
Naogaon	Naogaon Sadar	1962	2008	7	4

With regards to the question of whether entry into rice wholesale markets is difficult or not, most key informants from different markets have mentioned moderate level of difficulty involved in the process. The difficulty on behalf of a potential entrant is that entry into this market requires a large amount of financial capital and sufficient knowledge as well as experience in this particular trade. In some large markets, particularly in the major locations such as Chittagong and Dhaka, it is difficult to get suitable space for establishing the shop as some of these market locations are already crowded. An additional requirement for entry into this market is that the potential entrant enterprise needs to have contacts with a large number of potential clients or business partners. Often this implies that outside the metropolitan cities, only the local businessmen are found to be interested in setting up rice wholesale centers. It is considered very difficult and quite unlikely for a non-local businessman to start operations in a small rice market like *Dupchanchiya* and become successful because eventually, he must have widespread connections and business relations within the surrounding area, this the non-local one may not have.

With regards to the question of whether there were cases of exit from the markets; most of the key informants of the respective rice trading centers cited cases of exit during the last 5

years. Frequency of exits differs in the different surveyed locations. For example, Kushtia is a large sized market that did not register any cases of exit, while Dupchanchiya is a small sized market that registered five cases of exits along with zero cases of entry. This implies that markets themselves are evolving continuously at varying magnitudes of entry and exit. Defaults in credit transactions were pointed out to be the single most important reason for exit.

Rice wholesalers often operate as commission agents who act as an intermediary between rice millers and end-point wholesalers and/or retail wholesalers. As commission agents, the rice wholesaler often undertakes transactions on behalf of the millers on to the final-point wholesalers. Sometimes, on the basis of intermediary role played by the commission agent-cum-wholesaler, the miller sends the agreed upon rice stock to the final-point wholesaler, and obtains the money from the commission agent within some specified period of time. Hence, the commission agent expects to receive payments from the final-point wholesaler. However, contracts between these two parties are often verbal or small note-based, not legally documented. Sometimes, the final-point wholesaler delay payments to the commission agent, and in extreme situations, they completely failed to make the agreed upon payments. Thus, most of the cases of exit in the surveyed markets were due to this kind of default in transactions, as reported by the key informants.

#### **4.2.8 Market Shares of Enterprises in the Wholesaler Market**

Through the KII module, the key informants of different rice wholesale centers were asked to list the names of enterprises that had had the largest market shares in their respective local markets at different points in time during the last five years. Key informants of the same markets mentioned the same enterprises in most of the cases. Interestingly, the (perceived) market shares of the enterprises at different points in time as mentioned by the key informants closely match with each other. This implies that in any market, there is a common perception of market leaders in terms of market shares and changes in the shares over time. We find that the names of top market share-holding enterprises do not change much and the market shares of these enterprises do not exhibit wide fluctuations either. In some of the markets the market shares of the top one or two enterprises have actually slightly increased over the last five year period, according to the perceived calculations by the key informants. There is no single case where a new entrant has taken control of a large market share; likewise, there is no case that the oldest establishments have been able to control the largest market share. A plausible explanation for this may be that the enterprises do not differ much in terms of technology, management or marketing techniques. Inquired about why the leading enterprises have been able to enjoy large market shares, the common response was that these enterprises have a broader client base and a larger long-term reputation in the market, and at the same time have huge financial resources that absorb most kinds of shocks, particularly cases of default in transactions.

#### **4.2.9 Business Associations in the Wholesaler Markets**

Every market has a business association (*bazaar samity*) and membership of the association is a must for running the business operations in the market. According to the responses provided by the key informants, the *samity* has some guardianship role in the affairs of the business enterprises. The member enterprises have to pay some regular fees to the *samity*. The *samity* is expected to mediate in any disputes among its members, or disputes between its members and other outside parties. The member enterprises have to abide by some common business ethics, such as fairness in weighting of the rice transacted and respecting the business contracts. The *samity* notifies members of recent changes in the government rules

and regulations and may discuss causes of grievances with concerned government officials on behalf of its members. The *samity* takes required steps in ensuring security of all its members and faces any law and order situation in the market with the help of the law enforcing agencies. In some of the markets, the *samity* provides credit facilities to its members. Another very important role of the *samity* is to set the agency fee of the commission agents based on a consensus among all the member enterprises, i.e. the fee is fixed for all the wholesalers within a particular market. The key informants have mentioned that the *samity* does not involve itself in specifics of contracts between parties and does not dictate pricing decisions or bargaining to its members. It is only interested in upholding the sanctity of the contract once this has been agreed upon.

#### **4.2.10 Financing of the Wholesaler Enterprises**

According to the responses of key informants, the key sources of funding for investment in the rice wholesale market are family savings, investments from business profits, remittances, nationalized and private commercial banks, informal borrowing from friends and relatives and cooperatives, etc. Loans from banks used to be easily available for a long time until very recent times. Respondents mentioned that the banks are currently reluctant to give out loans as they are suffering from liquidity crisis.

#### **4.2.11 Storage Capacities of the Wholesaler Enterprises**

According to the responses of key informants, wholesalers in general do not have large storage facilities, and this observation applies to all markets across the country in general. Some enterprises have small storage facilities, designed for keeping the rice procured for short periods of time. The rice wholesalers work mostly as commission agents, connecting suppliers (millers) with demanders (end-point wholesalers or retail wholesalers). The transactions involve contracts in the form of verbal communication and write-up on small notes, and on this basis the shipment is done from the point of the supplier to the point of the demander. Therefore, the commission agent does not require large storage space since actual rice supply does not reach him at any stage of the transaction. Only in the case of large cities like Chittagong, the wholesalers have additional storage facilities since they have multiple roles of commission agents, traditional wholesalers and in some cases importers. Thus, they require added storage space to store the procured rice.

#### **4.2.12 Pricing and Bargaining in the Wholesaler Markets**

Wholesaler enterprises covered in the survey mostly function as “commission agents” in the market, and in some cases they operate as “wholesalers”. As commission agents, their role is to bridge millers to rice wholesalers and/or retailers at the end point. The basic steps involved within this bridge that lead to the price being set are described as follows.

The miller sends specifications of the rice and a reservation level of price is quoted to the wholesaler (commission agent). The price quotation is set on the basis of different costs such as paddy procuring costs, cost of transforming paddy into rice, storage and other additional costs, and agency fee of the commission agent. This agency fee in the rice markets is set by the *samity* based on a consensus among all the member enterprises. Hence, the fee is fixed for all the wholesalers within a particular market. Agency fees usually vary in different rice markets. Interestingly, the commission agent charges a fee on both suppliers (the millers) and buyers (wholesalers at the end point of the market).

As the commission agent is informed of the miller’s quoted price (which already includes his fee from the miller), he adds his fee (to be taken from his buyers) and then bargains with the

retail wholesalers, keeping in mind the existing market prices. The commission agent tries to obtain a price which will be at least equal to the miller's quoted price and his fee. Meanwhile, representatives of the buyers would want to purchase rice at the lowest possible price given the quotations from the commission agent. Once the bargain is over, the commission agent writes a hand-written invoice and informs the miller of the transaction. Accordingly, the miller arranges the transport and sends the quoted amount of goods to the destination.

An important point to note, the commission agent always gets his agency fees from both the parties that he connects. In any case, if the price bargained minus and agency fee (charged on retail wholesalers) is higher or lower than the miller's quoted price, the miller receives the lower/extra revenue. Since the bargained price always depends on existing market prices, the commission agent eventually shifts the price burden on to the miller.

Once the goods have been supplied, the retail wholesaler is required to transfer money to the commission agent, and simultaneously, the commission agent is required to transfer money to the miller. Therefore, the miller holds the commission agent accountable, staying out of the transaction relation with the retail wholesalers. Here lies the risky part of the commission agent's job. It normally takes quite a long time for the commission agent to acquire all outstanding sales. In a worst case scenario, the buyer can also default his payments.

Lastly, the retail wholesaler procures rice from the miller, stores it and sells it over time. Therefore, he requires storage space. The retail wholesaler bears all the price risk of the rice procured. The survey found some enterprises operating as both commission agents as retail wholesalers.

#### **4.2.13 Overall Market Trends in the Wholesaler Markets**

Key informants in small markets such as Dupchanchiya have reported that business situations have been quite the same during the last five years even if some enterprises have shut down their businesses. On the other hand, informants in large markets such as Chittagong have reported expansion of business activities in their areas during the last five years. There appears to be large changes that are taking place in the rice markets in terms of operations. While some markets are actually shrinking, others are rapidly expanding. The informants from the declining markets mentioned credit default, and establishment and development of newer markets in more suitable locations to be the main reasons. The informants from expanding markets reported increases in demand caused by growing population, increases in supply due to newer entrants of the market. Some informants in the expanding markets deem the market to be quite unstable in recent times, with high number of entry and exit of enterprises, rapid improvements in communication, etc. Some key informants mentioned that the government's Open Market Sales (OMS) operations have often dampened prices of coarse rice in the market and this adversely affected their profitability.

Informants from all survey locations have mentioned that transport and communication facilities have improved. Rice now flows much more smoothly from large rice trading centers to the smaller markets. A truckload of rice can reach any union level market without interruption or stoppages in district levels. Two most prominent factors for this change are developments of roads and rapid expansion of mobile phone technology. With improvements in road transport, the entire country has now come under the vast network of the millers and wholesalers, and this has increased the number of available options of selling for any miller or wholesaler. With advances in communication, in many cases the millers now-a-days communicate directly with the end-point or retail wholesalers in order to avoid expenses of the third-party commission agents.

In terms of technology, the milling technology is also changing and nowadays, auto rice mills are attracting a lot of attention. One important aspect of auto rice mills is that the quality of rice can be strictly maintained, and this is the reason that rice from these mills are becoming more and more popular among the consumers. Auto rice mills involve large amounts of input and output to be placed in comparison with other types of rice mills. Therefore, strong and stable network of paddy suppliers and rice demanders is necessary. Nowadays, auto rice mill owners tend not to depend entirely on wholesalers (commission agents) for marketing. Instead, they send their own personnel as sales agents to large markets such as Dhaka, Chittagong and Sylhet to bargain and negotiate with retail wholesalers.

There has not been much activity in the areas of private rice imports during the last three or four years, as stated by the respondents. The explanation is that prices in the international markets were high and there was not much of a gap between domestic and international rice prices to encourage private import. It appears that private import of rice gets into prominence only during times of high deficit of domestic rice supply. The informants reflected that the imported rice from India, Pakistan (non-Basmati), Thailand, Vietnam and Myanmar are generally considered inferior in quality and are sold at Taka 3 or 4 per kilogram less than the domestic varieties.

#### **4.2.14 Basic Features of Enterprises in the Wholesaler Markets**

Table 5 exhibits basic features of the sample enterprises in the wholesaler module. We notice that our sample of 116 wholesaler entries consists of 9 “large” enterprises, 56 “medium” enterprises and the remaining 51 “small” enterprises. This classification is based on the enterprises’ assessment of their respective size compared to that of other enterprises in the market. Thus, “medium” and “small” enterprises together comprise more than 90 percent of the sample observations, whereas “large” ones comprise the remaining. In terms of type of enterprise, around 30 percent of the total sample enterprises claimed themselves to be only commission agents, 21 percent claimed themselves to be only wholesalers and an additional 31 percent claimed themselves to be both commission agents as well as wholesalers. Most of the remaining 18 percent of sample observations claimed themselves to be millers. Miller enterprises sample have been covered in three locations namely Jessore, Kushtia and Naogaon. The distribution of wholesalers and commission agents are evenly spread out throughout the country. Road transport network have been found to be favorable for the sample enterprises as all of them are within 1 km distance from the main road.



**TABLE 5**  
**Basic features of the sample enterprises**

District	Sample Size	Basic features of the sample enterprises				
		Size of Enterprises			Type and Number of Enterprises	
		Large	Medium	Small		
Bogra	9	1	4	4	Wholesaler	4
					Commission Agent	5
Chittagong	20	0	12	8	Wholesaler	8
					Commission Agent	6
					Wholesaler and Commission Agent	6
Dhaka	24	1	14	9	Wholesaler	7
					Commission Agent	9
					Wholesaler and Commission Agent	8
Dinajpur	16	1	5	10	Commission Agent	8
					Wholesaler and Commission Agent	8
Jessore	20	2	10	8	Wholesaler	4
					Commission Agent	2
					Wholesaler and Commission Agent	9
					Wholesaler and Retailer	3
					Miller, Wholesaler and Commission Agent	1
					Miller and Wholesaler	1
Kushtia	20	1	10	9	Miller	1
					Miller and Commission Agent	3
					Commission Agent	1
					Wholesaler and Commission Agent	5
					Miller, Wholesaler and Commission Agent	3
					Miller and Wholesaler	7
Naogaon	7	3	1	3	Miller	2
					Wholesaler	1
					Commission Agent	4

#### 4.2.15 Employment Aspects of Wholesaler Enterprises

Rice wholesale enterprises exhibit some common patterns of employment across the country. A typical rice wholesale enterprise would have one manager and some assistants as monthly paid employees, and a number of laborers would be associated with it most commonly on a daily wage basis, not necessarily on a regular payroll. Enterprises that function as only commission agents require very few regular staff other than the manager himself. Then again enterprises with dual function as wholesaler as well as commission agent require some more regular staff. Employment is more in numbers and more in terms of job descriptions in the case of the enterprises which have multiple roles of millers as well as commission agents or wholesalers. We find that enterprises in more prominent rice markets such as in Kushtia and Naogaon have on an average more number of regular staff, manager's average salary

expenses, manager's salary range, average number of laborers, ranges of average daily wage rates of laborers. This finding is expected since these are the major locations that supply rice to all over the country and the enterprises of these locations have correspondingly more diversified job requirements compared to that of the other areas. We also note that some of the sample enterprises in Kushtia and Naogaon are actually millers as well as wholesalers that have networks throughout the country.

The areas do not differ much in terms of average daily wage rates the enterprises offer to their laborers, except for Jessore where the rate is much lower. Employment is one indication of the size of the firm, and so we can infer that enterprises in Kushtia and Naogaon may be considered to be larger compared to other enterprises in other parts of the country. In these locations, enterprises often employ accountants, mechanics and marketing managers on a regular payroll in addition to regular managers (Table 6).

**TABLE 6**  
**Employment Features in the Sample Enterprises**

District	Average No. of Regular Staff	Managers' Average Salary (Tk.)	Managers' Salary Range (Tk.)	Average No. of Laborers	Average Daily Wage Rate (Tk.)	Average Daily Wage Rate Range (Tk.)
Bogra	2	4 571	3,000 to 6,000	6.88	200	150 to 250
Chittagong	1.85	4 632	2,500 to 8,000	3.89	182	100 to 250
Dhaka	1.83	5 905	2,500 to 8,000	2.14	212	100 to 300
Dinajpur	2.88	5 255	3,500 to 10,000	7.5	200	150 to 250
Jessore	2.4	5 136	2,500 to 10,000	3.67	123	50 to 200
Kushtia	4.75	6 340	2,500 to 10,000	15.46	191	50 to 200
Naogaon	3.86	10 500	4,000 to 28,000	8.29	229	200 to 300

#### 4.2.16 Physical Assets and Transport Facilities of the Wholesaler Enterprises

We collected information on physical assets of the enterprises in the wholesaler module. As expected, office and storage space is relatively smaller for city locations as in Dhaka and Chittagong because of higher costs and these locations are more of end-point nodes of the rice market supply chain. On the other hand, Kushtia and Naogaon enterprises have large storage spaces since some of them are millers as well as wholesalers and so send supplies to all over the country.

**TABLE 7**  
**Office and Storage Space of the Sample Wholesaler Enterprises**

District	Number of Sample Enterprises	Median Shop/Office Space (Sq. Ft.)	Median Storage Space (Sq. Ft.)	Median Storage Capacity (M. Ton)
Bogra	9	140	1,125	40
Chittagong	20	90	450	38
Dhaka	24	108	275	39
Dinajpur	16	195	900	150
Jessore	20	285	600	20
Kushtia	20	168	2,800	150
Naogaon	7	200	2,000	300
<b>Total</b>	<b>116</b>	<b>180</b>	<b>700</b>	<b>50</b>

Some of the sample enterprises have transport facilities (owned or rented) and the rest do not have any. None of the enterprises located in the Dhaka and Chittagong metropolitan areas claimed to have any transport facilities, this matching with their role as end-point of the rice market supply chain. Their business counterparts take the responsibility of sending the ordered rice supply and therefore, they do not need transport facilities themselves. We notice that within the entire rice market in the country, enterprises in some locations in the northern and western areas (such as Kushtia and Naogaon) are particularly prominent in terms of storage space and capacity, actual capacity of transport facilities available, etc.

**TABLE 8**  
**Transport Facilities of the Sample Wholesaler Enterprises**

District	Number of Enterprise	Has Vehicle?		Type of Vehicle	Median Carrying Capacity (M. Ton)	Median Actual Capacity (M. Ton)
		Yes	No			
Bogra	9	6	3	Truck	14	5
Chittagong	20	0	20	-	-	-
Dhaka	24	0	24	-	-	-
Dinajpur	16	1	15	Truck	14	5
Jessore	20	3	17	Truck	8	5
Kushtia	20	12	8	Truck	20	14.5
Naogaon	7	2	5	Truck	10	9.5
<b>Total</b>	<b>116</b>	<b>24</b>	<b>92</b>	<b>-</b>	<b>15</b>	<b>9.75</b>

#### 4.2.17 Establishment of the Wholesaler Enterprises

The sample wholesale enterprises have documented long years of stay in the rice business since the average number of years of stay in business is 15.72 years. There is not much of a difference in terms of locations regarding this issue except for the northern location of Naogaon, where the average years of stay are around 24 years. Most of the sample enterprises have been newly started, whereas some more prominent rice markets such as Kushtia and Naogaon, the tendency to inherit the business is slightly higher (Table 9). In terms of sources of financing, owners' own savings from non-agricultural activities have been most commonly cited as major source of funds, and this is evident throughout the country. Remittances, sale of assets, borrowing from family and friends, loans from private commercial banks have been cited as other sources of funds in some cases. The median value of costs of establishment in the whole sample is reported as TK. 0.45 million (nominal values reported for the year of establishment, not converted into current values). Cost of entry into this rice wholesale market can be considered reasonably high.

