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Abstract

This paper offers a first ever theoretical study of a unique financing instrument associated with prominent emerging equity markets in South Asia. The instrument known as *badla*, in local parlance, has two interesting aspects, which have been ignored thus far. Firstly, it may serve as an information transmission mechanism and can be thought of as an institutional response to information gaps in the emerging markets. Secondly, it creates new types of rents, called "market microstructure" rents for certain market players. These rents are then exploited to gain control of the governing boards of equity markets. Consequently, institutional inertia is created which hinders the badly needed reform process.

Key Words: Information transmission; Signaling; Microstructure rents; Linked games; Institutional inertia

JEL Classification: G10, D02, D80, K42

Information Transmission and Micro-structure Rents in Emerging Markets: The Case of a Unique Financing Instrument

"[The information gaps] might change some of the performance characteristics, not to mention the institutional structure, of markets in which they appear."
Michael Spence, *Nobel Lecture (AER, 2002)*

A unique financing instrument is associated with prominent emerging stock markets of South Asia. In his paper, we show that the instrument can be thought of as an institutional response to the information gaps existing in these emerging stock markets. The instrument serves to eliminate information gaps. In this sense, the instrument provides one example of how information gaps change the institutional structure of markets in which they appear. Furthermore, we show that the instrument gives rise to 'microstructure rents'[1], which are exploited by certain players to control the management of stock markets. One of the puzzling features of these markets has been the recurring episodes of, what is widely believed to be, market manipulation by few large brokers. It's not just that manipulation anecdotes abound, but careful empirical evidence also points to the same conclusion. See Khwaja and Mian (2005) as one example, who document empirical evidence of market manipulation by two large brokers in the Karachi Stock Exchange. The entire broker community suffers due to the actions of few large brokers in terms of reputation; however, they still fail to elect directors who would check such manipulation. We argue that 'micro-structure rents' created by the instrument prevent a majority of small brokers from unseating the directors who favor large brokers. Hence, attempted reforms that would check such manipulation are stalled.

The rents arise due to informal rules surrounding the allocation of financing through the instrument. According to North (1990), the interaction between formal and informal rules is the key to understanding why institutional change is often characterized by inertia and path-dependence. Here, we show that the informal rules surrounding the instrument interact with formal rules governing the election of directors to create institutional inertia. The resulting institutional inertia has effectively stalled the reform process in the stock

[1] The origin of this term is due to Echeverri-Gent (2001)

markets of Pakistan. Furthermore, an alternative policy recommendation arises when the interactions between the formal institution of elections in the stock markets and the informal institution of the instrument in question are taken into account. We show that it may be less costly to deter manipulation by discouraging small brokers from electing directors who favor large brokers. This is in sharp contrast with the approach that is usually taken. Normally, regulators attempt to carry out an investigation after strong suspicion of manipulation emerges that creates sufficient public pressure. But, these investigations prove too costly due to various factors including the political connections of the accused, who happen to be large market players. Such investigations, almost always, prove inconclusive because they are too costly to be carried out properly.

In this paper, we model two aspects of the instrument; the information transmission aspect and the 'micro-structure rent' aspect. To our knowledge, this is the first ever attempt at theoretically modeling the important roles that the instrument has historically played in prominent emerging markets in South Asia.

Ever since Akerlof (1970), it has been argued that information flows are necessary for markets to function properly in a world of asymmetric information. If buyer and seller have different information regarding the value of the item to be exchanged, a "lemons market" may arise. Unable to distinguish between high-quality and low-quality goods, buyers may not be willing to pay a price that elicits the supply of anything other than the lowest-quality items. Consequently, potential gains from trade may go unrealized. A large number of papers in economics and finance have identified various information transmission mechanisms operating in financial markets. Ross (1977) identifies the management's choice of debt level as a possible indicator of true value to outsiders. Leland and Pyle (1977) point out that the amount of self-financing by entrepreneurs can be a credible indicator of value. Bhattacharya (1979), Meyers and Majluf (1984), Vermaelen (1984), John and Williams (1985), and Miller and Rock (1985) are other examples of models in which managers successfully transmit their private information to outsiders through various mechanisms. It is clear that a properly functioning equity market requires a complex set of interlinked institutions, both formal and informal to strengthen information flow.

