

# Agricultural commodity markets in India: Policy issues for growth

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## Abstract

Strengthening institutions in spot and derivative markets for commodities is a necessary ingredient of the liberalisation process in agriculture, and can impact upon the lives of millions. In this paper, we describe the existing market design prevalent on both the spot and the futures markets. We show some evidence on the role played by the nascent futures markets in price discovery. We document the problems of both the spot and the futures markets. We offer three policy proposals: using reference rates for strengthening transparency, exploring a greater role for cash settlement, and treating warehouse receipts as securities.

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## 1 THE IMPORTANCE OF THE COMMODITY MARKETS

As has been typical of the growth process in all countries, the importance of agriculture in the Indian economy has dropped steadily over the last two decades (Figure 1). Agriculture now accounts for 23% of GDP, as compared with the level of 50% in 1947.

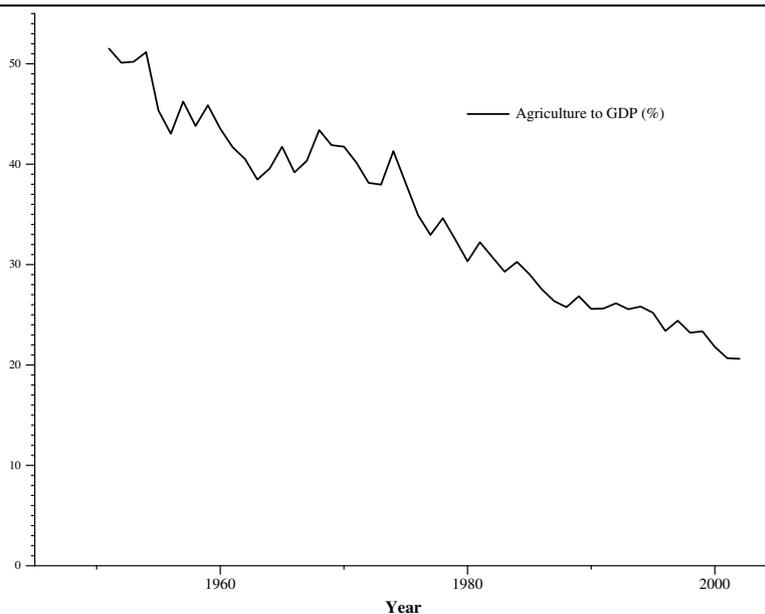


Figure 1: Fraction of agriculture in national GDP

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At the same time, 23% is a large fraction of GDP, by world standards. The overall average of 23% masks important inter-state differences (see Table 1). Roughly 60% of India's households depend on agriculture. This suggests that institutional development, which improves the liquidity and efficiency of commodity markets, would impact upon a large fraction of India's population.

Agricultural markets have been in existence in India for centuries, and perhaps for millenia. At the simplest, each neighbourhood had its own 'designated' location, where producers and buyers met in order to engage in trade, in an institutional vacuum. The wholesale spot market for agricultural commodities, as seen today, very much reflects this history. From a financial sector perspective, the weak institutions of the commodity markets are sharply reminiscent of the state of securities markets in India prior to 1993.

After independence, many major policy decisions adversely affected agricultural commodities markets. The first was the government's policy of defin-

State	Agriculture to GDP (%)		Fraction of rural poor
	1995	2000	(%)
Maharashtra	19.05	15.35	23.72
Gujarat	26.25	16.50	13.17
Tamil Nadu	22.51	16.96	20.55
Kerala	30.50	23.05	9.38
Karnataka	33.84	27.26	17.38
Andhra Pradesh		29.81	11.05
Rajasthan	34.94	30.42	13.74
Bihar	37.77	30.59	44.30
Madhya Pradesh	34.94	32.12	37.06
Haryana	41.12	33.32	8.27
Uttar Pradesh	38.97	34.85	31.22
West Bengal	33.41	35.55	31.85
Orissa	39.63	37.90	48.01
Assam	41.19	37.91	40.04
Punjab	45.12	40.51	6.35

States with GDP greater than 1% of national GDP.  
Agriculture to GDP ratios are from CMIE.  
The Fraction of rural poor in each state is from the  
**Human Development Report, 1999-2000.**

Table 1: State-level agriculture as a fraction of state-level GDP (%)

ing “primary commodities” for which the government would set a “minimum support price” (MSP). The farmer had the choice of selling to the government at a price higher than the market price if the market price dropped below the MSP for that commodity. Over the years, MSPs have risen dramatically, so that the ‘minimum support price’ is no longer an exigency to be invoked by farmers under events when market prices have collapsed. Instead, the MSP is often higher than the market price, and the MSP has become a highly inefficient subsidy. Large scale public sector procurement and storage has led to a shriveling of the private sector in the trade, storage and transportation of commodities.

The second key event was the banning of futures markets, which took place in the sixties. The formal agricultural commodities markets have been restricted to localised wholesale markets, while the derivatives markets largely went underground. The ban on forwards trading in agricultural commodities was removed in the seventies, but the new futures markets never regained the levels of liquidity that they had enjoyed earlier.

These restrictive policies were accompanied by many other aspects of intervention, which included barriers upon movement of agricultural goods, an extensive system of state intervention for agricultural inputs, etc. These add up to a situation where the agricultural sector is now perhaps the most repressed sector of the Indian economy. There is a considerable consensus amongst economists that this policy framework has many weaknesses. It imposes considerable direct costs upon the government, and has led to a suboptimal resource allocation.