**TABLE 9**  
**Years of Stay in Business of the Sample Wholesaler Enterprises**

District	Number of Enterprise	How Established?		Average Years of Stay in Business
		Newly Started	Inherited	
Bogra	9	5	4	15.22
Chittagong	20	16	4	13.2
Dhaka	24	19	5	15
Dinajpur	16	12	4	19.63
Jessore	20	18	2	15.85
Kushtia	20	12	8	12.7
Naogaon	7	3	4	23.86
<b>Total</b>	<b>116</b>	<b>85</b>	<b>31</b>	<b>15.72</b>

#### 4.2.18 Business Contacts of the Wholesaler Enterprises

We find that the rice wholesale market is intricately interconnected and this has been helped by widespread use of mobile phones. Rice wholesalers have business contacts with other businesses, and the addresses often cover the entire area of the country. This is more prominent in the case of the northern wholesale markets (Table 10). For example, an enterprise in Naogaon has on an average business contacts with 22.5 numbers of millers, 19.17 numbers of other wholesalers and 14.25 numbers of paddy aratdars. The addresses of these business contacts include some nearby locations as well as the other corners of the country, such as Sylhet, Chittagong, and even Cox's Bazaar. We find some pattern in this set of information, such as enterprises in Bogra, Dinajpur, Jessore, Kushtia and Naogaon have strong business connections with rice centers in Dhaka and surrounding areas, and at the same time they keep connections with centers in Chittagong, Sylhet, Barisal, Khulna, Mymensingh and other locations. Therefore even though the main channel of domestic rice supply is from the Northern areas to the central areas such as Dhaka, this is not the only option left for the Northern area enterprises. The rice centers of Dhaka and surrounding areas have to compete with Chittagong and Sylhet rice centers in terms of price offers and any time their offers are lower compared to others, the Northern area wholesalers would send rice supply to those other areas instead. These large number of business contacts indicate that there may be intense competitions in terms of price offers and bargaining among wholesalers in different locations as well as within the same location. Another interesting feature is that all the contracts are informal, and there is nowhere any legal, written document in the entire rice market. Therefore "trust" and "reputation" play important role in day-to-day business transactions, whereas default risk is always present in this environment. Transactions are done both in cash and credit, yet credit transactions are more common.

TABLE 10  
Business Contacts of Sample Wholesale Enterprises

District	Type of Business Partner	Average Number	Contract Formal? (Yes/No)	Most Common Locations of Business Partners
Bogra	Miller	15	No	Dhaka, Savar, Gazipur, Feni,
	Other Wholesalers	13.33	No	Rangpur and local areas of
	Paddy Aratdar	7.6	No	Bogra
Chittagong	Local Retailers	20.21	No	Naogaon, Dinajpur, Habiganj,
	Other Retailers	14.67	No	Ashuganj, Kashba, Brahmanbaria,
	Local Wholesalers	14.06	No	Netrokona, Mymensingh, Bogra,
	Rice Aratdar	7.86	No	and local areas of Chittagong,
	Miller	7.5	No	Cox's Bazaar, Bandarban, Rangamati
	Other Wholesalers	6.33	No	and Khagrachari districts
Dhaka	Local Wholesalers	33.44	No	Naogaon, Sherpur, Kushtia, Dinajpur,
	Local Retailers	31.52	No	Chapai Nawabganj, Bogra, Sherpur,
	Miller	13.79	No	Mymensingh, Brahmanbaria, Ashuganj,
	Other Wholesalers	10.4	No	Comilla, all local areas of Dhaka city
	Other Retailers	8.4	No	and surrounding districts

Dinajpur	Miller	23.2	No	Dhaka, Narsingdi, Ghorashal,
	Local Retailers	16	No	Chittagong, Tangail, Sylhet, Chandpur,
	Local/Other Wholesalers	7	No	Feni, Noakhali, Faridpur, Khulna,
	Paddy Aratdar	5.33	No	and local areas of Dinajpur
Jessore	Paddy Aratdar	22	No	Dhaka, Faridpur, Madaripur,
	Miller	15.55	No	Noakhali, Comilla, Chandpur, Chittagong,
	Local Retailers	14.55	No	Munshiganj, Barisal, Rangpur, Khulna
	Other Wholesalers	12.93	No	and local areas of Jessore
	Local Wholesalers	9.44	No	
Kushtia	Miller	25.07	No	Jessore, Bogra, Natore, Dinajpur, Dhaka,
	Paddy Aratdar	18.73	No	Barisal, Faridpur, Sylhet, Comilla,
	Other Wholesalers	28.47	No	Munshiganj, Madaripur, Narayanganj,
	Local Wholesalers	11.29	No	and all local areas of Kushtia
	Local Retailers	4.86	No	
Naogaon	Miller	22.5	No	Dhaka, Sylhet, Chittagong, Comilla,
	Other Wholesalers	19.17	No	Dinajpur, Khulna, Mymensingh,
	Paddy Aratdar	14.25	No	Noakhali, Cox's Bazaar and local areas

#### 4.2.19 Financing of the Wholesaler Enterprises

In terms of sources of fund for working capital, all enterprises in Bogra area mentioned public commercial banks, and one enterprise mentioned taking loans from informal money lenders. Credit transactions with miller and other wholesalers are also reported to be widespread in the rice markets of Bogra. Chittagong rice market enterprises mentioned re-investments as the main source of fund for working capital. Dhaka rice market enterprises were evenly split in their responses as nearly half of them mentioned re-investment from own business, most of the remaining ones mentioned private commercial banks, and a few enterprises mentioned public commercial banks. Out of 16 sample enterprises in Dinajpur, 8 mentioned private commercial banks and 6 mentioned public commercial banks as sources of funds for working capital. We find similar breakdown for other areas, such that around two-thirds of the sample enterprises take loans from private commercial banks and around one-third take loans from public commercial banks. All of the sample enterprises mentioned credit transactions and/or loans taken from business partners, most commonly from millers and other wholesalers.

The sample enterprises have reported how much loans they can raise from the market and whether they have some outstanding loans at the moment (Table 11). Comparing with other aspects of the market, we notice that enterprises from Kushtia and Naogaon have reported higher amounts that they would be able to collect from the market. The amount of outstanding loan is also higher for these enterprises.

**TABLE 11**  
**Loan Situation of the Sample Wholesale Enterprises**

District	No. of Enterprises	Average maximum amount of credit that can be taken for (Tk.)		Current Loan? (Yes)	Average Current Loan Amount	Interest Rates
		Working capital	Investment purposes			
Bogra	9	1,088,125	1,125,000	5	2,400,000	12.5, 13
Chittagong	20	1,235,000	2,735,000	2	1,030,000	13,15
Dhaka	24	2,816,667	2,883,333	11	1,638,182	14,13,16
Dinajpur	16	4,193,750	4,328,125	2	4,000,000	13,14,15,16
Jessore	20	2,496,000	6,437,500	4	2,317,500	13,14,15,16
Kushtia	20	15,257,895	36,657,895	3	2,793,333	13,14,16
Naogaon	7	6,666,667	7,166,667	6	22,000,000	13,15,15.5,16

#### 4.2.20 Rice Varieties offered by the Wholesaler Enterprises

The sample wholesaler enterprises have provided a list of rice or paddy varieties that they have sold during the last one year. The list presents an amazing array of rice varieties that are in offer, for example, on an average some 7 rice varieties have been mentioned by each sample wholesaler. Taking into consideration common names across enterprises, we find that a total of 177 numbers of varieties of rice have been listed by the sample 116 wholesalers. Out of the total of 177 varieties, 69 varieties have been listed as *Aman* varieties, 97 as *Boro* varieties, 3 as *Aus* varieties and the remaining 8 as common for two crop seasons. We find that *Boro* season offers more diversified varieties in the rice market as compared to the *Aman* season.

Rice varieties in the *Aman* season includes names such as BR 30, *Chinigura*, *Govindabhog*, *Guti*, *Heera*, *Kataribhog*, *Sharna*, *Najirshail*, *Paijam*, *Ranjit*, etc. On the other hand, rice varieties in the *Boro* season includes names such as BR 11, BR 28, BR 32, *Jirashail*, *Miniket*, *Pari*, *Chandina*, *Baashfuli*, *Hybrid Heera*, *Parija*, etc. The varieties that have been listed as *Aus* season varieties are *Borshali Paijira*, *Sharna Thin*, *Chinese*, etc. This amazing list of varieties imply that it is quite difficult for an economic agent in the rice market to be well informed about all the fine details and be able to bargain with the other agents on that basis. In a market like this where quality and product characteristics vary this much, bargaining of price within some ranges is expected since every agent may not have the same opinion about a particular variety and therefore their willingness-to-pay will differ. At the same time, it is also possible that agents may not have the same knowledge about the varieties in question. In an informal setting like Bangladeshi rice markets, we can expect widespread bargain among agents on the valuation of rice varieties and our survey findings match this assessment.

With regards to major sources of supply of rice varieties, we obtain a list of names of districts that includes most prominently nearly all the districts in the northern divisions of Rajshahi and Rangpur. Some varieties have been originated outside the country, such as countries like Myanmar and Pakistan. On the other hand, with regards to major sources of destinations of rice varieties, the capital city of Dhaka and its surrounding districts, the port city of Chittagong, Sylhet, Khulna, Barisal, Comilla are mentioned. We find a dominant pattern in the market, the most prominent route of rice is origin in North Bengal and end in Dhaka or Chittagong. Yet there are large number of other competing routes, none is as dominant as this one.

Rice wholesale enterprises have reported that May, June, July, December and January are the months in which the market is particularly active, whereas the market is less active in other months of the year.

#### **4.2.21 Price Movements of Rice Varieties of the Wholesaler Enterprises**

The sample enterprises have been asked to recall the price movements of rice varieties that they sold in their respective enterprises throughout the last one year. We find some interesting features of the data. First, prices of the same variety do not differ much across the entire country. Taking into account the common rice variety of BR 28, we find that differences in prices across the country do not exceed Tk. 7.5 for an average value of Tk. 38. Taking another example, of *Miniket*, the price differences across the country did not ever exceed Tk. 8.6 for an average value of Tk. 48 (Table 12). Second, prices differ not only across the markets, but also within the same market. Even a small market like Dupchanchiya has exhibited price differences across enterprises for the same variety of rice, and in some cases this difference is more marked compared to differences of average prices across the country. We therefore note that wholesale enterprises of a small market did not offer the same price for the same variety of rice.

Table 12  
**Price Movements of Selected Rice Varieties across the Country**  
 (May 2010 to April 2011)

Rice Variety: BR 28												
District	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
	2010	2010	2010	2010	2010	2010	2010	2010	2011	2011	2011	2011
<b>Average</b>	<b>31.24</b>	<b>31.75</b>	<b>32.77</b>	<b>33.32</b>	<b>34.38</b>	<b>34.92</b>	<b>35.97</b>	<b>37.08</b>	<b>38.14</b>	<b>38.70</b>	<b>39.13</b>	<b>37.80</b>
Bogra	34.06	34.88	36.50	37.75	38.25	38.56	39.94	40.69	41.76	41.39	40.64	35.47
Chitt	30.83	31.00	31.33	31.83	32.50	33.00	33.50	34.17	35.00	35.83	36.50	36.33
Dhaka	31.76	32.33	33.05	33.67	34.29	34.81	35.67	36.62	37.52	38.00	38.71	39.60
Dinaj	31.40	30.80	32.60	31.85	35.15	34.30	35.40	37.22	38.11	38.78	39.56	38.89
Jessore	32.06	34.19	34.89	36.14	36.69	37.78	38.83	39.94	40.67	40.33	40.72	38.83
Kushtia	28.13	28.63	29.50	30.31	31.06	32.81	34.13	35.50	37.00	38.81	39.56	38.38
Naogaon	30.44	30.44	31.50	31.67	32.75	33.17	34.33	35.42	36.92	37.75	38.25	37.08
Rice Variety: Miniket												
<b>Average</b>	<b>34.32</b>	<b>34.92</b>	<b>35.70</b>	<b>36.92</b>	<b>38.10</b>	<b>39.02</b>	<b>40.32</b>	<b>41.85</b>	<b>43.21</b>	<b>44.36</b>	<b>45.38</b>	<b>44.06</b>
Bogra	37.20	37.60	39.00	39.80	41.00	42.20	42.90	43.90	44.58	45.18	45.18	39.60
Chitt	33.27	33.55	34.00	34.45	35.41	35.95	36.91	37.86	38.91	39.64	40.80	40.60
Dhaka	37.25	37.83	39.00	40.08	41.00	41.88	43.67	44.92	46.30	46.30	47.13	46.38
Dinaj	35.00	35.86	36.43	38.14	40.43	40.86	42.14	45.00	45.33	46.67	47.50	48.17
Jessore	32.26	32.63	33.82	35.42	36.29	37.50	38.21	38.74	40.79	42.16	45.03	44.11
Kushtia	31.81	33.14	33.19	34.81	35.81	37.00	39.14	41.00	42.29	43.52	45.48	44.48
Naogaon	33.45	33.83	34.50	35.75	36.75	37.75	39.25	41.50	44.25	47.05	46.55	45.06
Rice Variety: BR 28, Market: Dupchanchiya (Bogra)												
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
	2010	2010	2010	2010	2010	2010	2010	2010	2011	2011	2011	2011
Average	34.06	34.88	36.50	37.75	38.25	38.56	39.94	40.69	41.76	41.39	40.64	35.47
Stdev	2.86	2.59	2.27	2.43	2.55	2.48	3.72	4.29	3.91	3.69	4.49	2.11
Max	39.00	39.00	40.00	40.00	41.00	41.00	45.00	46.00	46.00	46.00	47.00	38.00
Min	30.00	30.00	33.00	34.00	34.00	34.50	34.50	34.50	36.00	36.00	35.00	32.15
Range	9.00	9.00	7.00	6.00	7.00	6.50	10.50	11.50	10.00	10.00	12.00	5.85
Note:			<i>highest price</i>				<i>lowest price</i>		<i>Figures are in Taka per kg of rice</i>			

We now examine price movements of the wholesaler enterprises with respect to the size of enterprises, such as “large”, “medium” and “small” (this classification is based on the sample enterprises’ assessment of their respective size compared to the other rice enterprises within the same market). For example, we take the case of one common variety, BR 28. We find that within the same market there is some tendency for prices to move together across size of enterprise. One pattern that is found is that prices of “large” and “medium” enterprises in general slightly exceeds the prices settled by “small” enterprises, for the same variety of rice and within the same rice wholesale market. In other words the “small” enterprises generally closely follow prices quoted by the “large” and “medium” enterprises, but they often settle for a slightly lower price compared to the “large” and “medium” ones. This can be interpreted as follows: the “small” enterprises take into consideration price being quoted by the larger enterprises, and yet settle for a reduced price. This is plausible since “small” enterprises do



not have the same amount of reputation and do not possess the same amount of bargaining power as compared to the larger ones. Therefore there is higher amount of riskiness involved on behalf of the counterpart business enterprise when business is being conducted with a “small” enterprise rather than a “large” or “medium” enterprise, the riskiness being in terms of authenticity of quality of rice being supplied (by the “small” one). Another disadvantage that “small” enterprises have is that they may only be able to supply a smaller amount in total whereas larger enterprises can supply a much larger amount. A third factor that may work against the “small” enterprises is that they may have lesser number of contacts or references and thereby may have to take a discount in terms of price quotations. Summing this up, “small” enterprises may have lower bargaining power in the market and this result in their accepting discounts for sale (in Figure 9, we exhibit the graphs of price movements of BR rice, other varieties exhibit similar pattern).

Imported varieties of rice are presently quite uncommon in the market, and only in the Chittagong area we find mention of the imported varieties. The imported varieties available in the Chittagong market include names such as Burma *Beti*, Burma *Atap*, Pakistan *Beti*, Pakistan *Atap*, Thailand *Beti*, Vietnam *Beti*, etc. We find that “small” enterprises have a tendency to follow “medium” enterprises’ prices in the case of imported varieties (Figure 10).

#### **4.2.22 Profitability of the Wholesaler Enterprises**

In the wholesaler enterprise module, we have collected enterprises’ own reports of their respective monthly average profits. We estimate an OLS regression (with heteroskedasticity-robust standard errors) of natural log of the monthly average profits as reported by the enterprises on enterprise size and area specifications as well as number of enterprises in the rice wholesale market. We take “small” enterprises as base for dummies of “large” and “medium” enterprises, and enterprises in Dhaka area as base for the area dummies (see Table 13 in Appendix 2).

