Rice Market in Bangladesh: Role of Key Intermediaries

BIDS Research Almanac 2019, Dhaka

Nazneen Ahmed
Mainul Hoque
Nahian Azad Shashi
Background

- Rice is important, both for economic and cultural reasons
  - Key agricultural crop
    - 70-80% of agricultural land area
    - 4th Largest producer in the world
  - Staple food
    - 50-60% of the daily calorie comes from rice
    - Self-sufficient, surplus producer
- Major source of rural employment
  - 45% of rural labor force
- Price hike for rice is politically sensitive
- Large public sector involvement in terms of rice distribution
- Rice price exhibit occasional volatility
- Why does rice price vary despite considerable govt. role, stable production and almost insulated domestic market
  - Is there any distortion in the rice market?
  - Any anticompetitive behavior by traders?
- Understanding the rice value chain to identify role of different actors in the paddy-to-rice market is pertinent
Outline of the Study

• Background of Rice Market in Bangladesh
  • Demand- Production-Import of Rice
• Identifying Supply Chain: Understanding role of Different Actors
• Trends in wholesale and retail Price
• Review the Key Indicators of Competition in the Market
• Identify the Key Intermediaries
• Review the existing laws/regulations
• Role of different actors through the lenses of competitive environment
Data and Methodology

- Exploit Secondary Sources of Information
  - Agricultural Statistical Yearbook & HIES from BBS
  - Bangladesh Bank
  - COMTRADE database from United Nations
  - Food Policy and Monitoring Unit, Ministry of Food
  - Department of Agricultural Marketing
  - Recent studies on rice value chain in Bangladesh

- Interviewing Actors in rice supply chain
  - Mainly Actors at Intermediate Stages

- Focus Group Discussion with Trader’s Association

- Mixed Method for analyzing the data

- Indicators on Competition and market efficiency based on literature
  • Market integration by cointegration technique on time-series of national and regional prices
    - Tests are performed between retail and wholesale prices on monthly price data
    - Both for within district retail and wholesale prices as well as cross-district wholesale prices.
    - Cross-district pair determined by the matrix of top growing districts & top consumption district.
Coverage of KII

- Total 88 traders
  - Four Major Rice growing Districts
  - Four major rice markets in Dhaka: Badamtol Babubazar, Kawran Bazar Mohammad Krishi Market, Cantonment Kochukhet Bazar

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- Set of instruments developed to elicit information from enterprises on firm and market related questions including ownership, experience in trading, capital investment amount, assets, trading relationship with other agents in the supply chain (from whom they buy and sell to), number of traders in the market, proportion of large enterprises in the market, information flow, knowledge level, pricing decisions, membership in trading association and political affiliation etc.
Rice Production

- Rice is cultivated in almost all districts of Bangladesh, major share of production is concentrated in few districts.
- It is noted that both for boro and aman varieties Mymensing, Noagaon, Dinajpur and Bogra are among the top 4 districts. Aus is mainly produced in Comilla, Noagaon, Sylhet and Bhola districts.
- *Boro* and *Aman* varieties constitute 91% of rice production.
Top rice exporting countries are India, Thailand, Vietnam, Pakistan, USA, & China. Bangladesh exports very small amount.
Yearly Domestic Production, Demand, Export, and Import

Demand for rice in a particular year = (domestic production + import of Rice - export of Rice).

<table>
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<tr>
<th>Year</th>
<th>Rice production</th>
<th>Rice Import</th>
<th>Total supply of Rice (Production + Import)</th>
<th>Share Of Domestic production in total supply (%)</th>
<th>Share of Import in Total supply (%)</th>
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- Share of Import is less than 1-2%
- Import is mainly drawn from India (75-88%), Myanmar and Thailand
- Export is very low: Export mainly includes government to government export and export of aromatic rice.
- Demand estimate based on per capita consumption falls in the range of 25.4-34 million ton
Price trend analysis gives a broad picture on how different types of prices change over time which can be related to major events and shock to understand the potential factors and causes.

In this analysis, the movement of monthly wholesale and retail prices are presented for three different quality types of rice- fine, medium and coarse.

Although different varieties of paddies are available in the markets, due to processing the final products are mainly of three types: fine, medium, and coarse.