In a more market-driven agricultural sector, the spot and derivatives markets would be central, both in terms of direct transactions and in terms of the use of prices for information processing and making production decisions.

The questions that naturally arise in debates about agricultural liberalisation concern ‘who’ in the country will maintain the buffer stocks which are currently maintained by government, how price fluctuations will be smoothed, how will farmers not be vulnerable to sharp falls in prices, how farmers will make sowing decisions with highly uncertain future prices, etc. Commodity futures markets could play a major role in addressing each of these questions.

In recent years, there has been heightened interest amongst policy makers about the importance of commodity futures markets, in the process of liberalisation of agriculture. For example, in 2000, there was a World Bank project on starting an exchange to trade futures on cotton, an economically significant commodity (Balasundaram, 1998). More significantly, in early 2002, the government of India announced that it would step away from the rigid price and production controls it exercised on the sugar industry with

the caveat that it would be done “once there were futures markets available to economic agents for hedging market price risk.” Now that this political consensus in favour of active commodity futures markets has been established, there is an urgent need for skills and institutional capacity in building and operating modern financial markets infrastructure in these areas.

The spot and derivative markets for agricultural commodities have yet to develop a sophisticated institutional capacity. Over the last decade, the securities markets have experienced revolutionary changes, with the creation of new institutions Shah and Thomas (2000, 1999), the utilisation of cutting edge technology to give transparency and low costs, opening up to nationwide participation, etc.

In this paper, we argue that the securities markets are highly relevant in thinking about reforms to the commodity market. There may be many opportunities to utilise the knowledge, technology and institutional capacity that is present on the securities markets, to help obtain a comparable transformation on the commodity markets. If this comes about, it constitutes a channel through which the securities markets could have an impact upon the lives of a very large number of people in India.

This paper seeks to shed some light upon the functioning of spot and derivative markets for commodities in India today. We seek to describe the institutional mechanisms in use today, to summarise some recent research about the nature of price discovery, and to offer some new ideas for public policy.

The remainder of this paper is organised as follows. Section 2 describes the existing market design of the spot market, as it prevails across many products in the country. Section 3 addresses the futures market. In particular, Section 3.2 shows some recent research about price discovery in one market (the castorseed market), which is a useful illustration about the dual role of the spot and futures market under Indian conditions today. Section 3.3 gives a detailed description of one market (the jaggery futures market), as a case study of the existing market design. Finally, Section 4 offers some ideas on current policy issues.

## 2 SPOT MARKET DESIGN

All agricultural commodities in India trade in wholesale markets or *mandis* where the price of the commodity is set. If it is a *principal commodity*<sup>1</sup> and the market determined price is below a threshold (MSP), the trader has to

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<sup>1</sup>The Ministry of Agriculture categorises commodities as either “principal commodities” and “non-principal commodities” depending upon the fraction of total cropped area in the country occupied by cultivation of the commodity. Rice is the largest principal commodity since it has the largest fraction of total area under cultivation, at 50%.

take delivery at the MSP. In return, the trader is compensated by the *mandi* which is in turn, compensated by the government. Some of the principal crops are rice, wheat, pulses, oilseeds, cotton and sugarcane. Today, there are approximately 25 agricultural commodities for which the government of India still sets a “minimum support price” (MSP).

Agricultural commodity markets in India started as areas specific to limited geographical locations where producers and buyers collected to trade their goods. Today’s markets are basically unchanged in comparison. Their structure is very reminiscent of the structure of the Indian equity markets before 1995 – they are largely restricted to local fluctuations in demand and supply, which is also reflected in the local price of the commodity. Different regions in the country have different prices for the same commodities: the apparent presence of arbitrage could be the results of either a lack of good and cheap transportation infrastructure or of problems with the structure and design of the the market.

*Mandis* are set up only with the permission of state governments. Each state has a *state agriculture marketing boards* (SAMB). These, in turn, set up *mandi boards* at the level of a district. It is the *mandi board* that evaluates proposals to set up new *mandis* and permits the creation of a *mandi*. Initially, *mandis* were set up only at the level of a specific district. But their numbers have been rapidly increasing to allow trading at a more micro-level. Today there are several *mandis* to a district, with around 750 *mandis* that facilitate the trade of 140 crops and their different varieties, all across India. Most *mandis* in the same district trade a very similar set of commodities in the same district. This makes for a very fragmented market for any single agricultural commodities across the vast geographical reach of India.

At the proposal stage, the *mandi* starts with the goal of trading a principal commodity. After it is commissioned and built, every *mandi* is physically a yard or a set of yards with platforms where *licensed traders* buy from the farmers and sell to wholesale dealers. Since almost all order flow goes through the *mandis*, they become a source of daily information about the quantity of commodities and the prices at which they trade. The market design of a *mandi* is as follows:

**Products** Every *mandi* trades in at least one primary commodity specific to the region. Typically, trading is done in a set of primary and non-primary commodities at any one *mandi*.