In emerging markets, the question of information transmission becomes even more important since legal and institutional preconditions for proper information flow as pointed out in Black (2001) typically do not exist. It is clear, even to a causal observer, that ground

realities in emerging markets are very different from the developed markets. How do these markets respond? How do they continue to function? Perhaps, emerging markets respond by developing innovative information transmission mechanisms. That is, mechanisms unique to them.

In this paper, we identify a unique information transmission mechanism operating in South Asian equity markets. This mechanism is associated with the equity markets of India and Pakistan and operates through a unique financing instrument. The instrument, known as *badla* in local parlance, allows carry forward of open positions from one settlement date to the next. The party carrying forward its position pays a charge called the *badla* rate. An example clarifies. Suppose an investor buys 100 shares of stock X on Monday at Rs 1000 per share. Assume the settlement system is T+2, which means that the payment and delivery takes place two days after the transaction. That means, in our example, the investor is required to pay Rs 100,000 on Wednesday to the seller in exchange for the shares. If he does not have enough funds on Wednesday, he could defer settlement till the next settlement date (Friday) by using the following process: The *badla* financier pays the money and takes delivery from the seller[2], however, at the same time, the financier sells the shares to the investor at a price in excess of Rs 100,000. Since the sale will be settled on the next settlement date, the investor benefits as his open buy position has been carried forward. The financier benefits since the purchase price is set to be in excess of Rs 100,000. The annualized percentage excess amount is termed the *badla* rate. The financier holds the shares as collateral till settlement. The *badla* rate is determined through the forces of supply and demand, independently of the type of investor or stock. The fact that the *badla* rates do not differ significantly across various stocks can be interpreted as evidence that money is fungible.

Essentially, *badla* is an instrument that facilities a carry over transactions (COT) through a repurchase agreement. An investor engaged in *badla* is simultaneously selling and buying (a repurchase agreement) without changing his net position. The financier is simultaneously buying and selling (a reverse repurchase agreement). However, the financier

[2] The per-share amount paid by the financier depends on the closing price on Wednesday. In our example, we assume that this price is equal to the price on Monday for simplicity. However, if it is lower, the financier pays the lower price and the investor pays the difference. Typically, the price paid by the financier is further marked down by a margin (2 to 5% in case of Pakistan) with the investor coming up with the difference.

is exposed to the counterparty risk. There is no way of managing this risk between the transaction and settlement dates since the clearing house does not guarantee this transaction. The presence of counterparty or default risk is the reason why *badla* rates are significantly above the risk-free rate. Specifically, the *badla* financier faces the risk of not being able to recover all of his funds if the price falls significantly between settlement dates since in that case the investor may be forced into default. The value of shares the financier is holding as collateral may erode significantly. It is precisely this risk that allows information transmission to take place. It is important to note that *badla* financee does not have limited liability. He is obligated to pay back the amount to *badla* financier no matter what. However, in a sharply falling market, the financee may be forced into default. This possibility creates counter-party risk for the financier.

In this paper, we present a signaling model of *badla* financing. We show that if a broker has superior information about the value of stocks, then he can credibly transmit this information to investors by choosing the level of *badla* financing to provide in each stock. Hence, *badla* may serve as a mechanism of information transmission separate from the obvious function of providing liquidity. The key idea is that by providing *badla*, the broker-financier incurs counterparty risk. In equilibrium, this risk is justified if there is an increase in the perceived value of the stock financed since this increase translates into higher commission income for the broker.

Badla financiers are primarily brokers. In its original form, *badla* allows rollover of unsettled transactions from one settlement date to the next indefinitely as long as the investor can pay the financing costs. *Badla* appears strange in the context of a spot market since it effectively superimposes a feature of the futures market (settlement in the future) onto the spot market. However, the interest rate in the futures market is the risk-free rate whereas in *badla* transactions, the interest rate is significantly higher due to the counterparty risk. The counterparty risk is significant and has resulted in various payment crises in both India and Pakistan. In one instance, in May 2000, several brokers in the Karachi Stock Exchange (KSE) defaulted as share prices fell and *badla* borrowers did not pay up.