We find that the estimated coefficient for number of enterprises (in the wholesale market) not statistically significant ( $p\text{-value}=0.58$ ), this implies, controlling for other variables, entry of a new enterprise does not statistically significantly affect growth of the enterprises’ monthly profits (self-reported). This implies that the rice wholesale market can still absorb some additional enterprises without adversely affecting profitability of the existing enterprises. We find that the estimated regression coefficient of area dummy for Kushtia enterprises is statistically positively significant ( $p\text{-value}=0.00$ ). This implies that, controlling for size and number of enterprises, only Kushtia enterprises tend to have statistically significant higher amount of monthly profits compared to the Dhaka enterprises, whilst enterprises in other areas do not show any such clear difference. This result matches with findings in other sections of the module where Kushtia enterprises are often found to exhibit different results compared to those of other areas. We note that we have a mix of millers and wholesalers and also enterprises in dual roles of being millers and wholesalers as well as commission agents in the Kushtia area. A statistically significant result only for Kushtia location may have the implication that within the rice wholesale market structure, enterprises that operate as a mix of millers and wholesalers/commission agents have a tendency to exhibit higher growth rate of profits. Other than Kushtia locations, amount of profits are not much statistically significantly different as compared to the base of Dhaka throughout the country. We exhibit results of a joint significance test, and we find the area dummies jointly are statistically significant at least at 5% level ( $p\text{-value of F-test}=0.02$ ).

We find that both the estimated coefficients for size of enterprise dummies such as “large” and “medium” are statistically positively significant as compared to the base of “small”

enterprises, controlling for other variables in the model. A statistically significant result is also found in the joint significant tests for “large” and “medium” enterprises. This implies that controlling for other variables in our regression model, the growth of (self-reported) average monthly profits have a tendency to be higher for large and medium enterprises as compared to those of small enterprises. We can infer from this result that large and medium enterprises are more efficient and have a tendency to exhibit faster amount of profit growth as compared to the small ones. This indicates that there are some economies of scale in the rice wholesale sub-section of the rice market (more prominent in the cases where millers and wholesalers overlap in their operations). This does not match with a classic textbook (constant-returns to scale) interpretation of the market while this matches with our observation from the field that size actually matters and being large is considered good for obtaining higher growth rates of profits. Here we have used enterprises’ self-reported profit amounts as some arguably reasonable proxy for their true profit amounts since the true amount is not available for us. Our model also included enterprise-specific variables such as storage capacity (p-value at 0.12), years of operation, the total number of staff and number of business contacts with millers—controlling for other variables, these variables did not exhibit statistical significance at least at the 10% level.

#### **4.2.23 Pricing Decisions as Reported by the Wholesaler Enterprises**

Sample wholesalers have reported that prices are decided on the basis of bargaining among wholesalers or wholesalers and millers; this bargaining is based on market prices and quality characteristics of rice varieties. Within the rice market value chain, there are two major points of bargaining, one is the point of the farmer vis-à-vis the bepari (on behalf of the miller) for procurement of paddy, and the other is the point of the wholesaler where the wholesaler settles prices in between the miller and the end-point wholesaler. We therefore find that the miller is involved in both of the points of bargaining.

If we examine the motivations of millers in the case of the first point of bargaining (point where the farmer meets the bepari who acts as an agent of the miller), we understand that the miller tries to ensure his procurement of paddy for the lowest possible price that he can bargain for, and in this act he sometimes takes help from the bepari with whom he aligns his incentives. On the other side of the bargain, the motivation of the farmer is to obtain as high a price as possible for his paddy from the bepari. Since the farmer needs to sell paddy and bepari needs to purchase it, both of the parties of the bargaining process have an incentive to come to some mutually agreeable solution that will make both sides happy unless there is some pressing need of some party which will make the case weak for him. Another issue is the number of the interested parties involved and how much market power the agents have in the market. If farmer has no credit or cash constraint and no pressing need to sell paddy urgently and do not have any attached credit previously incurred for the paddy, he can opt for the best possible price from among the set of prices that is being offered by the interested beparis. Or alternatively the farmer can refuse all of the beparis and sell his paddy in the neighboring market. In this scenario the market power lies with the farmers, not with the beparis. On the other hand, a farmer who only knows only one bepari, for example, and no other alternative but to sell the paddy to the bepari, exhibits low amount of market power. This kind of situation can also happen when farmer is hard pressed to sell the paddy to service some outstanding loans or do not have storage facilities to store paddy for long.

In the second major point of bargaining, wholesaler or commission agent is in between the miller on the one hand and the end-point wholesaler on the other hand. The commission agent bargains with the agents of the end-point wholesaler regarding pricing of some particular variety of rice, this bargain is set by miller’s minimum quotation on the one hand and the

maximum that the counterpart agent wants to offer for the requested supply. The commission agent's fee is fixed, thereby a good bargain brings in higher revenue for the miller, and a bad bargaining results in lower amount of revenue for the same. A commission agent's reputation depends on how successfully he can make good bargains on behalf of the miller. Since this is not at all a one-time play, a business relationship between a miller and a commission agent is expected to last for long many years, commission agent's making a bad bargain may result in loss of this relationship, and this obviously a commission agent would want to avoid. A miller may have business relationships with many number of agents located in many different places, therefore he may switch from one commission agent to another within the same market, or switch to some other agent in a different market, or may decide to wait and see rather than agreeing with any agent at the current moment. Since the rice wholesale market has become heavily interconnected, a miller has by now a large number of options as commission agents and rice market centers. Therefore a miller in a North Bengal market such as Naogaon can compare prices offered by Dhaka market wholesalers with that of Chittagong market or of Sylhet market. Any small differences in offers may result in rice supply being directed to Sylhet rather than Chittagong, or Barisal rather than Khulna. This is the situation when the miller can exercise quite a bit of control over the price bargains because of his large number of business contacts. On the other hand, the situation for the miller can be unfavorable if he faces tough counterparts in the markets, such that some Dhaka retail wholesaler decides to bring supply from millers located in Naogaon market rather than those located in Kushtia market. We therefore find that in both of these bargaining process, the number of options available matter (along with option to wait or be able to refuse supply, implying availability of storage and storage cost), and ultimately this is the relative market power of the parties involved that decides the prices at these points.

#### **4.2.24 Market Structure of the Wholesaler Market**

##### ***Why Some Firms May Become Dominant?***

As we investigate the rice wholesaler markets in detail, we find that the small market centers are often dominated by a number of "large" firms. Why do some firms become "large", while others do not? In other words, why do some firms gain substantial market power, while others do not? As per Carlton and Perloff (2000), there are at least three possible reasons that are sufficient to create a dominant firm-competitive fringe market structure:

The first reason is that *dominant firms may have lower costs than fringe firms*. Four major causes of lower costs are: (a) the firm may be more efficient than others (better management or better technology), (b) an early entrant to a market may have lower costs from having learned by experience how to produce more efficiently, (c) an early entrant may have had time to grow large optimally (in the presence of adjustment costs) so as to benefit from economies of scale, and (d) the government may favor the original firm in terms of tax rates or other benefits.

The second reason is that *a dominant firm may have a superior product in a market where each firm produces a differentiated product*. This superiority may be due to a reputation achieved through advertising or through goodwill generated by its having been in the market longer.

The third reason is that *a group of firm may collectively act as a dominant firm*. Groups of firms in a market may have incentive to coordinate their activities to increase their profits. A group of firms that explicitly acts collectively to promote its best interest is called a *cartel*. If all firms in a market coordinate their activities, then the cartel is effectively a monopoly; if

only some of them do so, then the group acts as a dominant firm facing a competitive fringe of non-cooperating firms (op. cit. (2000)).

### ***A Dominant Firm Oligopoly Model with Free, Instantaneous Entry***

The dominant firm cannot set a high price when entry is unlimited, compared to when entry is restricted. One crucial assumption of the model is that an unlimited number of competitive-fringe firms may enter the market as long as they make positive profits.

The implication of the model is that fringe firms cannot make profits in the long run; either they make zero profits or have exited out of the industry. Assuming that fringe firms are all identical in costs, the market price cannot go higher than a fringe firm's minimum average cost, so that fringe firms always only make zero economic profits. The explanation is that, if there is some way that fringe firms make positive economic profits, more firms would flood into the market and drive price down to levels where each firm earns zero economic profits. On the other hand, since the dominant firm has lower costs than fringe firms, the dominant firm makes positive economic profits.

### ***Price Umbrella***

The model is sometimes placed in such a way that a dominant firm provides a pricing umbrella for smaller firms. As long as competing firms price at or below the level of the dominant firm, they will be able to find buyers. If the products they offer are considered inferior (for example, the firms lack established reputation or they are unable to provide a large supply at a time), the fringe firms have to set their prices substantially below those of the dominant firms.

### ***Equilibrium Determination in the Market with a Dominant Firm and Free Entry of Fringe***

Even with unlimited entry of fringe firms, the dominant firm can gain and hold indefinitely a large share of the market if it has some cost or other advantage. This may happen since the dominant firm may have superior products, superior and more numerous (business) contacts, or has generated goodwill with buyers and other business counterparts.

As more and more competitive-fringe firms enter ( $n$  rises), the slope of the competitive-fringe supply curve becomes flatter and flatter (it is  $n$  times the slope of a typical firm's supply, or marginal cost, MC, curve). As the number of firms grows large, the fringe's supply curve becomes horizontal, say, at price  $p^*$  (as long as price is at least  $p^*$ , the competitive fringe is capable of and is willing to supply any quantity that market demands), so the corresponding marginal revenue curve is also flat. Below  $p^*$ , the residual demand curve is the market demand, which slopes downward. Again, the marginal revenue curve corresponding to the residual demand curve jumps at the quantity where the kink in the residual demand curve slopes downward.

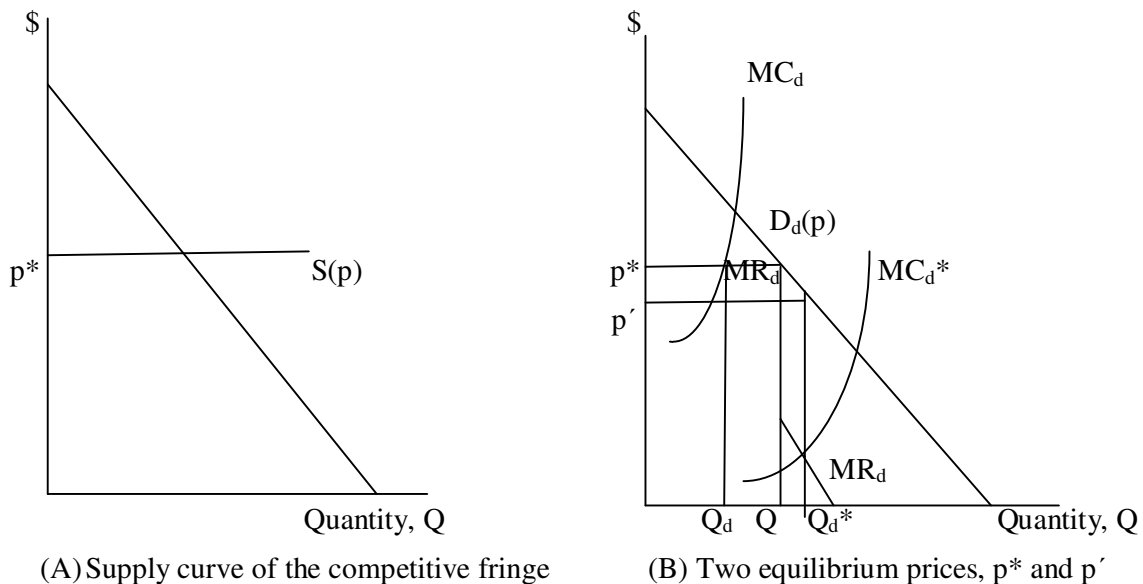
There are two possible equilibria. First, if the dominant firm's marginal cost is relatively high ( $MC_d$  in Figure I(B)), so that it intersects the horizontal portion of the  $MR_d$  curve, the price is  $p^*$ , and the competitive fringe meets some of the market's demand. At this price, each fringe firm makes zero economic profits (since its average cost equals  $p^*$ ) and therefore is indifferent between staying in business and leaving the market. The amount to be produced by the fringe firms depends on the dominant firm's cost structure (that is, where  $MC_d$  intersects the horizontal marginal revenue curve), which determines the dominant firm's output,  $Q_d$  (the fringe firms produce an output,  $Q_f = Q - Q_d$ ). To note that, it is possible that  $Q_f = 0$  even though the presence of the fringe constrains price to equal  $p^*$ . Thus, if fringe firms flood into a market whenever positive profits can be made, the dominant firm cannot

charge a price above the minimum average cost of a fringe firm. Whereas a dominant-firm can still make positive profits, competitive-fringe firms just break even.

The second type of equilibrium happens if the dominant firm's marginal cost is lower ( $MC_d^*$  in Figure I(B)), so this intersects with the marginal revenue curve in the downward-sloping portion of the residual market demand curve. Here price is so low that no fringe firm stays in the industry and the dominant firm acts as a monopoly.

Our discussion of the rice wholesaler market closely matches with the equilibrium price and output determination model of a dominant firm with a competitive-fringe with free entry and exits (Figure I(B), the first equilibrium) and where dominant firm produces output side-by-side the competitive fringe firms (neither is able to drive the other out of industry). The dominant firm provides an indicative price in the industry which we can associate with the phenomenon of the *price umbrella*. The dominant firm (or a group of larger-size firms acting as a dominant firm) still holds on to a large share of the market, and this share does not change much over time. On the other hand, there are a number of cases of entry and exit in the market, more particularly among those firms which are on the fringe. The cost advantage of the dominant firm (of firms) may arise from superior products (may be real or simply perceived), larger business networks, greater and older reputation, therefore having been able to generate more *trust* (reduces prospect of default or expectation of cheating). We can conclude that, provided examination of the information as discussed in the previous sections, the rice wholesaler market functions as a dominant firm oligopoly constrained by the presence of a competitive-fringe with free entry into and exit from the industry.

**Figure I. Equilibrium Price and Output in a Dominant Firm Model with Competitive Fringe and Unlimited Entry**



### 4.3 The Retailer Market

#### 4.3.1 Examining the State of Competitiveness in the Market for Retailers

In order to investigate the *state of competitiveness* in the rice retailer markets, we outline some basic features or testable implications that are expected to be present in this market. First we point out that a competitive market is one which contains a large number of buyers and sellers. The retailer market covers a large number of buyers and sellers; thus we do not find problems with this condition. Second we can expect free entry and exit of firms into this market. We find that even though it is not prohibitively expensive to enter into retailer market, usually this requires long “training” in the form of experiences of operations within this market for long periods of time. As was the case of enterprises in the rice wholesaler market, enterprises in the rice retailer markets requires business connections which takes long time to build. Thus we find that entry into this market to some extent is restricted in the form of entry barriers such as requirements for experiences and business connections.

#### 4.3.2 Findings from the Selected Retailer Markets

The primary survey covered a total of 21 retailers in the two end-point retailer locations, Dhaka and Chittagong. Out of these, ten retailers were interviewed in the Chittagong City Corporation area and eleven were interviewed in Dhaka City Corporation area (four from Babubazaar aka Badamtoli, three from Kochukhet and the remaining four from Mohammadpur Krishi Market).

The markets for retailers varied over different markets, typically these market locations covered 15 to 20 enterprises (the largest one among them is the Dhaka Kochukhet market with around 50 enterprises). Out of the total 21 retailers surveyed, 10 categorized themselves as being “medium” sized, 3 as “large” and the remaining 8 as “small” sized as compared to other enterprises in those particular retailer markets. All the surveyed retailers are located on the main road or within half a kilometer distance from the main road. Retailer enterprises are most often single-owned entities, with only some exceptions in the Chittagong areas. Without any exception, the owners of the surveyed retailers are all males. It is absolutely rare to find any female entrepreneur to have ownership over the rice market enterprises in the entire country, be it milling, or wholesale or retail. The average age of the surveyed retailers is 42 years, with ranges between 30 to 50 years. On an average, the owners of the surveyed enterprises have nine years of formal education. At the same time, the owners on an average have nine years of experiences in the rice market, whilst the maximum value is up to 29 years.

Retailers are small in operations, most often there are only two full-time employees besides the owner-manager. Most of the surveyed retailers only have some office space, measuring around 9 feet in length and 7 feet in width. Only few retailers have storage spaces. We can infer that retailers mostly concentrate on delivering the output at the ongoing market prices, rather than keeping it for some time. None of the retailer enterprises have any vehicle. And none of them have any branch offices. Most of the retailers have been established by the owners themselves, and some others have been inherited. On an average, the surveyed retailers are in operation for the last ten years, while the oldest among them has been in operation for thirty years.

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Retailers have lesser number of business contacts as compared to the wholesalers. On an average, the surveyed retailer has business contacts with 7 local wholesalers, 5 local retailers and 50 local customers. Almost all of these contacts are within the same locality, this implies retailers simply obtain the produce from the wholesalers and deliver those within the locality among the customers. They do not have long-distance networks as it is often the case with the wholesalers. With regards to financing of working capital, retailers mostly depend on private commercial banks, followed by family or friends. On an average, a retailer enterprise expects to be able to generate Taka 0.7 million for working capital or business expansion requirements from these financing sources.

Retailers of Chittagong and Dhaka receive rice from different districts, more prominently from northern districts of Bogra, Naogaon, Dinajpur, and western district of Kushtia. Since they reported limited business contacts with distant districts, they depend on the immediate wholesaler to deliver the rice from those districts. Retailers pass more active business seasons during May to August and again during December to February, this is simply a one-month lag time frame as compared to that of the wholesalers.