As the seller brings the produce to the market, it is first weighed and both the *type* and *quantity* recorded at the entrance by a *mandi inspector*. The seller is given a certificate of the type and quantity. Some *mandis* charge a fee at the entrance. Once the produce is recorded at one *mandi*, it has “free” access to other *mandis* in the district; ie,

the produce does not get double-counted at other *mandis*, nor is the farmer double-charged. The probability that the farmer will access more than one *mandi* to find the best price in the region then rests on the cost of transportation, and the lack of good packaging and storage during transport.

**Participants** Other than the buyers and the sellers, the market has *traders* who intermediate between the farmers and the wholesale dealers or mill owners. These traders are licensed by the *mandi* to trade at the market. Once licensed, they are permitted to intermediate between buyer and seller orders. Traders may use *brokers* to expand their business.<sup>2</sup>

Traders have to pay *mandi* fees, which are of two types:

- A *basic transaction fee* which is a fraction of the value of the trader's volumes.
- Other fees in the form of taxes, that are also typically a fraction of the value of the traders volumes. This is charged by the state and can vary widely across states.

These fees are usually passed back to the farmers/sellers. However, in the case of the primary commodities, the farmer has to be paid the MSP. In such cases, the central government technically paid up the fees and the taxes which were owed by the traders to the *mandi*. Sometimes, these charges would add up to 12% of the transaction volume (for example, as in Punjab for rice)! Recently, the fees and taxes that the *mandi* charges traders has been fixed to a flat rate of 4%.

**Trading** Trading in the *mandi* has two stages: one is a dealer market where sellers typically approach the traders for a price quote. Once they find a favourable quote, it is considered sold to the trader. The second is an "open-outcry auction", where the commodity is sold. The auction process has a fixed time at every *mandi*. The auction is run sequentially, typically going from one lot of the commodity with a fixed grade to the next.

There is no central dissemination of information of prices. As every lot is auctioned, a new price is set. The collection of prices takes place when the clearing is in process. Once again, this is very like the situation of price dissemination at India's equity markets before the reforms.

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<sup>2</sup>There is a close analogy between the trader-broker relationship of the agricultural commodity markets and the broker-sub-broker relationship on the equity markets.

**Clearing** Traders have to clear deals with buyers and sellers immediately.

At the time the trade is cleared with the seller, the produce gets inspected for quality. Typically this is done by the traders themselves. If there is a dispute about the quality of the produce, the conflict is resolved by the *mandi* inspector who can certify the quality of the produce. At the close of the trading day, traders have to report both prices and volumes to the *mandi*. Since traders pay fees to the *mandi* based on reported traded value, it is incentive compatible for the trader to under-report traded values. This means a possibility that volumes are under-reported, since under-reporting prices could have the undesirable effect of keeping the farmers away.

A cross-check available to the *mandi* is to tally the total volume brought into the *mandi* with the volumes reported by the traders. However, this is not fully reliable if sellers choose to exercise their option of moving to another *mandi* in search of a better price.

**Settlement** Farmers bring the goods to the *mandi* which they deliver to the trader to whom they sell. Traders, in turn, have this produce picked up by buyers. There are typically no facilities at the *mandi* for long-term storage. If there is excess produce than could be sold on the same day, the *mandi* permits the traders to keep the goods at the *mandi* yards overnight. There are either private or state-owned warehouses that provide storage close to the *mandis* at a cost.

Once settlement takes place, any dispute that arises about the quality of the good delivered is between either the buyer/seller and the trader. Since one counterparty is always the *mandi* trader, it is settled by a *mandi* inspector. Inspectors are the final arbitrators of dispute: they have the onus of checking and certifying the quality of the good, and they have the power to close the trade at a price that they deem correct. Both parties who trade at the *mandi* have to abide by the inspector's decision.

**Governance** The *mandis* are set up and monitored by the *mandi board*, which is a committee that has representations both by the farmer and the trader communities. There is also a representative from the state government on the *mandi boards*. The chairman of the *mandi board* however, is typically from the farmer community. It is the farmer community that usually originates discussions with the SAMB to organise a *mandi* in a new locality, and this community typically has a large voice in the governance of the *mandi*.

The operations of the *mandi* are handled by a staff consisting of a secretary, clerks for record keeping, and at least one inspector who is qualified to certify the quality of the produce. The staff are paid out

of the fees collected from farmers and/or market intermediaries.

**Oversight and regulation** At the spot market, where settlement takes place on a  $T + 0$  or  $T + 1$  basis, there is very little scope for problems of regulation. The disputes that arise are about prices and quality of the produce, which are typically handled by the *mandi* inspector. The most important regulatory requirement is the reporting of prices and volumes to the SAMB. Every district *mandi board* takes the responsibility of collecting and dispatching this information to the SAMB. The SAMB, in turn, dispatches it to the Ministry of Agriculture, where the prices are available on the internet at the end of every trading day.<sup>3</sup>

The presence of the state government representative on the *mandi board* appears to be the main link for the oversight role of the SAMB.

## 2.1 Problems of the spot market

**Price dissemination** Every *mandi* becomes a monopoly to the local producers, especially once they come to the market. Farmers typically face a short period between the time that they harvest and the time that they can sell the crop. In addition, the cost of transportation of commodities is typically significant, given the lack of good transportation alternatives. If they do not have access to reliable sources of price information, they become hostage to the closest source, ie the local *mandi*. Farmers should have access to prices not just at the local, but also the national level.