In addition to the retail and wholesale prices, the retail-wholesale price gap as percentage of retail price is also included in all of the graphical analysis.

In a competitive and efficient market, retail and wholesale prices should move together, and the gap between retail and wholesale prices should remain largely constant over time.

If market is efficient, no arbitrage condition would allow only the transaction cost as gap between the retail and wholesale price.

- If too much variation in the price gap is observed without any knowing evidence of changes in transport or trade policy, it would be suggestive of further investigation.
Price Movement, National Level Price

Price varies with the change in aggregate production, seasonality, natural disasters.
Price Movement, Regional Level Price

Fine quality rice, Dhaka

Coarse quality rice, Dhaka

Coarse quality rice, Chattagram

Coarse quality rice, Mymensingh
Huge Government Effort to stabilize rice price: Month-wise Closing Public Stock of Rice and Price

Price of rice is negatively associated with stock of rice in PFDS, consistently across quality of rice

Source: Various Issues of Bangladesh Food Situation Report, FPMU
# How Integrated is the Rice Market in Bangladesh?

## Horizontal Cointegration: Between Wholesale Price in Consumption District and Wholesale price in Growing District, **Coarse Rice**

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**Note:** YES indicates that two series are cointegrated while NO indicates that the series are not co-integrated. Districts in the first column are divisional districts while districts in the row are rice growing regions.
Horizontal Cointegration: Between Wholesale Price in Consumption District and Wholesale price in Growing District, Medium Rice

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Horizontal Cointegration: Between Wholesale Price in Consumption District and Wholesale price in Growing District, Fine Rice

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Findings from the time series analysis

- Natural disaster and unexpected price shocks often create upheaval to destabilize the market for a short period of time.
- Some regular price variability is observed due to seasonality.
- Cross-district Co-integration analysis shows that prices between growing region and consumption regions are cointegrated.
- Time series analysis of prices that basically examine co-movement of prices across space and across vertical stages (Ravallion 1986; Baluch, 1997; Barrett, 2001) is an indirect measure because two prices may move for spurious reasons as well.
  - If prices between two regions are different that price gap should be because of transportation cost and high transfer costs.
  - A larger price gap implies arbitrage opportunity. if two markets are integrated, any arbitrage opportunity is rapidly wiped out, it may indirectly indicate strong traders’ competition.
  - Two markets may not be integrated probably because of not-profitable arbitrage opportunity. Natural barriers, such as remoteness of an area make trade between the regions prohibitively costly.
- In a few pair of districts, the missing cointegration probably suggests non-existence of trade due to high transaction costs to make the trade profitable.
The dominant rice value chain is the traditional one in which the millers produce rice for the bulk market. The flow of rice to consumers takes place through the market intermediaries or different value chain actors, such as farias, beparis, millers, aratdars, commission agents, wholesalers and retailers.
Actor Specific Conducts in the rice Supply Chain

**Functions**
- Input supply
- Production
- Collection
- Processing
- Wholesale/retail
- Consumption

**Actors**
- Seed and Fertilizer suppliers
- Farmers
- Aratdars/Bepari/Faria/commission agent
- Millers
- Wholesalers/Retailers
- Consumers

**Activities**
- Seed collection and supply, fertilizer supply.
- Growing crops
- Harvesting
- Drying
- Threshing.
- Paddy collection and selling
- Rice trading and storage
- Appointing a representative (to monitor market or collect credit amounts, take orders, build communication between millers and wholesalers.
- Purchase from Farmers/millers
  - Storage
  - Grading
  - Selling
  - Taking orders from wholesalers
- Wholesaling
  - Retailing
- Consumption
Actors in the supply chain

• **Faria**: Faria operate in local village markets procuring supplies from growers in the market or at the farm gate and selling to beparis in the same market or to local aratdars. The dominant mode for farias to sell to beparis within the village market. A faria has no fixed premises.

• **Bepari**: A bepari trades long distance collecting from farias and growers in a village market, carrying out some sorting, grading and bulking and connecting to an aratdar generally located in a larger market some distance away. Like the faria, the bepari is also an itinerant trader.