#### **4.3.3 Pricing and Bargaining as Reported by the Retailer Enterprises**

The retailer enterprises report that they simply pass the wholesale prices on to the customers with some pre-fixed amounts of profit margins. The common practice is that they obtain their supply from the wholesale market at the ongoing (wholesale) market price, and then add Taka 25 or 30 per 50-kg bag of rice and sell it to the customers. How much to add to the wholesale market price is a common understanding reached among the retailers themselves prior to transactions. The retailers meet two categories of business counterparts in price bargaining. First category is the rice wholesalers who would supply rice to them at the ongoing rice market wholesale price. Second category is the rice customers who would check

with other enterprises and see if price could be any lower anywhere for the same variety, quality, specification, etc. The prominent presence of the rice customers at the end of the rice market supply chain makes sure that the retailer enterprises need to be watchful not to ask for “too high” a price that would scare away the customers, and again not to ask for “too low” a price which would reduce their own profit margin (the other group, the wholesalers, would want to have as high a wholesale price as possible). Since the retailers do not have any storage space, most often their role would be to just offload the rice produce on to the customers. In between two markets prices, one that of retail market, and the other of wholesale market-- the retailers have their profit margins (and costs of value addition for the retailers). Because of the presence of the customer group on the one hand and the wholesaler group on the other, the retailers do not have much influence on the directions of the market prices.

#### **4.4 Summary of the Primary Survey Findings**

We discuss here some concluding points from our survey findings. Firstly, the private import of rice has been very minimal during the last three years, and as such private importers were not interested to import since the gap between domestic prices and international prices have not been large enough to make import profitable. Only in this year there are some preparations for public import of rice. Therefore the recent price increases in the domestic market in recent times is mostly a domestic phenomenon, based on domestic demand and supply situations.

Second, rice market contains a large network of intermediaries from the beginning point of the farmer to the end point of the consumer. Whereas there are millions of rice farmers at the one end and millions of consumers at the other, the numbers of economic agents in the intermediate steps are not very large, and these intermediaries differ among themselves in terms of their respective roles, objectives, skill and expertise, technical support, constraints, strategies, etc. The intermediaries interact with each other and often bargain with each other, who are striving for securing his or her self-interests. Almost all the contracts within this market are informal, in the form of verbal or mobile phone conversation or hand-written notes. In this environment, “trust” and “reputation” are important themes and the firm aims to achieve these over time, since firms who enter into this market ends up operating here for long many years. On the other hand, default risk is quite high in this kind of environment and default of one of the transacting parties is cited as one major cause of exit of firms from this industry. Even though the entry cost into this industry is not prohibitively high, the issue of default risk, trust and reputation, skill and expertise and correct knowledge of the business partners are essential requirements to survive and these are steep entry barriers.

Third, within the rice market value chain, there are two points where major bargaining takes place; one is between the farmer and the *bepari* or *faria* (often as agents of the miller) over the price and quantity of paddy, and the other is between the rice market wholesaler or commission agent (as agent of the miller) and the end-point wholesale or retail wholesaler over the price, quantity and quality combination of rice. The rice miller is present directly or indirectly in both of these bargaining processes, and at the same time, he has storage capacity to postpone sell of stock for some time. This implies that millers or miller-cum-wholesalers have potentials to enjoy large leverage over the entire rice market value chain.

Fourth, the rice market has become heavily interconnected except for the case of the farmers who may have limited number of contacts and limited options other than sell at the price offered from the miller. The interconnectedness of the rice market has been strengthened by rapid expansion of mobile phone technology, road transport and construction of bridges, i.e.,



Jamuna Bridge. A miller-cum-wholesaler in a small rice market in North Bengal may have business contacts with wholesalers of an opposite corner of the country, for example, Cox's Bazaar, or Sylhet, and therefore now enjoys large number of options to choose from to decide where to supply his rice. Therefore every area in the country is in a way competing with each other to procure rice at the minimum cost and at the same time supply rice at the highest possible price. In this kind of an active market, a small difference in price offers may result in loss of business transactions, or even goodwill of counterparts. Such an intense competition over the entire geographical space of the country implies that it is very difficult for anyone to gain excessively compared to what others are gaining. The market does not have any single agent, who is indispensable. For example, even though millers of one location may enjoy large bargaining power, they may not be able to gain excessive profits either since they have to compete with millers from other locations as well, besides competing with each other.

Fifth, regression results from survey data of sample enterprises' self-reported profits exhibit large and medium-sized enterprises in the rice wholesale markets enjoy higher amount of profit growth as compared to small-sized enterprises. This indicates large and medium-sized enterprises enjoy economies of scale in their operations whereas small ones do not. The regression results also suggest that enterprises that have combined operations of millers and wholesalers/commission agents enjoy higher amounts as compared to the ones who are only wholesalers.

Sixth, price that is finally settled in any bargaining process within the rice market value chain depends on relative bargaining power of the concerned parties. Anyone who has better bargaining power enjoys the privilege of setting the range within which bargaining may take place, and the other party who has lower bargaining power may have to accept some price within that specified range. One clear case of lack of bargaining power is evident in our survey responses from some North Bengal small farmers. The farmers have reported that they have to accept prices set by the *bepari* since they lack storage space, need money for family expenses or repay outstanding loans. On the other hand, high bargaining power is enjoyed by miller-wholesalers in Kushtia, who can ask for the best price anywhere in the country or postpone sell.

Seventh, within the rice wholesale market, the enterprises are free to sell any amount at any price they can obtain, whereas each of them is concerned about prices of neighboring enterprises. Large and medium enterprises enjoy the advantage of setting the trend of prices in the market, and the rest small ones follow them. The small ones' prices are often found to be slightly lower for the same variety of rice, since they have to give discounts to compensate for the risks involved in dealing with them, particularly authenticity of quality of rice variety and lack of references. We therefore find prices of a variety of rice offered by all the enterprises to move together, whereas small enterprises sell the same at a slightly lower price.

SECTION 5  
**TRENDS AND RELATIONSHIP BETWEEN PRICES OF LOCAL AND INTERNATIONAL  
 VARIETIES OF RICE**

This section analyzes the trends in prices for local and international varieties of rice. In addition, the relationship between local and international prices is also explored. Seven domestic varieties of rice and five international varieties have been taken for analysis based on relevance. The dataset used consists of monthly price data of the different varieties for the period of 1997-2007.

Volatility in rice prices has been observed in recent years while rice prices have gone up both locally and internationally. For analyzing trends in rice prices, we consider both nominal and real prices (adjusted for inflation using non-food price index). Our price data consists of monthly nominal wholesale prices of different varieties of local rice as well as f.o.b. prices of several international varieties (Thai 5% broken, parboiled, Thai 25%, India's 25%, and Viet 25%). The domestic wholesale price data were collected from DAM and international export prices from the published FAO data, for the period of 1997 to 2007. Due to data unavailability in some months, linear interpolation was utilized and in other cases, yearly averages were taken as monthly prices. All prices were later converted to Taka per quintal for comparability.

Figure 11 to Figure 17 will give an idea about the price trends of different domestic varieties. As observed, there is both upward and downward movement in the price of rice per quintal until 2007. We observe similar pattern for both nominal and real prices. However, after 2007, rice prices exhibit a clear upward trend increasing over several months.

In case of international varieties (Thai 5% broken, parboiled, Thai 25%, India's 25%, and Viet 25%) similar trends were observed (Figures 18 to 22). This would suggest that there may close relation between both price movements. As one would expect local prices are highly integrated with international market in an open economy context. As observed in previous studies (e.g. Murshid et al., 2009) increases rice price was not related to domestic production per se rather other variables such as international prices, market forces as well as other unobservable could affect price increase. This study found some weak market integration with local rice price and rice price in Kolkata (capital of West Bengal). We intend to analyze this issue further and investigate co-integrating relationship between prices of local varieties with several international varieties of rice.

In order to avoid any spurious relationship, we first investigate the stationarity properties of the time series using the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1979). The purpose of 'augmenting' the Dickey-Fuller (DF) regression is to get *white noise* errors. A series  $Y_t$  is said to be integrated of order  $d$  denoted by  $Y_t \sim I(d)$  if it becomes stationary after differencing  $d$  times and thus  $Y_t$  contains  $d$  unit roots. A series which is  $I(0)$  is said to be stationary.

Table 14 in the appendix shows the results of the ADF test. The results suggest that the null-hypothesis ( $H_0$ ) of unit root can be rejected in the first difference,  $I(1)$  and therefore all the series (i.e. domestic and international varieties) are stationary in the first difference. Since the all series are clearly stationary in  $I(1)$ , this suggest that price of each varieties can be integrated of order one.

### 5.1 Cointegration Test

The Johansen cointegration testing technique is used for the ‘trace’ and ‘maximum eigenvalue’ statistics. Results of this test are shown in Table 15 in the appendix.

Both the ‘trace statistic’ and the ‘eigenvalue statistic’ imply rejection of null hypothesis of  $r = 0$  (no cointegrating vectors) against the alternative hypothesis  $r = 1$  (one co-integrating vectors). However, the same for  $r \leq 1$  against the alternative of  $r = 2$  (two co-integrating vectors) cannot be rejected at 5% level of significance. This test, therefore, reaffirms any co-integrating relation between the variables.

From the table is clear that India 25% varieties of rice have a strong cointegrating relationship with all domestic varieties except Aus-local. On the other hand, Viet 25% has cointegration with all the Aman varieties, i.e. coarse, medium, HYV. Aus local has no cointegrating relationship with international varieties like Thai 5% Broken, Thai 5% Parboiled, Thai 25%, India 25% and Viet 25%. Aus-HYV, Boro-Local and Boro-HYV had only one cointegrating relationship and that is with India 25% variety. The maximum cointegrating vectors are found between Aman-coarse and Aman Medium with the international varieties.

Thus above analysis indicate that trends in local and international prices exhibit similar trends over the years and in the long-run price movements in local and international markets in most cases are integrated. The cointegrating relationship is more pronounced in case of specific variety of local and Indian rice. In a revised version of this paper, we intend to investigate further on price relationships before drawing specific policy conclusions.

## SECTION 6

### SUMMARY AND CONCLUSIONS

We take a broader perspective on the issue of recent price increases in the domestic rice market in Bangladesh. We explore the nature of competition at different stages of the domestic rice market of Bangladesh by explaining incentives and behaviors of different agents in the market, particularly those of large firms operating in the middle of the rice market supply chain.

As observed rice markets contain a large network of intermediaries from the beginning point of the farmer to the end point of the consumer. These intermediaries differ in terms of their respective sizes, roles, objectives, skill and expertise, technical support, constraints, strategies, etc. The intermediaries interact and often bargain with each other, who are striving for securing self-interests. Almost all the contracts within this market are informal, in the form of verbal or mobile phone conversation or hand-written notes. Here, “trust” and “reputation” are important on which the firm invests overtime to operate in this market for long many years. On the other hand, default risk is seen quite high, which is cited as one major cause of exit of firms from the market. Even though the entry cost is not prohibitively high, the issue of default risk, trust and reputation, skill and expertise and correct knowledge of the business partners are very essential to survive and hence these can be considered as steep entry barriers.

The rice market has become heavily interconnected except for the case of the farmers, who may have limited number of contacts and limited options other than selling produce at the price offered by a miller. It has been observed that large and medium-sized enterprises enjoy greater economies of scale in their operations compared to smaller ones. Within the rice market value chain, there are two points where major bargaining takes place; one is between the farmer and the *bepari* or *faria* (often as agents of the miller) over the price and quantity of paddy, and the other is between the rice market wholesaler or commission agent (as agent of the miller) and the end-point wholesale or retail wholesaler over the price, quantity and quality combination of rice. The presence of rice miller, in both of these bargaining processes is observed, who by taking advantage of storage capacity is able to postpone sale at least for some period. This implies that millers or miller-cum-wholesalers have potentials to enjoy large leverage over the entire rice market value chain and thus potentially engage in opportunistic behavior within the market. Price determination process within the rice market value chain depends on relative bargaining power of the concerned parties. Large and medium enterprises enjoy the advantage of setting prices in the market, and the rest small ones follow them. We therefore find prices of a variety of rice offered by all the enterprises to move together, whereas small enterprises sell the same at a slightly lower price. Additionally, within the rice wholesale market, the enterprises are free to sell any amount at any price they can obtain, whereas each of them is concerned about prices of neighboring enterprises.

We also examined price trends of local and international varieties of rice. Both nominal and real prices show upward and downward movements during 1997 to 2007 period with persistently upward trend in the last periods of investigation. In case of international varieties similar trends were observed suggesting integration in an open economy context. We also observe long term relationship (cointegration) between prices of local varieties with several international varieties of rice with between most domestic varieties and India 25% variety, which is consistent as historically during the period of study major rice imports were from India. However, as in the recent years private imports of rice were virtually not happening in our context suggesting that the recent price divergences could only be explained

through local market dynamics and agents behaviors and we make an exploratory attempt in this regard.

In terms of discussion of market structure, we find that the rice wholesaler market is characterized by *a model of the dominant firm oligopoly with competitive-fringe firms with free, instantaneous entry and exit*. The larger wholesaler firms provide a *price umbrella* for the smaller firms whom we can consider as competitive, fringe firms. The status of dominance by one firm (or a group of firms acting as a single firm by way of an implicit cartel) may have arisen because of longer established reputation and trust in the market and real or perceived superior quality products and more numerous business contacts.

We conclude the paper with some observations on the issue of competition *in the rice markets* in Bangladesh based on the above discussion. It is obvious that agents in the market interacting with each other pursue different objectives as well as face different constraints in their operations. Hence it is appropriate to examine different segments of the rice market separately to reach any conclusion regarding market competitiveness. The first segment of the rice market, one that involves primary growers, can be considered as to a large extent *competitive*, although the benefits of competition do not reach small and marginal farmers. The reason is that the small and marginal farmers often suffer from credit and cash constraints, and lack sufficient storage capacities, making them vulnerable to the opportunistic behavior of rather powerful intermediaries. As we proceed to the second segment of the market, which is of the rice millers and the wholesalers, we find that the issue of competition is rather interesting. Given that an entrepreneur has to have large financial resources as well as business connections to be able to survive in the rice wholesaler market, entry into this market (segment) is rather difficult. Also default risks of financial transactions or delays in payments often serve as an entry deterrent for new potential entrants.

As observed price bargaining depends on relative economic power and/ or business connections of the two agents whereby the more informed and connected agent gains from the bargaining process. With regards to price movements of wholesaler firms within the rice wholesaler markets we found that large farms' price quotations are often considered as the indicative prices and small and medium sized firms often simply follow this price. This resembles the standard oligopolistic price-leadership phenomenon, where one dominant firm sets the prices and the other firms (often smaller) act as follower. Overall, in the second segment of the rice market, that of the wholesale markets, one may argue that *competition* is to a large extent restricted. Even though a large number of wholesaler firms operate in the market, the ones with more economic resources and business connections dominate. In the case of the third segment (of the retailer firms), this mostly acts as a channel for prices set in the second segment (of the rice wholesalers). Our survey findings have implications for public policy.

We cannot however conclude on how the *competition* (or lack of it) affects the end consumers since our study concentrated mostly on the price bargaining and negotiations within the primary growers' segments, wholesalers' segment and retailers' segments, we specifically did not follow the issue of burden of any opportunistic behaviors on the consumers directly. This could be an extension of the present study.