In each case, when prices across the country are available, they will be better able to evaluate their ability to incur transportation cost to access the better price. This will help to reduce arbitrage opportunities and wide price differentials across geographical locations, and help farmers earn more for their produce.

The same rationale applies to buyers who need to take delivery of the commodity within a short time frame. Whole-sale traders who have the option of waiting for a better price, face a smaller problem of monopoly capture. Since they do not incur a cost of transportation of the commodity, they can readily move to markets with a better price. Today, with access to cheap telecommunication services that has spread to practically all corners of the country, whole-sale dealers have a better idea of prices in a larger area than before.<sup>4</sup>

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<sup>3</sup>The website where the prices are displayed is <http://www.agmarknet.nic.in>

<sup>4</sup>At the spices markets in Kota, Rajasthan, whole-sale dealers, in touch with their counterparts at different *mandis* across the state, were able to offer real-time updates to their quotes in the markets while the auctions were being conducted.

**The lack of standards and certification** Prices can be quoted and compared across the country once there is a good standardisation of commodities. Once commodities can be clearly categorised as one standard as opposed to the other, then prices become more meaningful for comparison at one *mandi* versus another. These standards should be applicable equally across all states.

If standards are in place, then there should be facilities that allow for reliable and easily accessible certification of these commodities all over the country. This need not be a huge bottleneck – at every *mandi*, there are already inspectors who can form the base of a nation-wide certification network. The role of the *mandi* can be mutated to shift from trading, clearing, settlement to certification and warehousing.

Once commodities are certified standards (and if this can be accompanied by warehousing and warehouse receipts), then trading on the commodity can be done on an electronic exchange, pooling orderflow and liquidity from a much larger area than any one single *mandi*.

Thus, certification and standardisation of commodities can facilitate important reforms in the agricultural commodities markets.

### 3 FUTURES MARKETS

#### 3.1 Background

*Derivatives markets* for agricultural commodities have undergone a more turbulent history than the wholesale spot markets. The first of the derivatives markets were the cotton forwards markets which started as far back as 1857 (Kolamkar, 2003), followed by markets in a wide variety of commodities. There is evidence to support the notion that it was used by farmers as well as whole-sale dealers, traders and end-user enterprises and firms.

The growth and development of these markets were halted when forwards on all underlying were banned by the central government, en masse, in the 1960's. *Options*, which was traded on cash crops like cotton, was banned even earlier in the 1930's. When the government finally brought back forwards trading on agricultural commodities in the early 1980's (Khusro committee), they did so with commodities that did not have a very significant role in the economy: castorseed and castor oil, jaggery, jute, pepper, potato and turmeric.<sup>5</sup> During the liberalisation of 1990, there were recommendations that forwards trading start in a larger universe of commodities (Kabra

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<sup>5</sup>Other than castor seeds and castor oil, for which India is the world leader in exports, none of the commodities have very large volumes in the underlying spot market.

committee).

Since their revival, forwards markets have developed along the same lines as the spot markets. There are several exchanges to trade the same commodity, each of them with a local broker/wholesale-merchandiser constituency. For example, by the late nineties, there were three exchanges – Ahmedabad, Bombay, Rajkot – which traded castor seeds and castor oil as the main commodity for forwards contracts. This was (and is) very different from commodity markets all over the world, where there is a single exchange that typically pools the demand and supply for one-commodity in one exchange; price discovery for the commodity is clearly centralised in one market.

In India, volumes (and liquidity) were fragmented across the local exchanges. Every exchange individually conducted a relatively small fraction of business. In addition, the business itself has been relatively small in the last two decades. For instance, at the peak of forwards trading in castor seeds and castor oil at the official exchanges, the annual volumes at the Ahmedabad Commodity Exchange Ltd. (trading castor seeds and castor oil futures) was of the order of Rs.70 million. Almost all other exchanges have trading volumes lower than this.

### **3.2 Price discovery in castorseed futures**

Sometimes, in debates about commodity futures markets, grave concerns are expressed about the role of commodity futures. Are these merely gambling dens? Are they sources of price volatility which hurt the interests of farmers? In this section, we show some evidence about the role of the futures market in price discovery in one case (castorseed). We ask the following question: even with highly underdeveloped institutional capacity, what role does a futures market play in price discovery?

Thomas and Karande (2001) examined the question of where price discovery in the castor seed and castor oil commodity markets takes place. The castor seeds futures markets, like all agricultural commodities futures markets, have multiple trading venues. Both the Ahmedabad and the Bombay markets for castor seeds futures have existed from the 1980's. Each was important for very distinct reasons: most of the castor production in India takes place in Gujarat around Ahmedabad, where as most of the export of castor seeds and oils took place from the port of Bombay. Both futures markets also had associated spot markets.

This paper asked the following questions:

1. Do futures market prices lead spot market prices?

2. Does the Ahmedabad futures market lead the Bombay market, or vice versa?

If the futures do play a price discovery role, we would expect that futures prices should lead spot prices in both markets.

In the case of Ahmedabad futures markets versus the Bombay market, since Ahmedabad is where the production of the underlying happens, it should have an advantage over the Bombay market. We should expect that if there are no barriers to information flowing freely between the two markets, there should not be any significant lead-lag relationship between the two locations. The definition of the contracts on both these markets are exactly the same: there are four contracts that trade with physical settlement (details can be seen in Figure 2) on the same amount of the underlying and maturing in the same months.