Badla started as an informal, though legal, credit market serving equity markets in South Asia. However, due to the counterparty risks involved, authorities in both countries tried to do away with *Badla* several times. In India, after each ban, *badla* was started again in a modified form with an objective of better managing the counterparty risk. Eventually *badla*

was eliminated officially from Indian markets in 2001, however, it continues informally. In Pakistan, *badla* continues under the name of Continuous Funding System (CFS). There are plans to eliminate CFS. However, even if CFS is eliminated, it wouldn't mean elimination of *badla* since it would continue informally. Its elimination faces stiff resistance from key market players. We show, in this paper, that key market players are able to mount stiff resistance due to the 'microstructure rents' that *badla* creates. By exploiting these rents, these market players are able to gain control over the management of stock markets. This creates institutional inertia.

Despite the important role played by *badla*, little academic research on *badla* exists. Berkman and Eleswarapu (1998) report a negative abnormal return of 15% on *badla* stocks after this financing facility was banned in India for the first time in 1994. Husain and Rashid (2007) investigate the link between *badla* financing and the performance of KSE-100 index and report a two-way relationship. Uppal and Mangla (2007) undertake a comparative analysis of stock exchanges in Bombay and Karachi in the context of *badla* financing. All the research on *badla* has been empirical so far. The lack of a proper theoretical framework to guide empirical work may have been a reason for insufficient study of *badla* financing. This paper attempts to fill this gap and is, to our knowledge, the first ever theoretical study of this instrument and the various roles it plays.

The paper is organized as follows. Firstly, an overview of the prominent equity markets in South Asia is provided in the context of the institution of *badla*. Next, under the assumption of asymmetric information, we develop a signaling model of *badla* financing that shows that the institution of *badla* may lead to a perfect Bayesian equilibrium (separating equilibrium) in which superior information held by broker-financiers is credibly transmitted to investors. Conditions are identified which lead to the break-down of such an equilibrium. Then, we show how *badla* creates micro-structure rents for certain players. These rents are exploited to control the management of the stock markets. Hence, institutional inertia is created that hinders the reform process.

1. South Asian Equity Markets and the Institution of Badla

The major stock market in Pakistan, the Karachi Stock Exchange (KSE), was established soon after independence in 1947. KSE has been declared the best performing stock market of the world in 2002 by "Business Week". As of December 31, 2007, 654 companies were listed with a market capitalization of Rs 4,204.522 billion ($68 billion) having listed capital of Rs 671.29 billion ($10.88 billion). Average daily trade value in KSE is around $400 million. It is estimated that, in a booming market, approximately two-third of daily transactions are rolled over through *badla*. The amount of funds available in the *badla* market is estimated to be in excess of $1 billion at the peak of the market in 2007. Apart from *badla*, market microstructure of KSE is the same as any developed market. Trading at KSE is fully automated and order-driven through limit and market orders. The counterparty risk inherent in *badla* financing has caused various payment crises in KSE. In one instance, in May 2000, several brokers defaulted as key investors refused to clear their payments due to the continuous decline in the market. *Badla* financing can potentially worsen a fall in the market since *badla* financiers have an incentive to withdraw financing in a falling market. This is reportedly what happened in March 2005 according to a report by the Task Force, which was set-up to investigate the unprecedented decline in KSE after the March 2005 crisis. In recent history of KSE, *badla* related crises have occurred in May 2000, September 2001, May 2002, March 2005, and June 2006. In view of these crises, various attempts have been made to eliminate *badla* financing; however, they were strongly resisted by the market, particularly by large brokers. *Badla* remains in KSE in the form of CFS even though there are plans to eliminate it. However, elimination of CFS will not end *badla* as it is will almost certainly continue informally.