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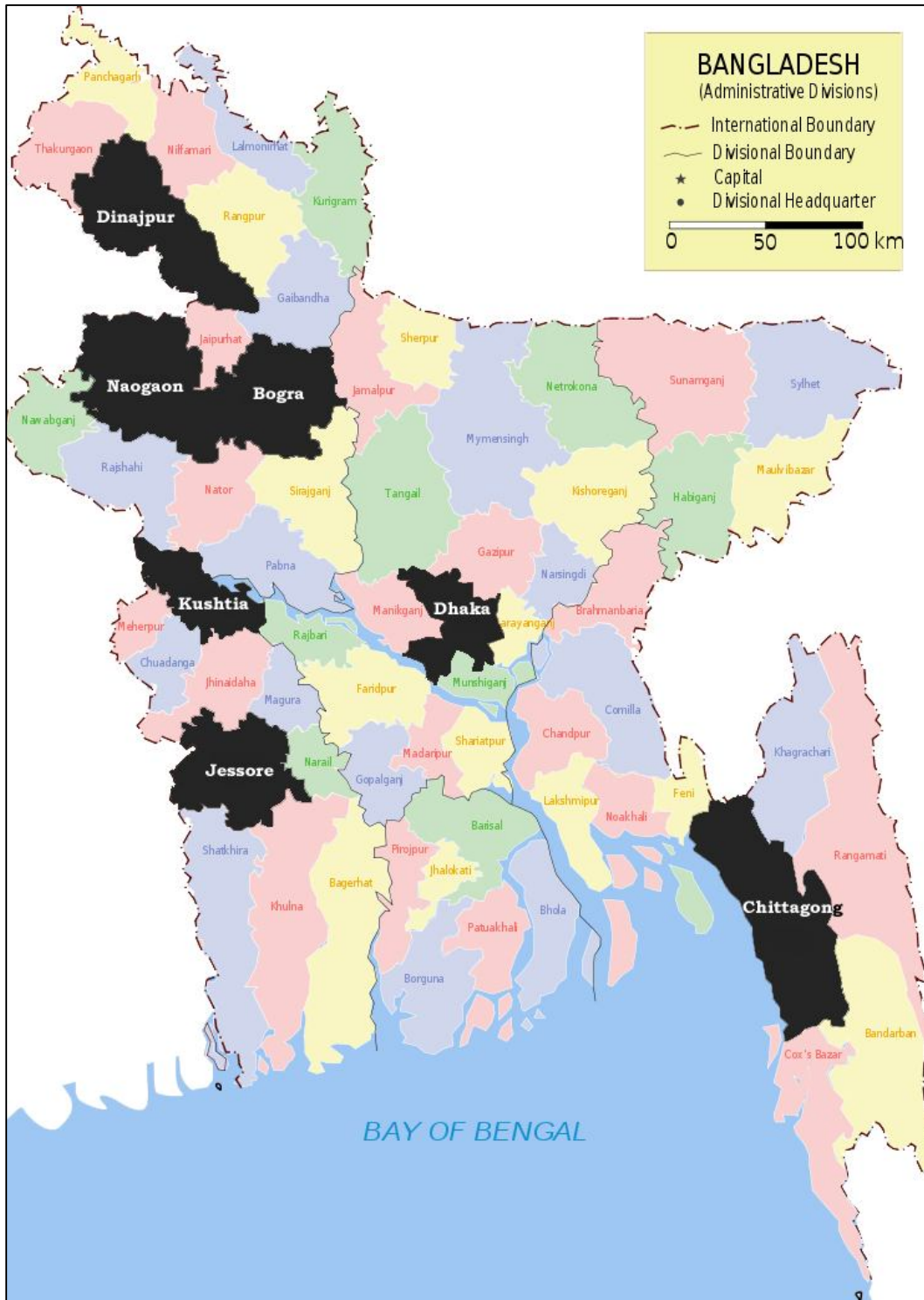
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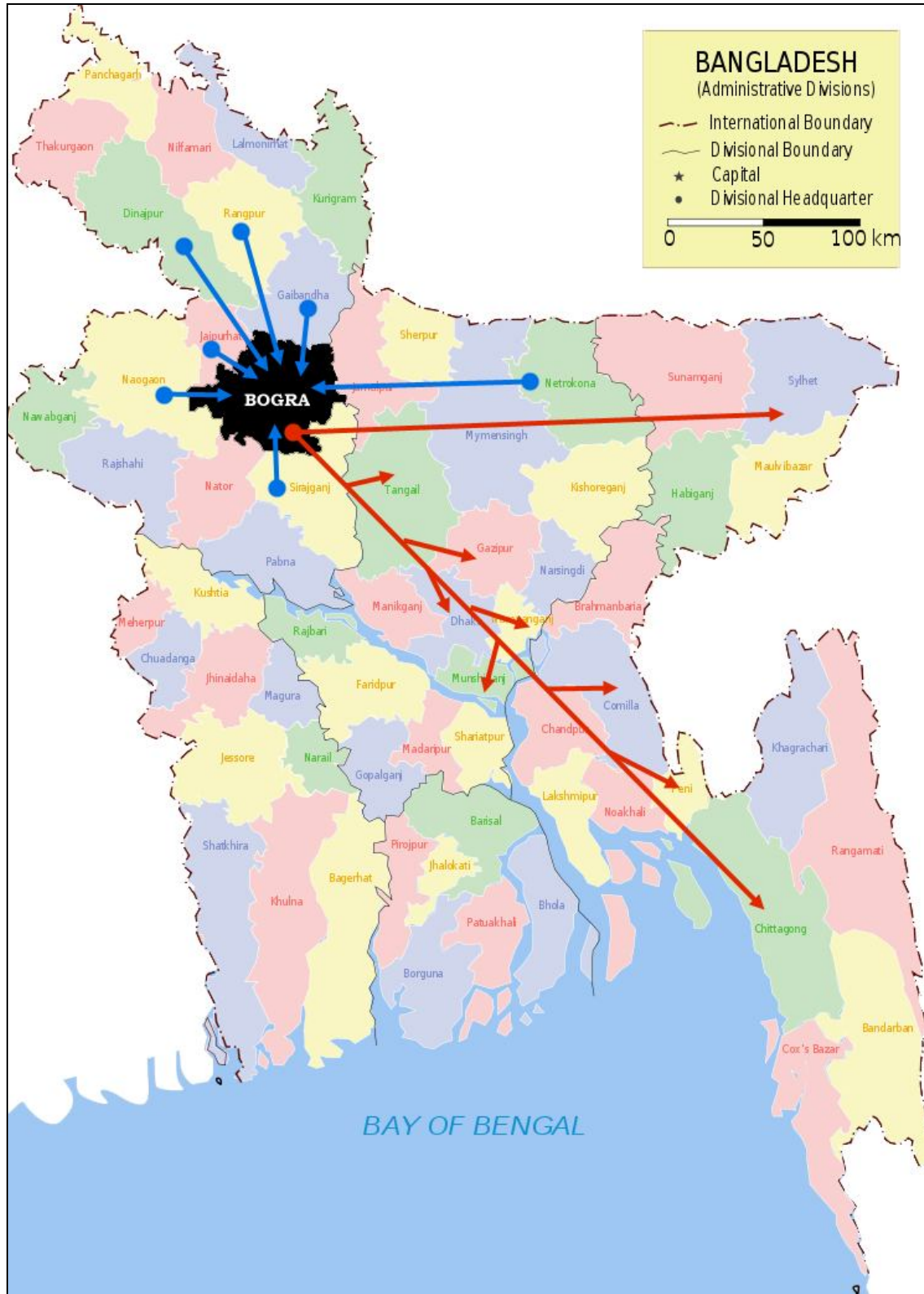
APPENDIX 1  
MAPS AND FIGURES

FIGURE 1  
Surveyed Districts



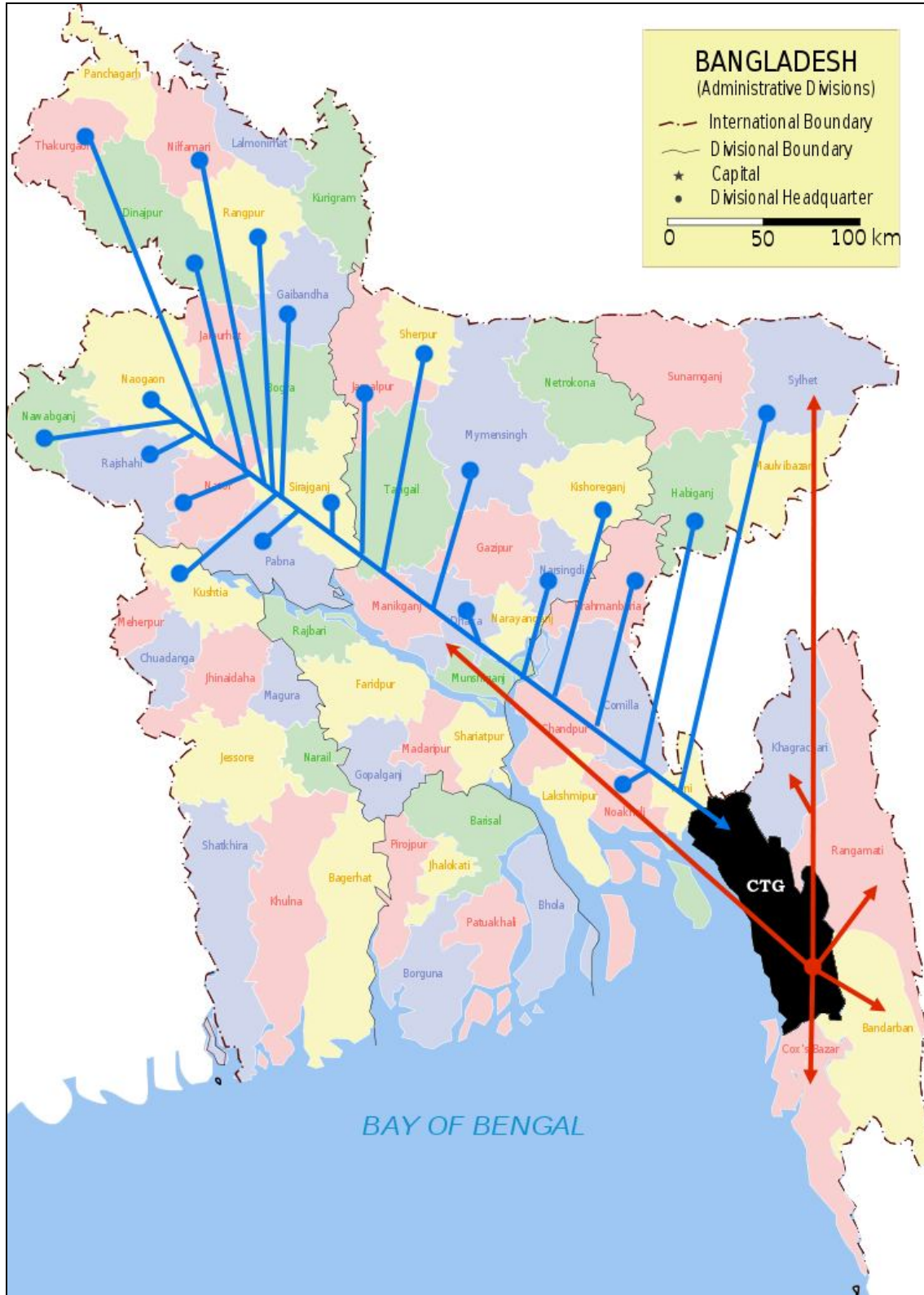


**FIGURE 2**  
**Major sources and destinations of supply of rice in the district of Bogra**



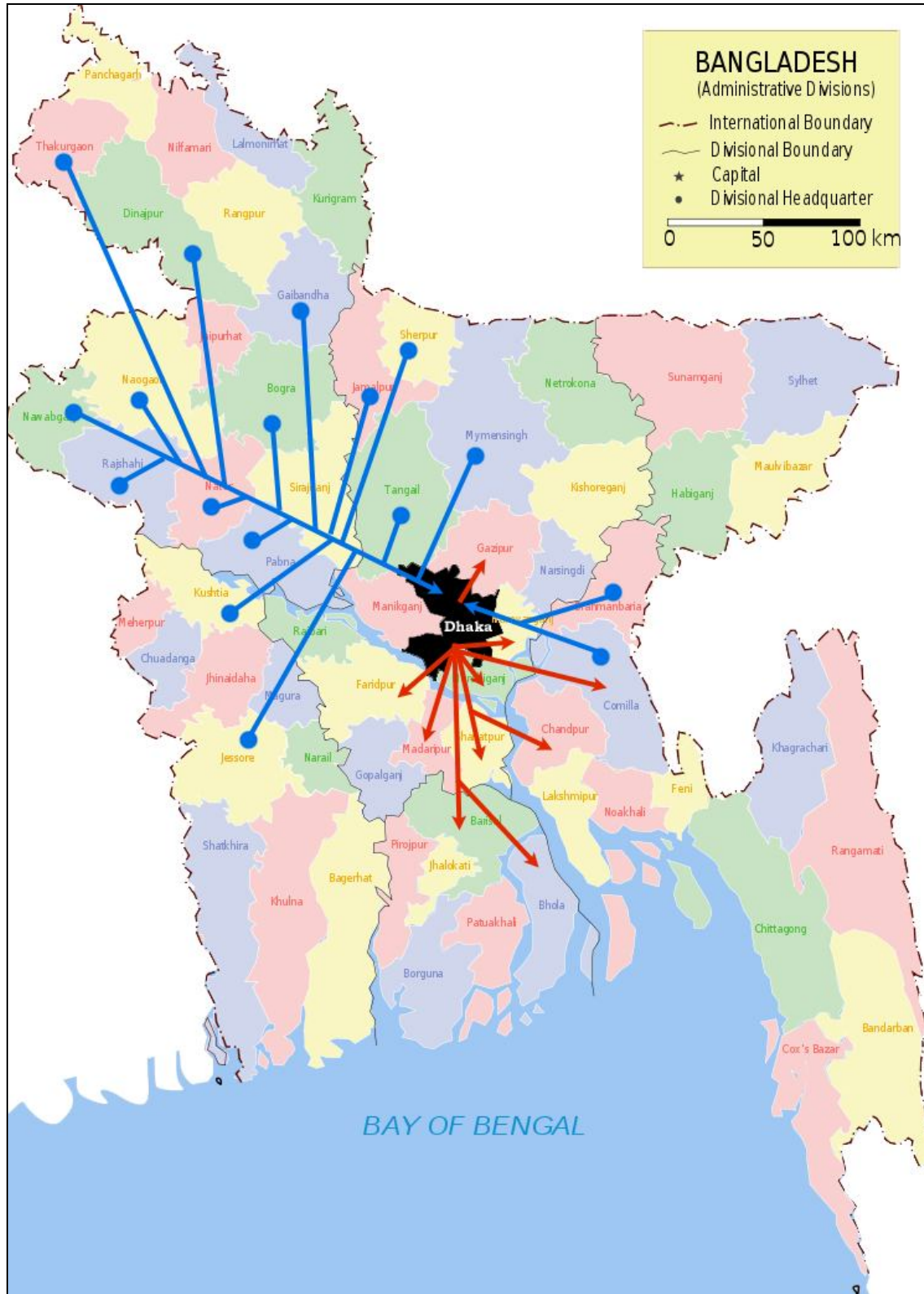
*Note: Blue arrow indicates source areas, and red arrow indicates destination areas.*

FIGURE 3  
Major sources and destinations of supply of rice in the district of Chittagong



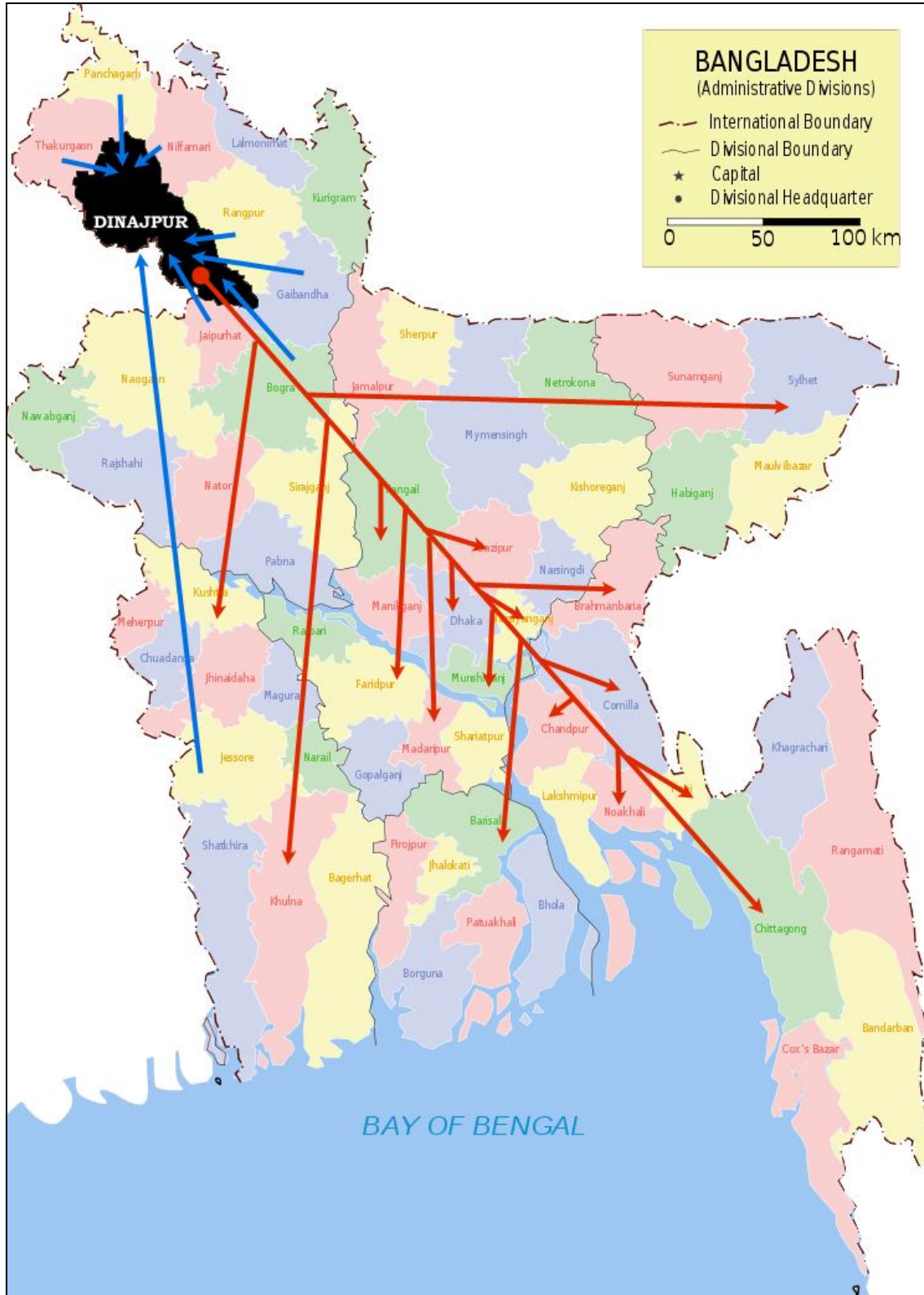
*Note: Blue arrow indicates source areas, and red arrow indicates destination areas.*