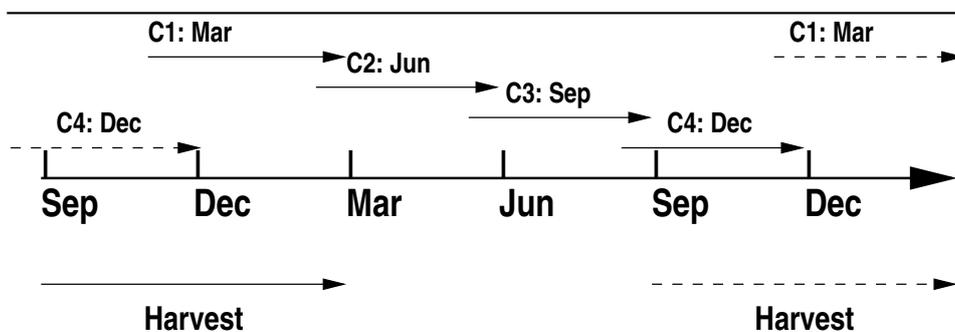


Figure 2: Maturity structure of castor seeds and oils futures contracts

The analysis is done for the period from 1980 to 1995. This period started with high costs of telecommunications which then dropped to much smaller levels towards the end of the period. In such a setting, we would expect to find that prices in these markets should be contemporaneous. If there is a lead-lag relationship, then Ahmedabad prices would lead Bombay prices.

The paper finds the following:

1. Futures markets lead spot prices in all but one contract, ie, the contract that matures in March.

The “March” contract is the “harvest” contract – the production cycle for castor begins with the seeds being sown in September and the crop being harvested in March. Thus, we find that when the crop comes to market, the spot market dominates the spot market in price discovery; for all the other contracts, the futures markets do play a price discovery role.

2. The Bombay futures markets leads the Ahmedabad market in all but

one contract, ie the March contract.

This finding is counter-intuitive to our hypothesis of Ahmedabad being the market where information shocks first enters the market prices. However, if prices in the castor markets were largely driven by demand (export demand) rather than supply (crop produced), then Bombay would be the market where information first enters prices. Our hypothesis does hold for the March contract where the product market of Ahmedabad is the dominant source of information.

The paper does show that futures markets do play a role in price discovery. Their development would have a positive impact on the development of the agricultural commodities markets. However, it is puzzling as to why the volumes in these markets are so low. Sahadevan (2002) documents annual volumes in the period from 1995 to 2000. The largest market in this period (in terms of annual volumes) was the Muzaffarnagar market for Jaggery with average annual volumes of 4.5 million tonnes. The spot market for jaggery had a size between 9 to 10 million tonnes. These volumes have remained reasonably constant since then.

In comparison, the equity futures market that started with index futures in 1999, reached an annual volume of Rs.3.3 trillion at the end of March 2003 at the National Stock Exchange. During this period, the underlying spot equity market saw an annual volume of Rs.6.2 trillion. Volumes on the equity futures markets quadrupled over volumes in the previous year, while the spot market volumes grew at 20%.

The economic role of both these markets is to provide efficient prices and liquidity to their constituencies. However, the reach and efficiency of the equity market far outstrips that of even the most liquid of the commodity markets in India. This difference might be explained in terms of the different structure of the two markets: starting from the mandate to the issues of operations, risk management, technology and governance.<sup>6</sup> In the following section, we examine the structure of the futures market for Jaggery at Muzaffarnagar, U.P.

### **3.3 The Muzaffarnagar jaggery futures market**

When we seek to understand commodity futures markets in India, there is a need to know more about the market design which is presently in use. In this subsection, we seek to closely describe one commodity futures market as a case study: The jaggery futures market, which is located at Muzaffarnagar.

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<sup>6</sup>The structure and performance of the equity market have been discussed in Shah and Thomas (1997) and equity derivatives markets in Thomas and Shah (2003).

There are five jaggery futures markets in India, which are all located in the U.P.-Haryana ‘sugar belt’. They are located at Bhatinda, Delhi, Hapur, Meerut, Muzaffarnagar. All these have jaggery spot markets as well. The futures markets at Muzaffarnagar is operated by a private firm, Vijai Beopar Chamber Ltd. (VBCL).

In India, jaggery has only been used mainly as a sugar proxy and the consumption of jaggery has been on the decline. This decline is reflected in the volumes that are traded on the jaggery futures market. Nonetheless, the Muzaffarnagar jaggery futures exchange remains one of the more active and profitable exchanges while others trading futures on commodities that have much larger spot volumes and economic importance languish.

**Contract design** There are different types in the jaggery produced, depending up on the region where the cane is grown. Some of the different types of jaggery are *chapu*, *khura*, *pansera*. *Khandsari* is a crude sugar-jaggery mixture. However, VBCL trades only one grade of jaggery for its futures contract, *pansera*.

If the trader delivers any other kind of jaggery instead of Pansera, the exchange specifies the premium which the seller will have to pay to the buyer to compensate for the difference in the delivery quality.

Typically, only one contract trades at a given time on the exchange. The maturity is tightly linked with the harvest cycle of jaggery (just as was the case with castor seeds futures). There are four maturities: a six month contract expiring in mid July, a two month contract expiring mid January, a three month contract with expiry in mid March, and a five month contract expiring in mid July. The exchange has to obtain permission from FMC for every new contract it trades, irrespective of whether it has been traded before in the market, or a new contract design.