• **Aratdar**: An aratdar is a broker or a commission agent who connects sellers (beparis) with buyers (other beparis, millers or processors, paikars or even retailers). A fixed commission is charged from both buyers and sellers so that the main goal of an aratdar is to have a high turnover. Besides brokerage role, Aratdar is known to wear other hats as well, combining direct (speculative) trading and wholesaling in addition. The aratdar is really the central actor in the market playing the all-important role of enabling stranger-transactions, creating trust, and in general, supporting credible contracts to be entered into and leading to repeat transactions. The aratdar is the ultimate guarantor in an exchange; without whom the local village markets would remain unintegrated.

• **Millers** (Auto, Chatal, Halar): Bridging between downstream of paddy and upstream of rice

• **Rice Aratdars/Rice whole sellers**: Procure Rice from Millers and sell to retailers

• **Retailer**: Procures supplies from a wholesalers
Faria/Bepari: plays major role in the upstream in moving paddy from farmers to Aratdars or millers

• In our rapid survey, Faria/Bepari directly buy from the farmers and sell either to the millers or Aratdars.
• Almost 2/3rd of them buy in credit and the repayment period is 2-7 days.
• Buy mostly from farmers (33.6, on average) in the neighborhood, with a significant transaction history (8.9 years, on average) with sellers.
• The peak season of the business spans around the harvesting periods and average storage capacity of this group of traders is 17.5 tons.
• The mean level of initial capital of the business was 0.1 million Taka while the mean level of current capital is 0.4 million Taka.
• While selling, it appears that the frequency of transaction between millers and Faria/Bepari is increasing overtime.
• They sell 50% of total sales at credit, with mean repayment period of 13 days.
Aratdar: establishes the linkage between stages in the upstream and millers

• Buy paddy from various sources: directly from farmers (100%), from Faria/Bepari (59%), and from other rice growing districts (6%).
  • 82% of the Aratdars procure from multiple sources.

• Sell mainly to millers located in the same districts and neighboring districts.

• Peak season of paddy collection is December and January (harvesting seasons for Aman variety), and in May, June, and July (harvesting seasons for Boro variety).

• Average age in business is 16.35 years.

• Approximately one-third of the respondents mentioned about membership in any association consisting of similar type of traders.

• Mean level of current capital of the enterprise is 1.7 million Taka while initial level of mean capital value stated as 0.4 million Taka.
  • Average share of bank loan in total capital is 8.5%.
• An average *Aratdar* transacts with 28 paddy sellers on average, with whom they have a mean level of transaction history for 9 years.

• On average, they sell to 9 buyers.
  • The transaction history with buyers is also quite long - one third of the buyers (32.07%) transact for >5 years while 46.04% transact for a period of 3-5 years.

• Evidence of credit transaction is more prevalent at the time of purchase (82.4%) compared to sales (58.5%).
  • Repayment period for credit transaction varies in the range of 2-30 days.

• By legal restriction (the Hoarding Act), maximum allowable storage of paddy at the “*Aratdar*” level is 300 metric tons.
  • Mean level of storage capacity for the relevant respondents in our sample is 38.7 tons with the maximum level reported at 160 tons
  • Compliant with the regulatory limit.
Auto Rice Millers: Characteristics

• Long history in the business. Average experience of the rice millers are 16 years, in the range of 4 to 39 years.

• The main by-product of rice mills are husk, bran, and broken rice. Out of each maund of paddy, a rice miller produces 24.4 kg of rice, 10.5 kg of husk, 2.5 kg of khud, and 2.6 kg of bran oil.

• The median milling capacity of the mills is 72 ton/day, in the range of 15-140 tons.

• Auto rice millers’ total investment lie in the range of 25-1500 million Taka with the mean of 570 million taka.
  • 50-90% percent of this investment is sourced from banks
  • Monthly working capital requirement in the range of 16 million in off-peak season to 37 million taka during peak season.
  • A miller with daily milling capacity of 100 mt of rice would require 40 to 50 million Taka as working capital.
  • For emergency operational cost need, most traders take short-term loan from bank.
Auto Rice Millers Characteristics II

- Millers transaction history with both buyers and sellers is quite long. With roughly 50% of them, millers have trading relationship for more than five years.