**FIGURE 4**  
**Major sources and destinations of supply of rice in the district of Dhaka**



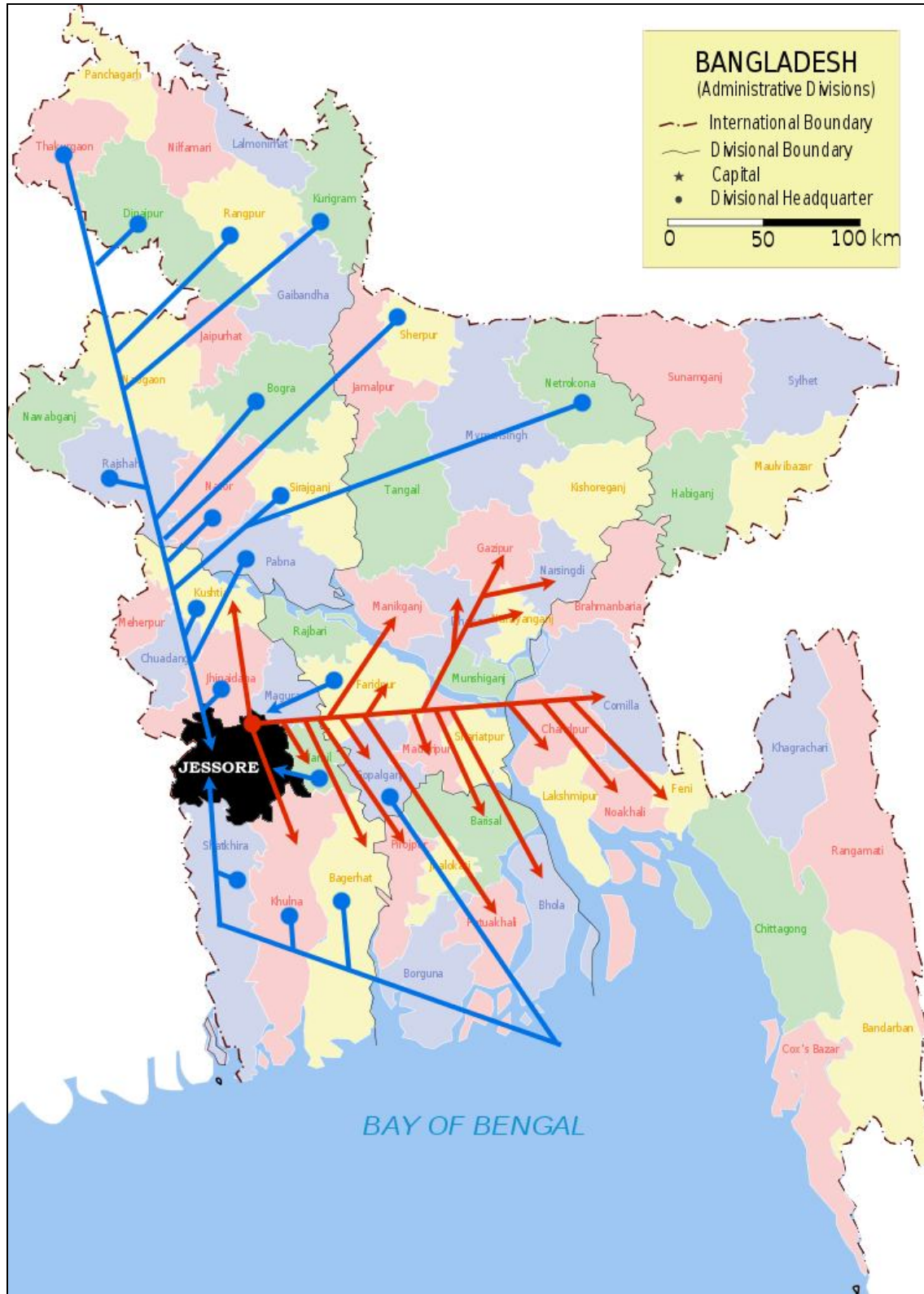
*Note: Blue arrow indicates source areas, and red arrow indicates destination areas.*

FIGURE 5  
Major sources and destinations of supply rice in the district of Dinajpur



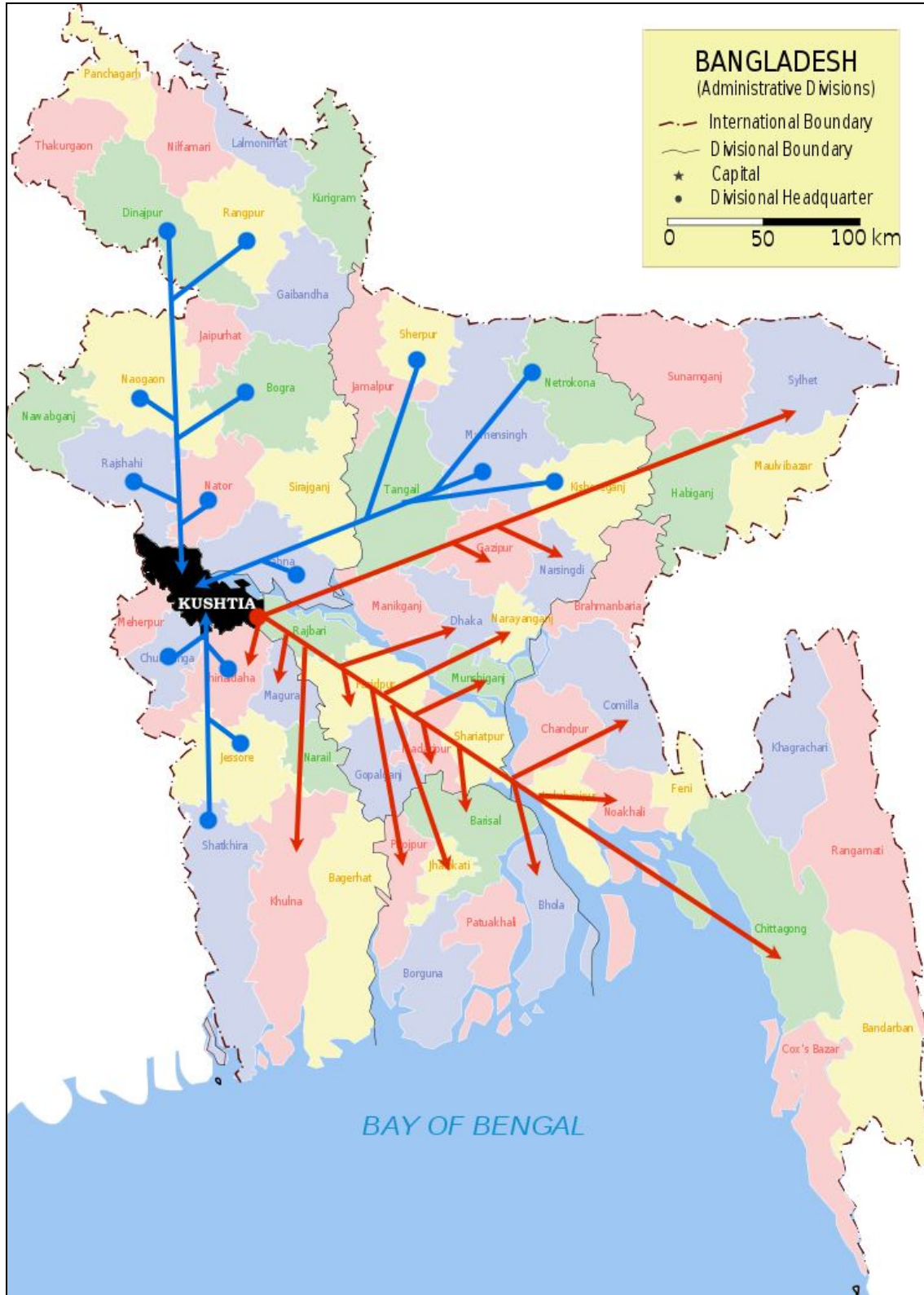
*Note: Blue arrow indicates source areas, and red arrow indicates destination areas*

FIGURE 6  
Major sources and destinations of supply of rice in the district of Jessore



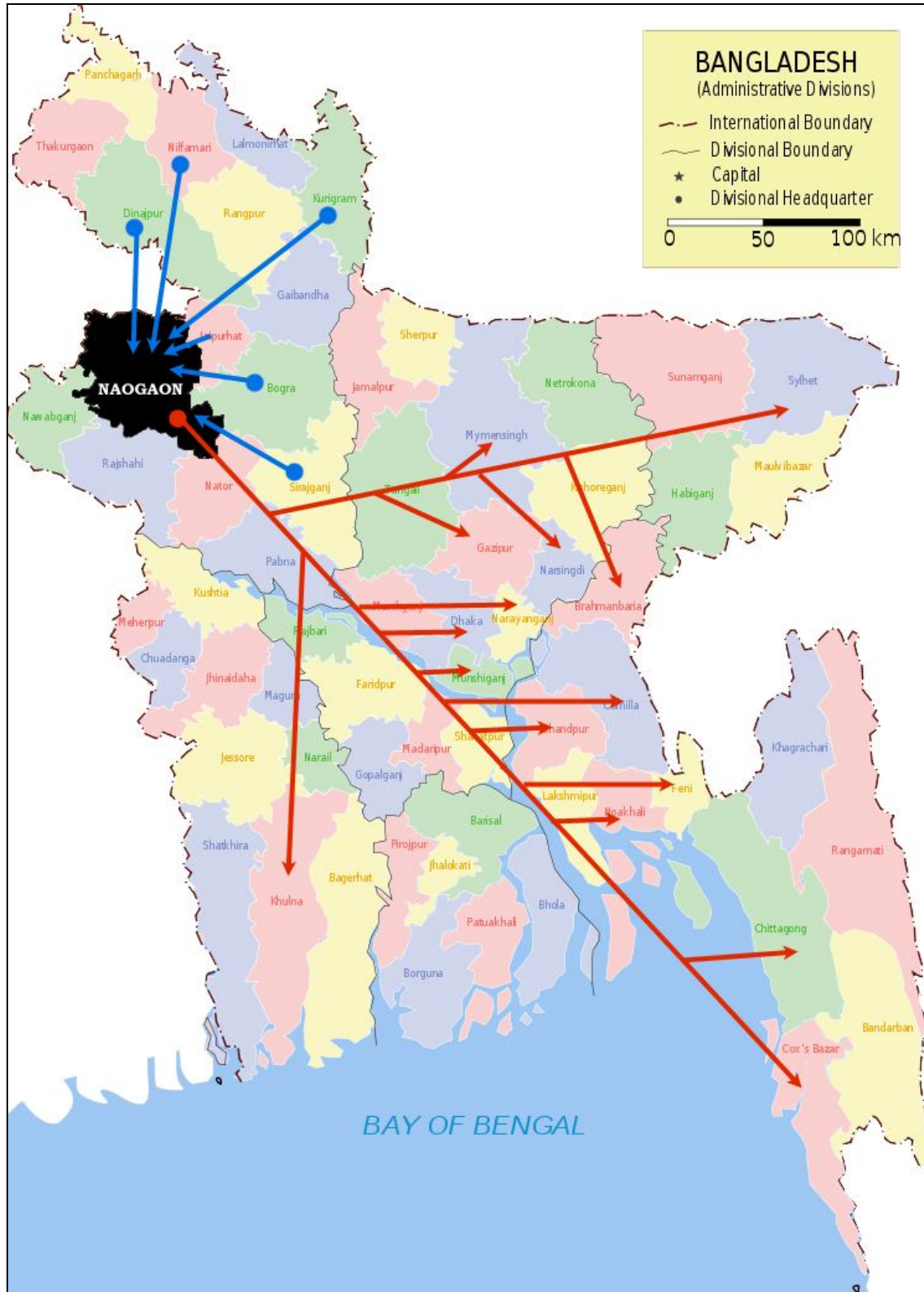
*Note: Blue arrow indicates source areas, and red arrow indicates destination areas*

FIGURE 7  
Major sources and destinations of supply of rice in the district of Kushtia



Note: Blue arrow indicates source areas, and red arrow indicates destination areas

**FIGURE 8**  
**Major sources and destinations of supply in the district of Naogaon**



*Note: Blue arrow indicates source areas, and red arrow indicates destination areas*

**FIGURE 9**  
**Price Movements of Enterprises across the Country for BR 28 Rice, 2010-11**

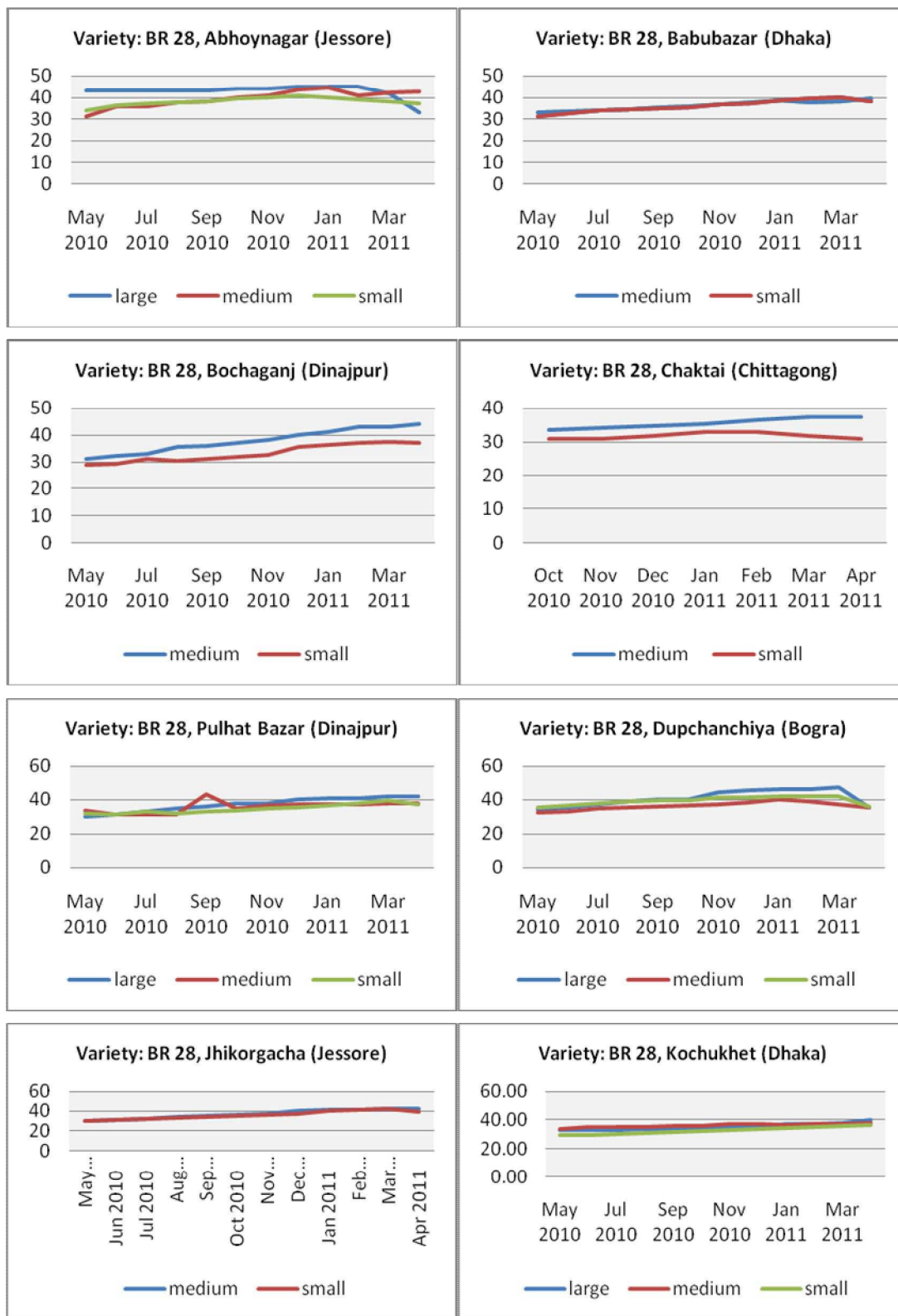




FIGURE 10  
**Price Movements of Enterprises across the Country for BR 28 Rice, 2010-11(Continued)**



FIGURE 11  
Trend of Aman – Coarse (Real and Nominal)

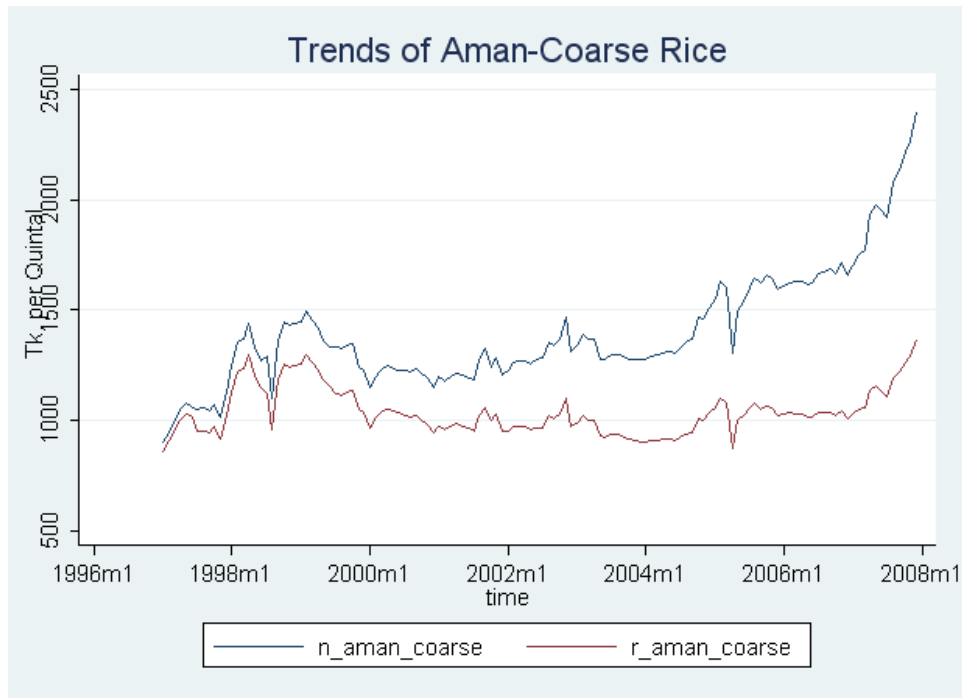


FIGURE 12  
Trend of Aman – Medium (Real and Nominal)