All contracts are written with physical settlement at maturity. The settlement price are decided by an exchange committee at the end of every trading day, based on intra-day traded prices at the exchange.

**Trading system** Trading at VBCL takes place on an open outcry market. Trading opens at 10am and closes at 3pm. There are no designated market makers in the market, with all members offering two-way quotes.

Price limits are imposed uniformly on all contracts, irrespective of their maturity. The price band is 15% up or down on a weekly price for a quintal, set by the FMC, and are said to be rarely binding.

The price at every half hour is collected by polling eight *large* brokers for bid and ask quotes by an employee of the exchange, and posted on

the doors of the exchange.

The exchange charges Rs.2.5 per contract traded, out of which Rs.1.5 is brokerage that has to be paid to the trading member at the end of the month.

The dominant cost in carrying out spot–futures arbitrage are the costs of trading on the spot market, rather than those on the futures market. The impact cost on the spot can work out to around 8%, and 12% if the position is held to maturity.

**Clearing system** The exchange has a clearing house that records transactions by members and calculates and implements risk management at the exchange. Clearing of trades is done both by the clearing house as well as the Trading Member’s back office. Every trade is recorded twice: one record that is retained by the broker and the other that is stored at the clearing house.

Counterparty risk management is done through a system of *Initial margin* (Rs.5000 when the member joins the exchange) and *Daily Mark-to-market margins*. Any daily MTM loss has to be paid to the clearing house between 11am and 1:30pm the next day.

All members clear through a designated clearing bank. There are approximately five clearing banks, none of which do nation-wide funds transfer (yet). These banks are: SBI, Punjab Bank, Syndicate Bank, All India Bank of Commerce.

Any disputes between the accounts of the clearing house and the member is brought to the exchange board for arbitration.

**Settlement** Even though all contracts on the exchange are based on physically settlement, for all practical purpose, there is no delivery in these contracts. The exchange actively discourages physical settlement. In the case of a dispute, the exchange provides certification of the delivery, which is cumbersome and leaves the exchange vulnerable to the high costs of resolving arbitration cases.

A second problem is a deep seated fear of short squeezes. This inhibits members from taking large open positions that carry over from day to day, and is indicative of a lack of transparent and frequent spot market prices.

**Participants** Trading on the exchange is done by *Trading members* (TMs) or *TMs/Brokers*. Brokers can clear their trades only through trading members. They can take either proprietary or client positions. Members can only join the exchange based on recommendations from existing brokers. This implies an entry barrier with potential social

biases, rather than the credit worthiness of the individual. There are typically around 120 members who trade when jaggery is in season, and approximately 40-60 in the off-season period.

**Governance** The exchange is governed by a board of directors comprised of: four members from the spot market community, six from the futures community, two “shareholders”, four nominated by FMC, two “nominated by the board”. The board is in charge of taking important decisions like how a bankruptcy is to be “dealt with”.

The day to day management of the exchange operations is carried out by the 18 member exchange staff. None of the management staff can take positions or trade themselves.

There are several trading member committees to deal with specific problems at the exchange, such as:

1. Clearing house committee: decisions on disputes at the clearing house.
2. Daily rates committee: decides the daily opening, high, low and close of the day.
3. Survey committee: certify the quality of the goods transferred from buyers to sellers.
4. Arbitrators: Every dispute is handled by two designated arbitrators, one appointed by each of the two conflicting parties.
5. Vigilance committee: investigates any violation of the exchange bye-laws, rules, regulations and the FCRA, 1952.

**Regulation** The Forwards Markets Commission (FMC) is the regulatory body for commodity futures markets. It is an offshoot of the Department of Civil Supplies. Daily reports of the prices, positions and margins of each of the trading members are passed onto the FMC at the end of every trading day. Position limits, margin rules, fees and charges have also to be approved by the FMC.

The FMC plays a much stronger regulatory role in the running of the futures markets compared with the SAMB and the *mandis*.

### 3.4 Problems of the futures markets

**Lack of price transparency** The commodity futures markets also suffer from problems of lack of price transparency. There is no common interface or communications infrastructure using which prices from one

market become accessible at another. The collection of price information is done at the initiative of individual traders and dealers. This works in situations where the cost of collecting information is low – for example, using cellphones to get real-time updates on prices from nearby markets – but becomes a bottleneck when the cost is high. The human and telecommunications cost of getting real-time price updates from far-flung markets is prohibitive. This implies markets with relatively high price efficiency among local markets, but poor efficiency across national markets.

**Lack of contract and product standardisation** The cost that traders are willing to pay to access price and orderflow information from distant market is exacerbated by the lack of product standardisation and differences in contract design from one futures market to the next.

**Fragmented order flow and the lack of economies of scale** There are several similarities between the equity markets of the nineties and the commodities futures markets today. But, commodities exchanges suffer from a much higher degree of fragmentation than the equity markets in the late nineties. In the case of the equities markets, the typical structure of markets was to have one exchange per state: this meant that the economic order flow was fragmented at most at the level of the state. In the case of commodities markets (either spot or futures) in India, there are typically *multiple* exchanges to a single district for commodities!<sup>7</sup>

This implies that the volumes get split between a large number of exchanges, making the viability of running an exchange a tenuous proposition. When this is compounded by the fact that the commodities that futures markets trade on today, tend to be the smaller of the agricultural commodities, the probability of reaching economies of scale in setting up exchange infrastructure become smaller. Economically, this implies that today most of these exchanges are too small, and their profit margins too weak, to support the investments in technology and human capital that are required to be credible players in the modern financial sector.