Bombay Stock Exchange (BSE) is the oldest stock exchange in India. It was established in 1875. As of November 30, 2007, equity market capitalization is $1619.18 billion with 4879 listed companies. BSE has an average daily turnover of about $2 billion.[3] BSE is an automated and order-driven market like any developed market. BSE was the largest *badla* market in South Asia for a very long time. There were many crises linked with *badla* financing. In 1993, there were defaults linked to *badla* financing in BSE forcing the

[3] www.bseindia.com

Securities and Exchange Board of India (SEBI) to ban this product. However, *badla* was re-started after strong resistance to the ban was shown by the broker community. After the March 2001 crisis, also associated with *badla*, SEBI banned *badla* officially for good. However, it continues informally. For a description of tussle between SEBI and broker community over *badla*, see Echeverri-Gent (2002).

National Stock Exchange of India[4] (NSE) was established in 1994. Unlike BSE, NSE was promoted by leading financial institutions at the behest of the government. NSE was the first demutualized exchange in the country where the ownership and management is completely divorced from the right to trade on it. This precluded conflicts of interests. NSE initially refused to allow *badla*. However, in 1999, it allowed *badla* in a modified form called the Automated Borrowing and Lending Mechanism (ABLM). ABLM was banned after the March 2001 crisis. Hence, *badla* financing is now officially present only in Stock Exchanges of Pakistan. However, market participants argue that in India *badla* continues by involving two exchanges where the first leg of the transaction is carried out in one exchange and the second leg in another exchange to circumvent regulations banning *badla*. [5]

Typically, *badla* is thought of as an instrument that provides liquidity to the market. However, here we show that there is much more to the story of *badla* than just liquidity provision. Firstly, it can be thought of as a signaling mechanism and an institutional response to the information gaps that are particularly severe in emerging markets in the absence of proper regulatory and institutional framework. Secondly, it gives rise to market structure rents, which may be exploited to control the management of these markets. No wonder, reform process in the stock exchanges of Pakistan has not only stalled but back-tracked and regulators had to fight a long and hard battle for reforms in the stock exchanges of India (see Echeverri-Gent (2002)). In the next section, we turn our attention to the signaling aspect of *badla*.

[4] Information about NSE is available at www.nseindia.com

[5] Some call it synthetic *badla*. See www.bdshah.com/arbitage.htm

2. Signaling through the Institution of *Badla*

The model relies on the idea that a broker who is also a badla-financier has superior information about the value of various stocks. Since badla-financing generates counterparty risk for the financier, the broker can credibly transmit this information to investors by choosing to provide different levels of financing in different stocks. The broker-financier has an incentive to provide this information since such transmission increases the commission income accruing to the broker. The model can be thought of as one of the long list of signaling models inspired by Akerlof's lemons market paper (Akerlof (1970)) and Spence's paper on education as a signaling mechanism (Spence (1973)).

Suppose different types of firms have issued shares that are traded in the market. The number of shares issued by each firm is N. Each firm lives for one period marked by two points in time; time-0 and time-1. The profit of each firm is realized at time-1. A firm's profit, x_i, is drawn from a uniform distribution [0,K] at time-1. The value of K differs from firm to firm and is uniformly distributed over [y,z]. There is a risk-neutral representative broker-financer who knows the exact value of K for each firm. However, outside-investors do not have this information. The broker-financier is assumed to strictly act as an intermediary (that is, the broker-financier does not trade on his own account). At time-0, the total transaction value intermediated by the broker-financier in a given stock is $T(V_p)$ where $T'(.) > 0$ and V_p is the price per share. For simplicity and without loss of generality, we assume that $T'(.)$ is a constant. .The broker charges a commission as a percentage of total transaction value. At time-0, the commission received by the broker in a given stock is $f_0.T(V_p)$ where $0 < f_0 < 1$. In addition, the broker-financier also provides *badla* financing at time-0.

If the value of K is known, risk averse investors value each firm's stock as:

$Vp = \dfrac{K - \lambda}{2N(1+r)}$ where r is the risk free rate, and λ is the risk-aversion parameter.