- 90 percent of the millers mention about credit sale.
  - On average, 64% of the total sale is transacted in credit and the repayment period extends in the range of 7-30 days.

- When millers sell to government, 80% of the transaction is in cash.

- Investment of the millers in maintaining the supply network in the downstream is considerable - 81% reveal that they have recruited agents for sales at large cities and district headquarters.

- Auto rice millers have membership in trading association. Very few (approximately 12%) hold any direct political affiliation.
  - Except one, all millers attend at least one meeting called by the association during last three months.
  - Approximately 53% of them meet in such meeting at least once in a month.
  - Evidence suggests that members meet quite frequently and help each other when adverse situation arises.
Millers’ Membership in Association and Types of Cooperation

- **Exchange Supply in Emergency Need**: 81% Yes, 19% No
- **Letting the other miller utilize excess/unutilized capacity in my mill**: 56% Yes, 44% No
- **Legal Aid**: 81% Yes, 19% No
- **Lending money in case of emergency**: 25% Yes, 75% No
- **Exchange Market Information**: 25% Yes, 75% No

**Source**: BIDS Rapid Survey, 2019
Monthly Pattern in Millers’ Purchasing and Milling Activity

- The rice millers mainly buy from the *Aratdar*
- Distribution of total yearly purchase and milling activity across months follow closely each other.
  - Peaks in such activity is observed during the month of June and July, right after the *Boro* harvest.
  - Slump during the month of October and November characterized as lean season.
- Share of purchase from Aratdar peaks in the harvesting months of two major cropping season
- During the slow-season, the proportion of purchase from *Aratdar* goes up.
Millers Milling Capacity and Legislative Restriction on Storage Limit

• Since millers conduct milling operation throughout the year, they procure paddy mostly during the harvest season when price is low and use those as inputs to continue milling activities for several months until the next harvest takes place.

• Widespread belief that millers store rice as a tool to make windfall gain through manipulation of market by creating shortage

• The government of Bangladesh enacted regulation on maximum storage practice for essential food grains.
  • The regulation basically states how much grain/food a trader can store and for how long.

• This storage act allows millers to store paddy and rice respectively in an equivalent amount to five times and twice of the mill’s fortnightly milling capacity.
  • The limit on days of storage for paddy is 30 days but 15 days for rice.

• From our rapid survey, a simple analysis based on millers’ maximum stated storage capacity and daily milling capacity is conducted to draw comparison on legally allowable limit on storage.
### Legislative Restriction on Storage Limit:

- **SRO No 113-Ayne/2011-Control of Essential Commodities Act, 1956.**

<table>
<thead>
<tr>
<th>Food grains</th>
<th>Automatic Millers</th>
<th>Limit to duration of Hoarding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>5 times the fortnightly capacity to mill</td>
<td>30 Days</td>
</tr>
<tr>
<td>Rice</td>
<td>2 times the fortnightly capacity to mill</td>
<td>15 Days</td>
</tr>
</tbody>
</table>

#### Storage Capacity of Millers and Correspondence with Legally Allowable Limit

- Based on our rapid survey of 16 medium scale millers.
- 12.5% of the millers have maximum storage capacity which is larger than the amount of paddy that they are legally allowed to store.
- If the storage capacity could be utilized for rice storage completely, 50% of the millers will have the capacity to store more rice than what they are legally allowed.
Millers distribution and milling capacity across the country indicate how densely they are located and if there is notably high concentration in any particular area.

Understanding his concentration ratio is critical since there is scope for geographic monopsony.

- If number of millers in certain growing area is low, actors in the further upstream would be geographically constrained to sell to that particular miller due to relatively high transaction cost involved in trading with millers located further away.

Concentration ratio of total 949 auto rice millers at the national level in terms of fortnightly milling capacity is calculated (Caveat: do not have actual production data, assuming a positive and proportional relationship between capacity and production)

- The top 4 millers capacity is 3% of all rice milled
- The comparable number for 8-firm and 16-firm concentration ratio is 4% and 8% respectively.
- For top 50 millers, the concentration ratio is still less than 20%.

The concentration ratio in the spatial dimension of administrative level is considered,

- Some evidence that large millers in Dhaka and Khulna may exhibit moderate level of market dominance.