The equity markets offer a sobering lessons for the commodities markets in this regard. When the NSE was setup in 1994, and became the largest exchange by volume by the end of 1995, almost all the regional exchanges sought to emulate the NSE and put in place infrastructure to support electronic trading that had proved to help the NSE gain liquidity. However, it is very difficult to take away liquidity from an

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<sup>7</sup>For example, jaggery futures trades in a set of seven to eight exchanges in the U.P./Delhi region within 100km of each other.

entrenched market, especially when the entrenched market offered the most transparent and the safest platform for trading, clearing and settlement. The NSE was competition for the local exchanges, who had to incur costs to match the facilities of the NSE without having access to the revenues of their order flow.

Of the 23 local exchanges that India had in the mid nineties, today there are two national exchanges that can be said to be economically viable presently. All indicators point to the probability of this reducing to one national exchange in the future.

Today, the cost of setting up similar infrastructure and technology that helped the NSE become the market leader has dropped by orders of magnitude. In the face of the small-sized revenues that the commodities futures markets currently access, it is not clear that they can be profitable if the systems are put into place, even at such low costs of technology. Thus, any policy directive that seeks to improve the liquidity, access and usage of commodity futures markets much aim at building these markets at low costs.

A case in point is the Bombay Oils and Oilseeds Exchange (BOOE), which was the Bombay exchange for castor seeds and castor oil futures studied in Section 3.2. In the 1997, the FMC mandated that the BOOE upgrade their facilities to make the exchange a more transparent and safe market along the lines of the NSE. At the time, Bombay was losing volumes to the Ahmedabad exchange, and the exchange members were willing to invest in alternative mechanisms to get back or increase the orderflow. In order to do this, the exchange:

1. Partially set up an electronic floor.

They retained the open-outcry floor, but purchased computers that would allow the brokers to put in limit orders on the market if they wanted to.

2. Set up a clearing house.

This was accompanied by a system of initial and daily margin collection, but the exchange did not offer *novation*, which is still a service offered only by the National Securities Clearing Corporation, Ltd. (NSCCL) for the equity and equity derivatives markets.

3. Set up a warehouse to store commodities.

For the rest, the membership, governance and the ownership of the exchange remained the same unlike at the NSE where the membership spanned the entire country, and the exchange was governed by a pro-

fessional team rather than the broker community. None of the changes instituted helped the BOOE increase the liquidity of the exchange.

**“Illegal” derivatives markets”** The most robust competitor for order-flow in the commodity futures markets is not other futures markets, but the black market in future trading in India. In addition to a visible local exchange, every commodity has got a local shadow market where futures trading takes place. For example, the largest castor seeds and oils futures market is said to be located in the small town of Bhabhar in Gujarat, 100kms north of Ahmedabad. The trading community categorically assert that the price discovery is driven out of this town. Similarly, there is said to be a large black market for jaggery futures based in Delhi.

These markets started with the ban on futures in the sixties and have flourished since then. Policy directives to improve and increase the liquidity of commodity futures markets will have to create a market to compete with these shadow markets if they are to be successful.

## 4 POLICY PROPOSALS

With this backdrop, where we have described the existing spot and derivatives markets, and summarised some of their problems, we now turn to some specific policy proposals, which could possibly play a positive role in strengthening the functioning of these important markets.

### 4.1 Price transparency

A key weakness of the existing framework of commodity markets in India is the lack of price transparency. It is difficult for each farmer to know the correct price that is prevailing in surrounding spot and futures markets.

This problem is deeply related to the lack of modern institutions on the spot and futures markets. If the spot market operated using electronic trading, then there would be full price transparency in realtime. However, at present, the spot market and the futures markets are both characterised by weak institutions, bilateral transactions, and an absence of transparency.

The spread of modern telecom has had a substantial impact upon sheer price access. Farmers in remote areas are now able to use cellular phones or STD booths in order to place a few phone calls and glean some information about prices. However, even if a farmer had plentiful access to telephones, there is a genuine problem with obtaining price information.

Access to prices that can be trusted is also extremely important to the financial sector. For example, if a bank gives out loans against collateral, then it is crucial to have daily official prices which can be used for marking to market. These official prices should be such that when a risk management system within the bank triggers a decision, collateral can be sold at the official prices.

This problem is not without precedent in the financial sector. In India, the fixed income and currency markets are similarly characterised by weak institutions, bilateral transactions, and a complete absence of price transparency. In this case, one important success story of obtaining a trusted price series even from a primitive underlying market is that of the NSE MIBOR (Shah, 2000), which stands for Mumbai Interbank Offer Rate.

The basic principle of NSE MIBOR is that in the non-transparent inter-bank market, dealers operating in the market have information about current market conditions, but nobody else has that information. A set of dealers is asked the question: *If you had to buy or sell in the market right now, what are the best prices available in the market?* Each dealer reports one value for the best buy price available in the market, and the best sell price available in the market. These are put through a robust estimator in order to obtain two values, MIBID and MIBOR. The methodology uses bootstrap techniques to adaptively drop extreme values reported by dealers, so as to reduce the extent to which dealers can manipulate the official prices.