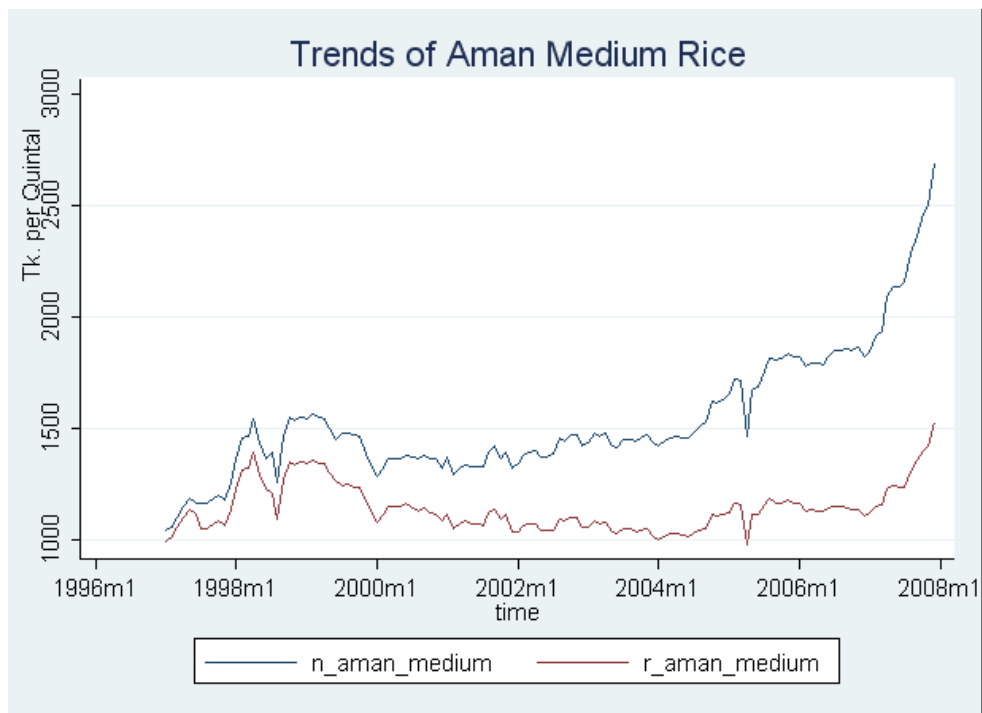


FIGURE 13  
Trend of Aman – HYV (Real and Nominal)

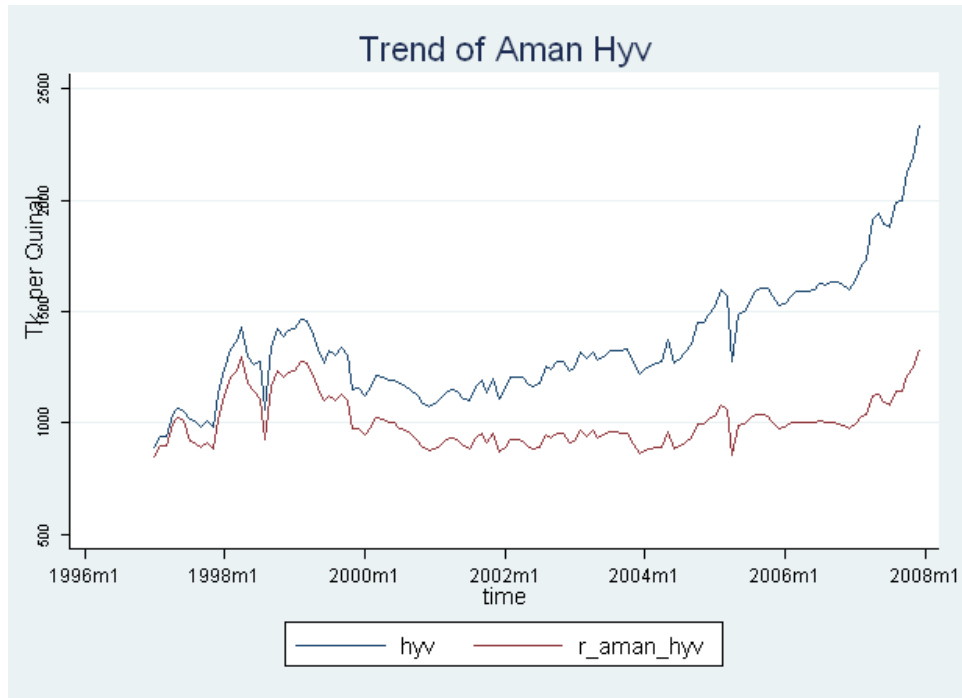


FIGURE 14  
Trend of Aus – Local (Real and Nominal)

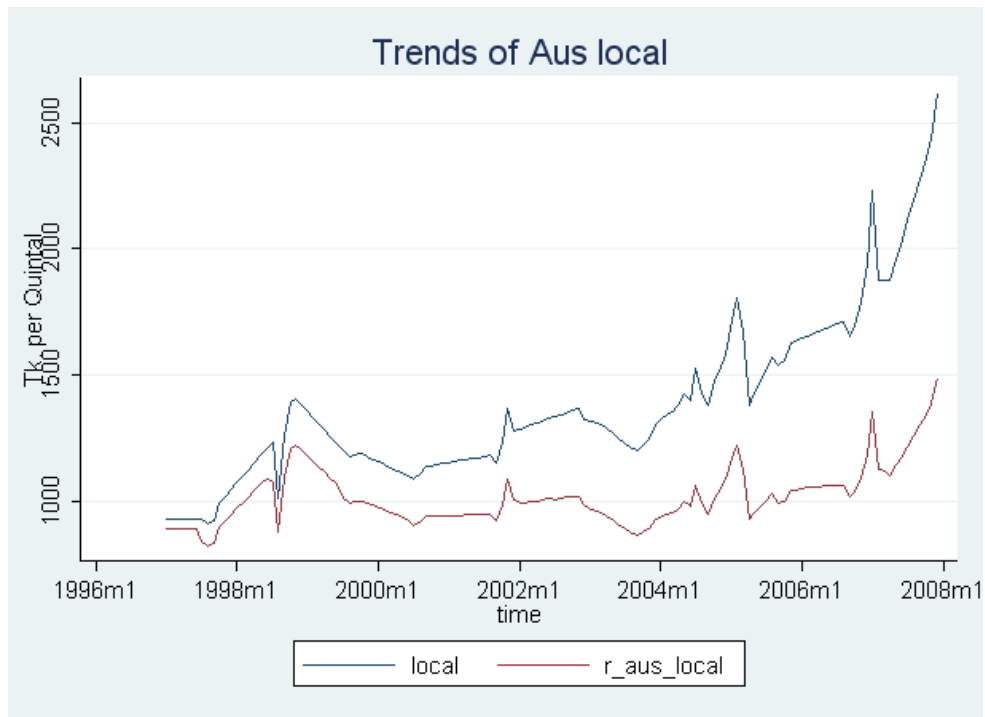


FIGURE 15  
Trend of *Aus* – HYV (Real and Nominal)

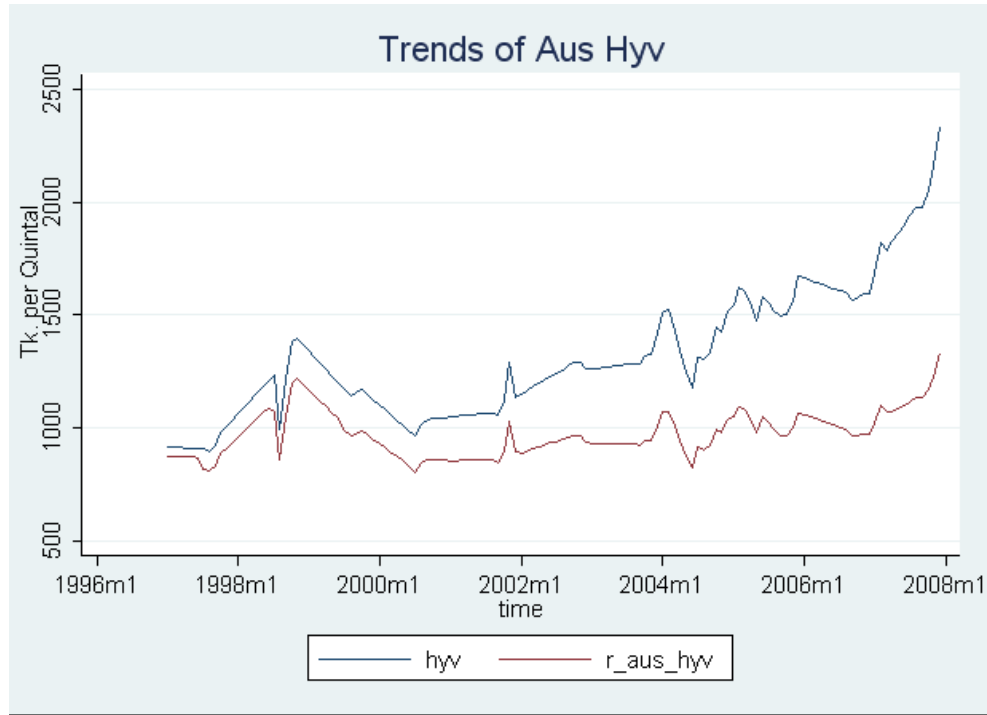


FIGURE 16  
Trend of *Boro* – Local (Real and Nominal)

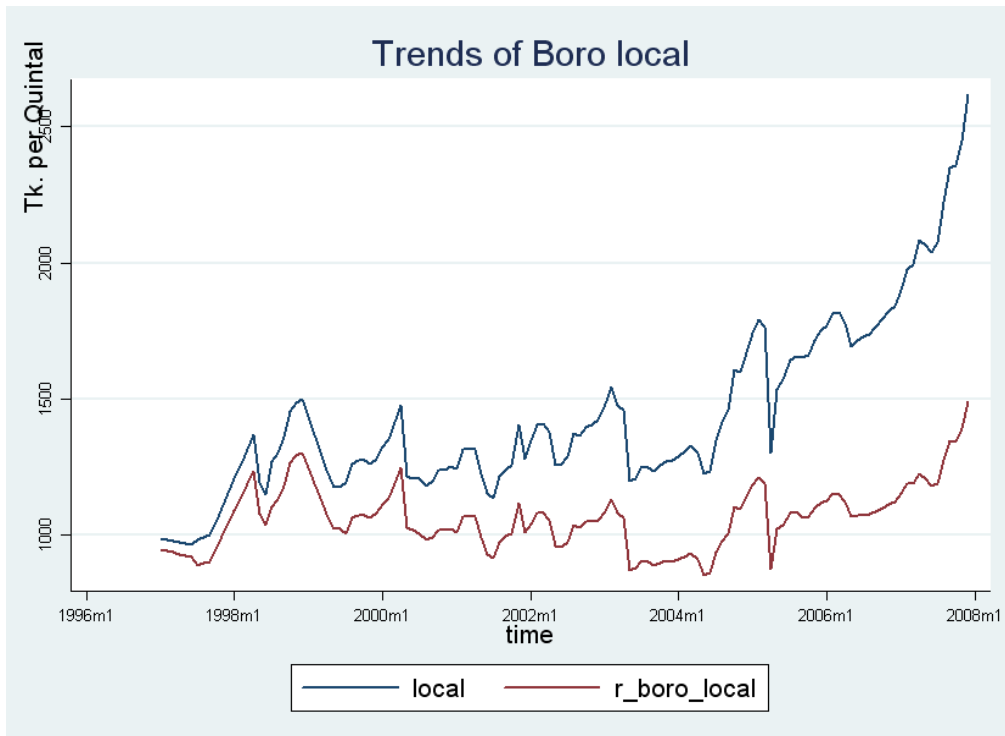


FIGURE 17  
Trend of Boro - HYV (Real and Nominal)

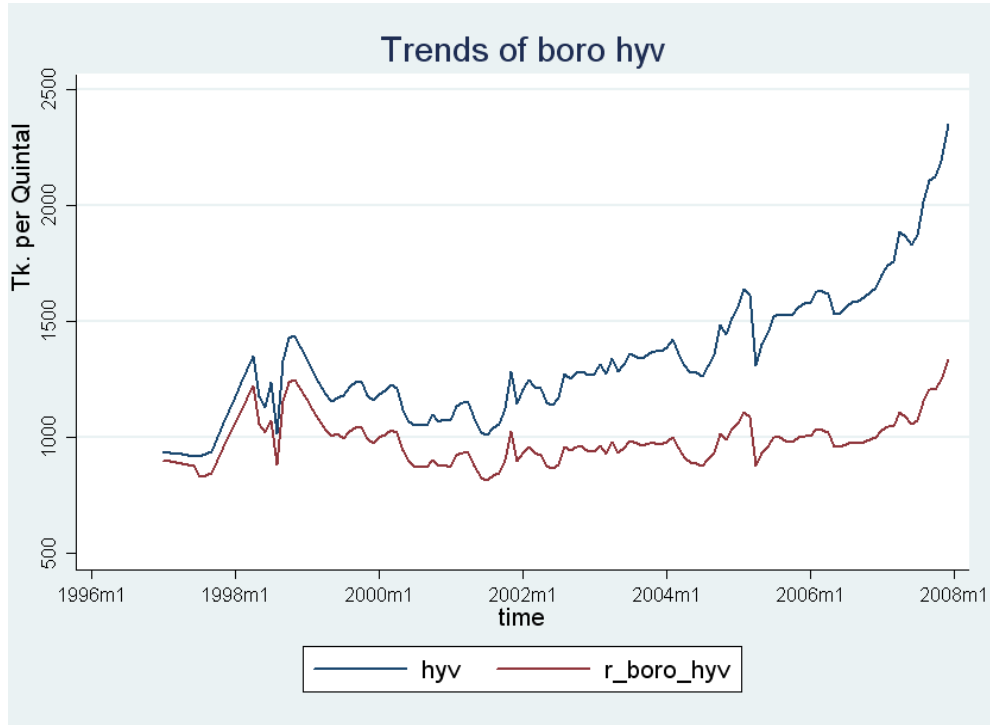


FIGURE 18  
Trend of Thai 5% Broken (Real and Nominal)

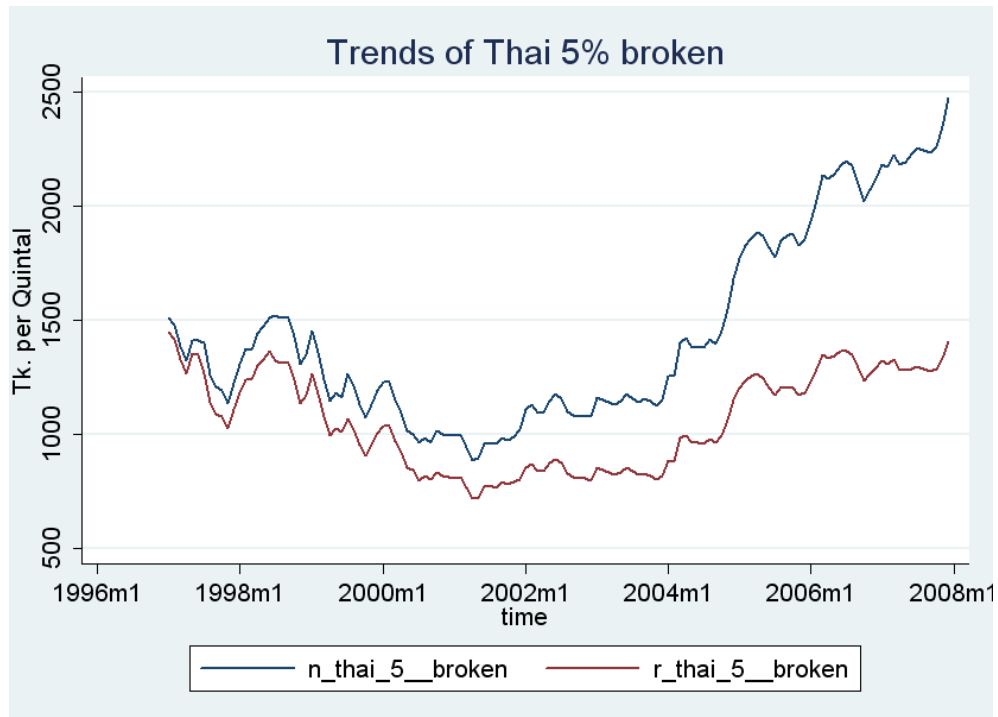


FIGURE 19  
Trend of Thai 5% Parboiled (Real and Nominal)