Since K is unknown, investors, in the signaling equilibrium, infer the value of K for each firm from the amount of *badla* financing provided in each stock: $Vp = \dfrac{a(B) - \lambda}{2N(1+r)}$ where $a'(B) > 0.$

So, higher the value of B, higher is the price of the stock. Consequently, higher must be the realized value of x_i at time-1 that ensures no loss for the broker-financier. Specifically, time-1 profit of broker-financier is $\pi 1 = i \times B \quad if \ X \geq \Psi(B)$. There is a loss of $\pi 1 = -e \times B \quad if \ X < \Psi(B)$, where $0 < \Psi(B) < K$. B is the amount of *badla* financing, i is the *badla* rate, $\Psi(B)$ is an increasing function of B, and e is a positive constant between 0 and 1. For notational simplicity (and without loss of generality), we assume $\Psi(B) = B$.

The optimization program of the risk-neutral broker-financier in each stock can be expressed as:

$$\text{Max } \pi = f0 \times T(Vp) + \frac{1}{(1+r)}\left\{iB \times \frac{K-B}{K} - eB \times \frac{B}{K}\right\}$$

The model proceeds as follows. Firstly, the risk-neutral broker-financier receives information about the K-value of various firms. The broker-financier then announces the amount of *badla* financing available in each stock. The interest rate on *badla* financing is exogenously given and is the same for all stocks. All of the *badla* funds are utilized by the investors. Proposition 2.1 shows that a separating equilibrium may arise in which the true K-value of each firm is revealed to the investors.

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Proposition 2.1 ***If*** *i* ***is sufficiently small, there exists a separating equilibrium (a perfect Bayesian equilibrium) in which the broker-financier credibly transmits superior information to outside-investors. In the separating equilibrium, the true K-type of each firm is revealed as***

$$K = a(B) = \frac{-iB}{f0w} + \sqrt{\left(\frac{iB}{f0w}\right)^2 + \frac{4B^2(i+e)}{f0w} + Y^2 - \frac{2iB \times Y}{f0w}}\ .$$

Proof. The first order condition is

$$f0.T'(.)a'(B) \times \frac{1}{2N} + i = \frac{2B(i+e)}{K}$$

Replacing $T'(.)/N$ with a constant w, and looking for a separating equilibrium $\{that \ is \ K = a(B)\}$, we arrive at the following differential form:

$$a(B)da(B) + \frac{2i}{f0w}a(B)dB = \frac{4B(i+e)}{f0w}dB$$

Integrating both sides:

$$\frac{a(B)^2}{2} + \frac{2i}{f0w}\int a(B)dB = \frac{2B^2(i+e)}{f0w} + c$$

Using the linear approximation, $a'(B) = {a(B) - a(0)}/{B}$, one can approximate as follows,

$$\int a(B)dB = \frac{a(B)B}{2} + \frac{a(0)B}{2}.$$

With the above approximation, and the value of i sufficiently small to ensure that $\frac{i}{e} < \frac{B}{K-B} \ \forall B > 0$, we arrive at,

$$\frac{a(B)^2}{2} + \frac{iB \times a(B)}{f0w} + \frac{iB \times Y}{f0w} = \frac{2B^2(i+e)}{f0w} + c.$$

Here, we have imposed the boundary condition, $a(0) = y$ (obviously, no need to signal the lowest type through *badla*). The same boundary condition can be used to solve for the value of c also. It follows,

$$\frac{a(B)^2}{2} + \frac{iB \times a(B)}{f0w} + \frac{iB \times Y}{f0w} = \frac{2B^2(i+e)}{f0w} + \frac{Y^2}{2}$$

Hence,

$$a(B) = \frac{-iB}{f0w} + \sqrt{\left(\frac{iB}{f0w}\right)^2 + \frac{4B^2(i+e)}{f0w} + Y^2 - \frac{2iB \times Y}{f0w}}.$$

■

Proving *badla* creates counterparty risk for the broker-financier. All things equal, the risk is lower for high value stock when compared with a lower value stock. In equilibrium, this risk is compensated by the increase in commission income. Balancing of these costs (counterparty risk) and benefits allows a separating equilibrium to emerge. However, the separating equilibrium breaks down if the *badla* rate crosses a certain threshold ($\frac{i}{e} < \frac{B}{K-B} \ \forall B > 0$ for the separating equilibrium to emerge). This is in line with the

anecdotal evidence from market participants who typically exhibit satisfaction with *badla* financing when the interest rate charged is close to the risk-free rate. Also, in periods immediately preceding various market crises (for example, the March 2005 crisis in the Karachi Stock Exchange), the *badla* rate was very high. This indicates that perhaps an information transmission failure is also a contributing factor to market crises in emerging markets.