This basic approach appears to be quite relevant for the commodity spot markets. It should be possible to put together groups of dealers in the country for each grade of each commodity, poll them every day, obtain official prices, and disseminate these through a wide variety of mechanisms. The proliferation of telecom and cybercafes implies that it is now increasingly possible to communicate these prices to the remotest farmers and other users of markets.

As with MIBOR, at some point in the future, when strong institutions develop on the market, such polling would become irrelevant. When trading takes place using advanced concepts like the electronic call auction, or anonymous order matching, the trading process innately lends itself to price transparency. However, until this transformation of the spot market comes about, such polling-based creation of “official rates” can play an important role.

## 4.2 Cash settled derivatives?

If trusted official spot prices are known, then the problem of designing a derivatives market simplifies dramatically, since cash settlement can be em-

ployed.

In a futures market with physical settlement, a buyer of gold at a future date at Rs.5,000/tola is obligated to bring Rs.5,000 to the clearing corporation in exchange for a tola of gold on expiration date. If the price prevailing on the spot market proves to be Rs.6,000 on the expiration date, then settlement could equally be achieved (for all practical purposes) through a payment of Rs.1,000 by the clearing corporation to the futures buyer. This design is termed ‘cash settlement’.

Broadly speaking, whenever the spot market is trusted and can yield sound prices, cash settlement is generally superior to physical settlement, for two reasons. First, cash settlement avoids the costs of settlement in physical goods. Second, the possibility of a ‘short squeeze’ is eliminated with cash settlement.<sup>8</sup>

It may be possible to have cash-settled derivatives on commodity underlyings on the mainstream derivatives exchanges of the country (such as NSE). The spot price time-series would be treated as an economic index, and the futures settlement would be construed as a “contract for differences”. In this fashion, cash settlement can be a useful tool for breaking down the regulatory barriers which separate the commodity markets from the mainstream financial sector.

### 4.3 Warehouse receipts as securities?

One mechanism through which major change can be obtained relatively easily consists of exploiting warehouse receipts.

In a modern agricultural sector, a key element is a modern ‘warehousing industry’, which would accept goods, verify the grade, and issue a receipt to the customer. This receipt is then tradeable. In a world with warehouse receipts, farmers would take their output to a suitable warehouse, and convert it into a receipt. This is comparable to the step of ‘immobilisation’ in an old fashioned securities depository. Once this is done, the receipt becomes the tradeable instrument, and can change hands many times until it reaches the end-consumer of the commodity.

We can conceive of a legal framework where these warehouse receipts are maintained as dematerialised *securities* in the existing securities depositories, NSDL and CDSL. Once this is done, everything about the market

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<sup>8</sup>In a short squeeze, a manipulator adopts an extremely large long position on the market, larger than can possibly be delivered by any shorts. As expiration approaches, the typical speculative short (who does not have goods required for delivery) seeks to close these positions by buying back futures. This generates a sharp rise in futures prices. This phenomenon is called “a short squeeze”.

design for spot and derivatives markets on the securities markets would become applicable to commodity markets.

The spot market would operate using nationwide, electronic trading. Netting would take place intra-day (using novation at the clearing corporation). On T+2, settlement would take place at the depository, and the buyer would be the owner of a warehouse receipt.

Similarly, it would be easy to create futures and options on the warehouse receipts, using physical settlement whereby the short delivers these securities at the depository.

This proposal is a remarkably powerful one, in that if we can make warehouse receipts to be dematerialised securities, at one fell swoop, the entire complexity and sophistication of India's securities industry can be brought to bear upon the commodity sector.

The hurdles faced in making progress in this direction:

1. Establishing a sound system of warehouse receipts is not easy. This system has been discussed in various fora and projects over the last decade, but has not yet seen any progress.
2. The horizontal extension of the securities industry could encounter **turf** problems. In particular, once warehouse receipts are securities, the regulation and supervision of the spot and derivatives markets for commodities would vest with SEBI and not with FMC.

## 5 CONCLUSIONS

India differs from most other countries in the world, in having a substantial agricultural sector. Looking forward, there is a clear opportunity for India to greatly increase value added from agriculture, through a much more liberal policy regime. To the extent that such a policy program makes progress, it could positively impact upon the lives of hundreds of millions.

The repressed policy regime has stifled market development, and given weak institutions. Strengthening institutions for spot and derivatives markets is a key aspect of a reforms effort.

The first financial market which enjoyed the benefits of liberalisation was the equity market. Over the last decade, we have seen a flowering of a considerable institutional capacity on the equity market, giving nationwide trading, the elimination of entry barriers into intermediation, anonymous electronic trading by price-time priority, risk management at the clearing corporation, dematerialised settlement at the depository, and derivatives

trading. The new institutions thrown up on the equity market have considerable strengths, by world standards.

This institutional capacity is an important potential asset for solving the problems of the commodity markets, since there is a great commonality between all kinds of trading, ranging from crude oil to wheat to government bonds to equities.

Three key avenues where relatively easy progress appears to be attainable are:

- Utilise the technology of MIBOR for creating sound reference rates,
- Use cash settlement to strengthen futures trading,
- Use dematerialised warehouse receipts to better organise the spot market.

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