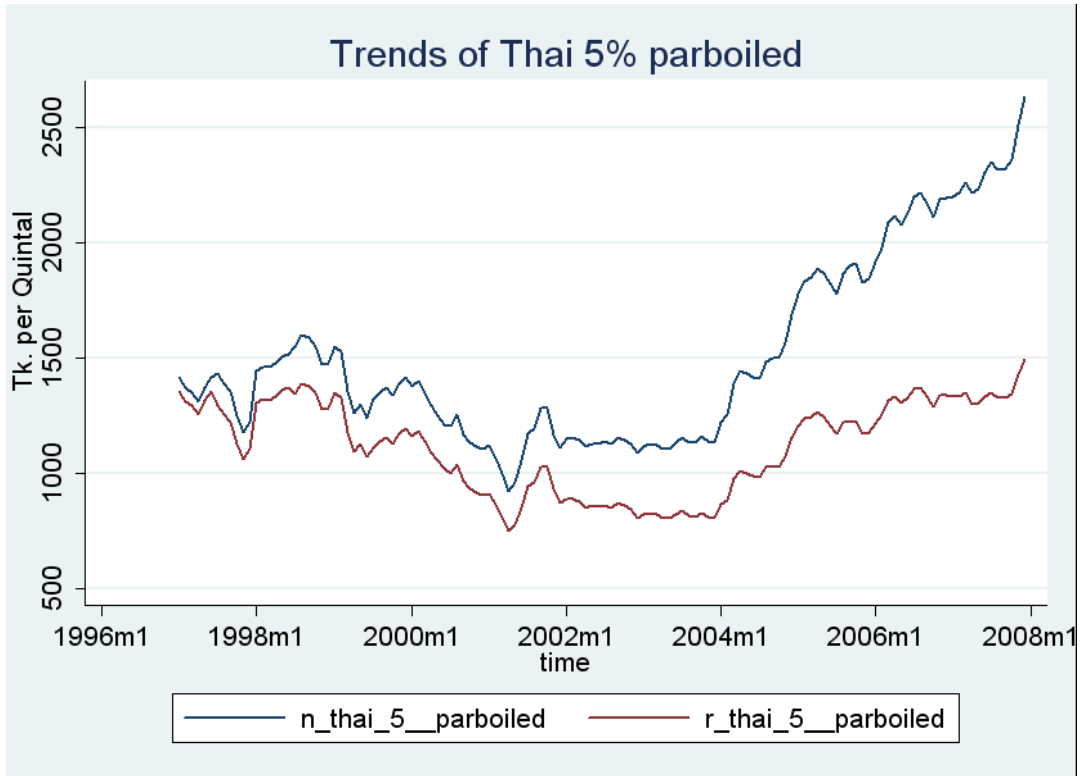


FIGURE 20  
Trend of Thai 25% (Real and Nominal)



FIGURE 21  
Trend of Indian 25% (Real and Nominal)

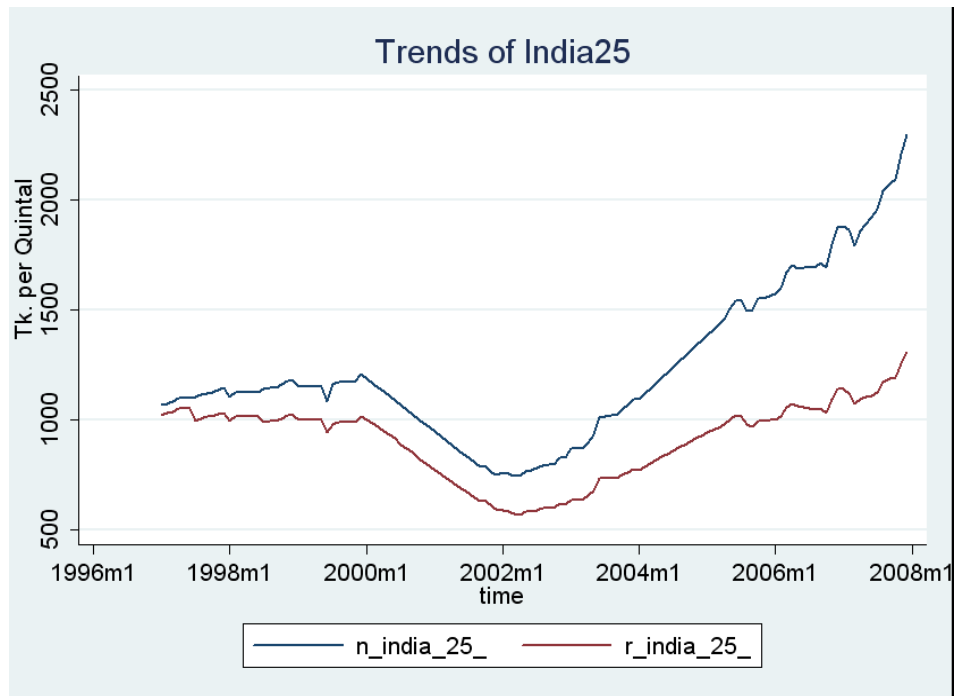
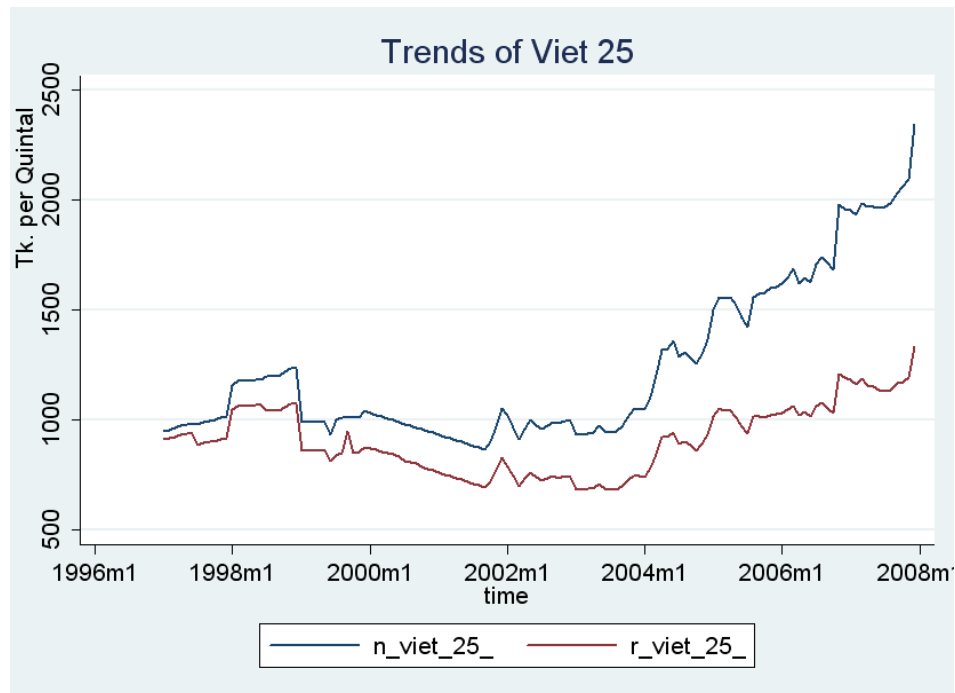


FIGURE 22  
Trend of Vietnamese 25% (Real and Nominal)



APPENDIX 2  
ECONOMETRIC TEST RESULTS

TABLE 13  
OLS Regression of Reported Monthly Profit

<i>Dependent Variable</i>			
Lnmonthlyprofit	natural log of monthly profit reported by the enterprise		
<i>Independent Variables</i>			
noofenter	number of enterprises (in the rice market)		
large	dummy for "large" enterprises		
medium	dummy for "medium" enterprises		
storton	storage capacity of the enterprise (in tons)		
yrsofop	years of operation of the enterprise		
totnostaff	total number of staff of the enterprise		
nconmillers	number of millers as business contacts of the enterprise		
bogra	dummy for Bogra area markets		
chittagong	dummy for enterprises in Chittagong area		
dinajpur	dummy for enterprises in Dinajpur area		
jessore	dummy for enterprises in Jessore area		
kushtia	dummy for enterprises in Kushtia area		
naogaon	dummy for enterprises in Naogaon area		
<u>Variable</u>	<u>Estimated Coefficients</u>	<u>Heteroskedasticity- Robust Standard Error</u>	<u>p-value</u>
noofenter	- 0.00	0.00	0.58
large***	1.60	0.54	0.00
medium***	0.63	0.21	0.00
storton	0.00	0.00	0.12
yrsofop	0.00	0.01	0.95
totnostaff	- 0.02	0.03	0.49
nconmiller	0.00	0.00	0.49
bogra	- 0.40	0.44	0.37
chittagong	0.05	0.22	0.82



dinajpur	0.08	0.33	0.81
jessore	0.41	0.48	0.40
kushtia***	1.95	0.58	0.00
naogaon	- 0.69	0.89	0.45
constant***	12.77	0.42	0.00

Number of Observations= 113;

F(13,99)= 6.36

Prob>F= 0.00

R-Squared= 0.51

Root MSE= 0.91

Joint Significance Tests:

*Null Hypothesis of All Locations Equal to Zero:*

F(6,99)= 2.58

Prob>F= 0.02

*Null Hypothesis of Large And Medium Equal to Zero:*

F(2,99)= 7.43

Prob>F= 0.00

---

Note. \*\*\* implies significance at 1% level, \*\* implies significance at 5% level and

\* implies significance at 10% level.

**TABLE 14**  
**ADF Test Results**

Variables	Level/ First Difference	Augmented Dickey-Fuller		Conclusion
		(ADF) Test Statistic**		
		<i>Without Trend</i>	<i>With Trend</i>	
Aman-Coarse	Level	-2.471 (0)	-2.45 (0)	I (1)
	First Difference	-12.426 (0)*	-12.394 (0)*	
Aman-Medium	Level	-1.483 (0)	-1.433 (0)	I (1)
	First Difference	-11.514(0)*	-11.515 (0)*	
Aman-HYV	Level	-2.454 (0)	-2.427 (0)	I (1)
	First Difference	-12.331 (0)*	-12.305 (0)*	
Aus-Local	Level	-1.50 (0)	-2.103 (0)	I (1)
	First Difference	-11.087(0)*	-11.099 (0)*	
Aus-HYV	Level	-1.707 (0)	-2.134(0)	I (1)
	First Difference	-10.625 (0)*	-10.625 (0)*	
Boro-Local	Level	-2.136 (0)	-2.361(0)	I (1)
	First Difference	-11.287 (0)*	-11.277 (0)*	
Boro HYV	Level	-2.43 (0)	--2.588 (0)	I (1)
	First Difference	-12.172 (0)*	-12.162 (0)*	
<b>International Varieties</b>				
Thai 5% Broken	Level	-1.24(0)	-1.638(0)	I (1)
	First Difference	-8.151(0)*	-8.403 (0)*	
Thai 5% Parboiled	Level	-0.94(0)	-1.002(0)	I (1)
	First Difference	-8.038 (0)*	-8.180 (0)*	
Thai 25%	Level	0.070 (0)	-0.587(0)	I (1)
	First Difference	-9.267 (0)*	-9.603 (0)*	
India 25%	Level	0.645(0)	0.394 (0)	I (1)
	First Difference	-7.550(0)*	-8.248 (0)*	
Viet 25%	Level	-0.447(0)	-0.946 (0)	I (1)
	First Difference	-10.355 (0)*	-10.497 (0)*	

Note:

In ADF tests, optimum lag lengths, shown in parentheses in the test statistics column.

\*\* denote significant at 5 percent level.

All regression estimations and test results are obtained by using STATA 10.0 econometric software.

\*\* MacKinnon approximate p-value are used for test statistics.

TABLE 15  
Johansen Cointegration Test Results

Test Variables	Null Hypothesis	Alternative	Trace Test		Maximal Eigen Value Test	
			Statistics	5% critical value	Statistics	5% critical value
<b>Aman Coarse Vs</b>						
Thai 5% Broken	$r=0$	$r=1$	15.76*	15.41	14.46*	14.07
	$r \leq 1$	$r=2$	1	3.76	1	3.76
Thai 5% Parboiled	$r=0$	$r=1$	12.72	15.41	11.85	14.07
	$r \leq 1$	$r=2$	0.87	3.76	0.87	3.76
Thai 25%	$r=0$	$r=1$	15.15*	15.41	13.17*	14.07
	$r \leq 1$	$r=2$	1.98	3.76	1.98	3.76
India 25%	$r=0$	$r=1$	18.23*	15.41	16.91*	14.07
	$r \leq 1$	$r=2$	1.32	3.76	1.32	3.76
Viet 25%	$r=0$	$r=1$	18.31*	15.41	17.16*	14.07
	$r \leq 1$	$r=2$	1.15	3.76	1.15	3.76
<b>Aman-Medium Vs</b>						
Thai 5% Broken	$r=0$	$r=1$	17.44*	15.41	15.42*	14.07
	$r \leq 1$	$r=2$	2.02	3.76	2.02	3.76
Thai 5% Parboiled	$r=0$	$r=1$	12.87	15.41	10.07	14.07
	$r \leq 1$	$r=2$	2.8	3.76	2.8	3.76
Thai 25%	$r=0$	$r=1$	15.50*	15.41	12.05	14.07
	$r \leq 1$	$r=2$	3.45	3.76	3.45	3.76
India 25%	$r=0$	$r=1$	17.34*	15.41	17.31*	14.07
	$r \leq 1$	$r=2$	0.03	3.76	0.03	3.76
Viet 25%	$r=0$	$r=1$	16.59*	15.41	14.49*	14.07
	$r \leq 1$	$r=2$	2.1	3.76	2.1	3.76
<b>Aman-HYV Vs</b>						
Thai 5% Broken	$r=0$	$r=1$	17.49*	15.41	16.37*	14.07
	$r \leq 1$	$r=2$	1.12	3.76	1.12	3.76
Thai 5% Parboiled	$r=0$	$r=1$	13.76	15.41	11.97	14.07
	$r \leq 1$	$r=2$	1.79	3.76	1.79	3.76
Thai 25%	$r=0$	$r=1$	15.03	15.41	11.77	14.07
	$r \leq 1$	$r=2$	3.26	3.76	3.26	3.76
India 25%	$r=0$	$r=1$	21.67*	15.41	20.00*	14.07
	$r \leq 1$	$r=2$	1.67	3.76	1.67	3.76
Viet 25%	$r=0$	$r=1$	19.04*	15.41	17.02*	14.07
	$r \leq 1$	$r=2$	2.02	3.76	2.02	3.76
<b>Aus-Local</b>						
Thai 5% Broken	$r=0$	$r=1$	10.62	15.41	9.39	14.07
	$r \leq 1$	$r=2$	1.22	3.76	1.22	3.76
Thai 5% Parboiled	$r=0$	$r=1$	9.92	15.41	8.45	14.07
	$r \leq 1$	$r=2$	1.48	3.76	1.48	3.76

Thai 25%	$r=0$	$r=1$	12.29	15.41	9.66	14.07
	$r \leq 1$	$r=2$	2.64	3.76	2.64	3.76
India 25%	$r=0$	$r=1$	13.9	15.41	13.8	14.07
	$r \leq 1$	$r=2$	0.097	3.76	0.097	3.76
Viet 25%	$r=0$	$r=1$	12.35	15.41	10.76	14.07
	$r \leq 1$	$r=2$	1.58	3.76	1.58	3.76
<b>Aus-HYV</b>						
Thai 5% Broken	$r=0$	$r=1$	12.86	15.41	11.99	14.07
	$r \leq 1$	$r=2$	0.87	3.76	0.87	3.76
Thai 5% Parboiled	$r=0$	$r=1$	11.09	15.41	10.19	14.07
	$r \leq 1$	$r=2$	0.89	3.76	0.89	3.76
Thai 25%	$r=0$	$r=1$	13.93	15.41	11.33	14.07
	$r \leq 1$	$r=2$	2.6	3.76	2.6	3.76
India 25%	$r=0$	$r=1$	17.94*	15.41	16.48*	14.07
	$r \leq 1$	$r=2$	1.46	3.76	1.46	3.76
Viet 25%	$r=0$	$r=1$	12.29	15.41	10.14	14.07
	$r \leq 1$	$r=2$	2.14	3.76	2.14	3.76
<b>Boro-Local</b>						
Thai 5% Broken	$r=0$	$r=1$	12.22	15.41	11.9	14.07
	$r \leq 1$	$r=2$	0.31	3.76	0.31	3.76
Thai 5% Parboiled	$r=0$	$r=1$	11.42	15.41	10.59	14.07
	$r \leq 1$	$r=2$	0.82	3.76	0.82	3.76
Thai 25%	$r=0$	$r=1$	13.03	15.41	11.07	14.07
	$r \leq 1$	$r=2$	1.98	3.76	1.98	3.76
India 25%	$r=0$	$r=1$	15.41*	15.41	14.83*	14.07
	$r \leq 1$	$r=2$	0.58	3.76	0.58	3.76
Viet 25%	$r=0$	$r=1$	13.6	15.41	13.13	14.07
	$r \leq 1$	$r=2$	0.48	3.76	0.48	3.76
<b>Boro-HYV</b>						
Thai 5% Broken	$r=0$	$r=1$	13.11	15.41	12.95	14.07
	$r \leq 1$	$r=2$	0.15	3.76	0.15	3.76
Thai 5% Parboiled	$r=0$	$r=1$	11.6	15.41	10.59	14.07
	$r \leq 1$	$r=2$	1.01	3.76	1.01	3.76
Thai 25%	$r=0$	$r=1$	14.96	15.41	11.96	14.07
	$r \leq 1$	$r=2$	2.99	3.76	2.99	3.76
India 25%	$r=0$	$r=1$	17.49*	15.41	16.36*	14.07
	$r \leq 1$	$r=2$	1.12	3.76	1.12	3.76
Viet 25%	$r=0$	$r=1$	14.92	15.41	12.57	14.07
	$r \leq 1$	$r=2$	2.34	3.76	2.3	3.76

*Note: 'r' implies the number of cointegrating vectors*

*\* reject null hypothesis at 5% level of significance.*

*Osterwald-Lenum Critical values are used for test statistics*



## Biography



Minhaj Mahmud is currently a research fellow at the Bangladesh Institute of Development Studies (BIDS), Dhaka. Dr Mahmud received his PhD in Economics from the University of Gothenburg, Sweden in 2005 and MA in Economics from the University of Manitoba, Canada in 1999. Dr Mahmud has taught at Keele University and Queens University Belfast in the UK and Jahangirnagar University and BRAC University in Bangladesh. He held visiting positions at Jawaharlal Nehru University, India and University of Gothenburg in Sweden. He has publications in highly reputed journals such as *Journal of Economic Behavior and Organization*, *Economics Letters*, *Economica*, *Health Economics*, and *Plos One*. He has been a consultant to the ICDDR.B, Dhaka in its various projects on water and sanitation. He has recently authored a background paper on Governance Issues for the Sixth Five Year Plan (2011-2015) of the Government of Bangladesh.



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