Since the mobility of the milled rice across regions is common, higher concentration ratio of millers in certain region may have adverse implication on local actors in the upstream.
Auto Mills and Milling Capacity

Number of Auto Mills and Total Fortnightly Milling Capacity

- Barisal: 6899.8
- Chattagram: 37845.2
- Dhaka: 23821
- Khulna: 60562.5
- Mymensingh: 47613.5
- Rajshahi: 145870
- Rangpur: 85849.5
- Sylhet: 5870.9

Number of Auto Mills
Total Fortnightly Milling Capacity
National Level Milling Capacity - Understanding Concentration of Auto Rice Millers

<table>
<thead>
<tr>
<th>No of Millers</th>
<th>Total fortnightly milling Capacity</th>
<th>Share in Aggregate National Milling Capacity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 4 Millers</td>
<td>11648</td>
<td>3</td>
</tr>
<tr>
<td>Top 8 Millers</td>
<td>18552</td>
<td>4</td>
</tr>
<tr>
<td>Top 16 Millers</td>
<td>32465</td>
<td>8</td>
</tr>
<tr>
<td>Top 32 Millers</td>
<td>54100</td>
<td>13</td>
</tr>
<tr>
<td>Top 50 Millers</td>
<td>78686</td>
<td>19</td>
</tr>
</tbody>
</table>

Source: Ministry of Food, Government of Bangladesh.  
Fortnightly capacity is recorded in tons
Number of Auto Mills and Share of Top 4 Firms

- Chattagram: Number of Auto Mills = 6.2, Share of Top 4 Firms = 17
- Dhaka: Number of Auto Mills = 1, Share of Top 4 Firms = 1
- Khulna: Number of Auto Mills = 3, Share of Top 4 Firms = 17
- Mymensingh: Number of Auto Mills = 4, Share of Top 4 Firms = 6.8
- Rajshahi: Number of Auto Mills = 5, Share of Top 4 Firms = 5.3
- Rangpur: Number of Auto Mills = 6, Share of Top 4 Firms = 9.6
Wholesalers I

• Since millers have agents in all large cities and district headquarters, wholesalers in Dhaka mainly procure through them most of the time and sometimes through direct contact with millers located in other districts.
  • Wholesalers in Dhaka procure predominantly from Kushtia, Bogra, Chapainawabganj, Naogaon, and Sherpur.

• Wholesalers in the local markets located outside Dhaka, with a concentration of milling activity, procure directly from millers of the same district.

• In districts where rice millers are not concentrated, wholesalers buy either from commission agent/millers’ agent located in the same district or directly from millers in nearby districts.

• While selling, wholesalers in large wholesale markets in Dhaka sells to wholesalers and retailers from other markets in the city

• wholesalers located outside of Dhaka sells to retailers in the same market as well as wholesalers in other districts.
Wholesalers II

• The wholesalers in Dhaka has an experience of 11.5 years while those outside Dhaka are in business for roughly 19 years.

• Number of similar traders is high both in Dhaka and districts outside Dhaka.

• The current value of capital invested for enterprises outside Dhaka is twice as high as that in Dhaka (2.5 million vs. 1.3 million Taka).

• Credit sale is highly prevalent among the wholesalers. All of the wholesalers across all of the districts mentioned that they sell in credit and average repayment period varies in the range of 7 days to 1 month.
  • Proportion of credit transaction out of total sales is relatively higher outside Dhaka (54.6% vs. 14.5%).
  • Average repayment period is 11-16 days
  • Transaction history reveals that the wholesalers transact with roughly one fifth of them for more than five years while with two-third of them for more than 3 years.

• Maximum allowable storage capacity for the wholesalers is 300 mt for 30 days
  • Wholesalers in our survey report maximum storage capacity that lie in the range of 3-175 m. ton.
  • Mean level of maximum capacity is 51 ton and there is large variation in the storage capacity of wholesalers in Dhaka (29.5 tons) vs. outside Dhaka (64 tons).
Share of Different Actors in Net Marketing Margin

- **Margin from Traders’ Survey, Challenges:** Common to analyze traders accounts through detailed survey of the relevant traders’ balance sheet (Mnten and Kyle, 1999; Fafchamps and Gabre Madin, 2006; Osborn, 2005). Advantage largely hinges on accurate estimation of traders’ margin.
  - Estimation is challenging because of missing component in traders’ transaction costs such as opportunity cost of capital, family labor, overtime of the trader, and other hidden costs such as bribe and unofficial fees paid (if any).
  - Identifying a representative sample of traders is almost never possible due to seasonality inherent (Dillon and Dambro, 2017).
  - Traders’ unwillingness to reveal truthfully due to strategic reasons and unobserved heterogeneity in traders’ transaction costs.

**Source:** Mustafa Mujeri, Nazneen Ahmed and Iqbal Hossain (2013)
Findings from the Margin Analysis

- Millers are not the entity that earn largest net margin in the supply chain. retailers consistently make modest net margin across rice type.

- Since the margins are reported at per kilogram level, it is notable that millers’ scale of operation and transaction volume is huge to imply that absolute amount of margin made by a miller is too high to compare with that of retailers.

- Paddy aratdar or rice-wholesaler cum commission agent does not appear to make large margin per unit of sale. However, their transaction volume is also large compared to grower or retailer.

The higher margin scenario by a group can be consistent with both competitive and non-competitive market structure. Higher margin is not a sufficient condition to conclude a market as non-competitive.

- Under competitive market structure: high margin is consistent when traders absorb risks

- When there is non-competitive market, a number of factors may drive to higher margin scenario.
  - when there are natural barriers to entry,
  - artificial barriers can be caused by the existing traders,
  - regulatory constraints
Concluding observations-1

• Supply chain is mainly dominated by the Millers. Aratdars are the upstream link of the millers while wholesalers are their downstream link.
  • Price at which millers want to buy the paddy will ultimately determine the minimum price which “aratdar” would be willing to pay to the farmers\n  • Price that millers want to pay to the wholesalers will determine the price at which wholesalers will sell to the retailers.

• Although there is strong belief among the market participants that millers influence the market price, the evidence is not absolutely concrete.
  • Millers’ risk is higher and so is their expected return from the business.
  • Close to 20,000 registered millers in the market, spread in different districts of the country. The likelihood of an effective cartel working for a longer period of time is low.

• Millers’ Market Investment in significant. Large share of their investment is financed through banks.
  • This appears to be a barrier of entry to market

• Millers spread network in big cities by employing paid representative to coordinate with other market actors and gather market information
Concluding observations-II

- Millers are found to be well-connected with association of similar traders. Those association appears to be well-structured
  - They exchange market information, help each others in crisis, work like an informal insurance mechanism
  - Superior set of information could be translated into higher profit

- The distribution of millers in terms of milling capacity does not imply any concerning pattern of concentration ratio at the national level.
  - As Dillon and Dambro (2017) :the conventional rule of thumb is that a concentration ratio below 20 is suggestive of competitive behavior, while measure above 60 indicates high likelihood of non-competitive behavior

- Millers have to incur a continuous operating cost that is meet by sales revenue. So they can’t afford to stop sales for a longer period of time.

- Majority of the auto rice millers are constrained by working capital, working capital from financial institutions is not accessible -it affects small and medium millers.

- This situation is not similar for large corporate houses who have entered the rice business very recently with huge establishment and milling capacity.
Concluding observations-III

- Interviewed medium-size auto millers mentioned about existence of monopoly for some branded fine quality rice products (for example, *polao rice*).

- Auto millers processing capacity is significant. They enjoy economies of scale. Different stages of rice processing, for example drying, has been automated.

- There is evidence that auto-millers have large storage capacity. Some of them may absorb the role of Aratdars as well.
  - This implies that they have capacity to store more than what legally is allowed.
  - However, this does not necessarily imply anti-competitive behavior. If the millers buy large quantity right after the harvest when price is low, they have to store those.

- Most of the market actors, even the millers, believe that large millers play the most critical and influential role in the supply chain.

- Since millers have strong network and evidently long trading relationship with aratdars in the upstream and wholesalers in the downstream, they may temporarily slowdown the production process which may exert a spike in rice price.
Thank you