The signaling equilibrium may also break-down if there is segmentation in the *badla* market. That is, if different *badla* rates are charged in different stocks. However, historically, *badla* rates have not been significantly different for different stocks. This may be taken as an evidence of the realization of the signaling function of *badla*.

It is important to note that the equilibrium described here fits well with the empirical description of the market. There are two features of the *badla* market that appear puzzling. Firstly, the market is dominated by brokers even when there is no bar on the participation of banks and other financial institutions. This is especially true for Pakistan where authorities tried to encourage banks to participate in this market. Secondly, in normal times, *badla* rates do not appear high enough to justify the significant counterparty risks that it entails. These aspects seem to indicate that there are some indirect benefits of *badla* that only accrue to broker-financiers and not to outside financiers. The broker specific accrual may be due to the increase in commission income enhanced by the signaling function as described above. Obviously, outsiders cannot claim commission income. These indirect benefits also keep the *badla* rates low effectively making *badla* an infeasible investment for outside financiers.

Next, we turn our attention to another aspect of *badla* financing. We show that *badla* creates 'micro-structure rents' for certain players. Due to these 'micro-structure rents', essential market reforms have been stalled.

3. Micro-structure Rents and the Institution of *Badla*

Typically, economists recognize two types of rents; innovation rents and intervention rents (Buchanan (1980)). Innovation rents are rewards for innovation that arise in the context of the market and are considered welfare enhancing. However, such rents tend to dissipate

quickly as others imitate the innovator. In contrast, intervention rents arise due to state intervention and are considered welfare reducing. Echeverri-Gent (2002) argues for a third type of rent called the 'market micro-structure rent'. Such rents are said to arise when the trading rules and institutions that comprise a market micro-structure benefit particular market participants.

Badla providers are typically a small number of large brokers. *Badla* is lucrative to all brokers, irrespective of their size, since it magnifies their trading volumes and commission incomes. Financial institutions such as banks typically stay away from the *badla* market due to the substantial counterparty risks and separation of the lending function from the investment function. Hence, market participants are generally dependent on a small number of large brokers for their *badla* funds. Consequently, the institution of *badla* puts a few large broker-financiers in a privileged position. Hence, micro-structure rents are created.

To understand the significance of these rents, it is essential to understand the story of attempted stock market reforms in South Asia. In particular, the story of attempted institutional reforms in the stock exchanges of Pakistan is a very interesting one. We tell the story here with particular reference to the Karachi Stock Exchange, however, the description is, more or less, applicable to the other stock markets in the region. There are two main institutions in the Karachi Stock Exchange (KSE). The term institution here means "rules of the game". The rules can either be formal or informal. The two primary institutions in KSE are: a financing institution called *badla*, and a governing institution that specifies how the directors are elected. These directors form the governing board of KSE and are responsible for smooth functioning of day-to-day operations. After the March 2005 crisis, policy makers came out with a plan of reforms which was aimed at reforming both the above mentioned institutions. However, both sets of reforms have been stalled due to resistance from key market players.

Apart from the question of why those resisting reforms have succeeded, there are two related questions that must also be answered. Firstly, brokers themselves have argued for and successfully implemented certain reforms. Reforms such as the introduction of electronic trading, 'dematerialization' of shares through creation of CDC, switching from 'quote driven' trading to 'order driven' trading, and replacing periodic settlements with rolling settlements were broker-driven. Without any doubt, all these reforms have made trading more transparent and safer by reducing opportunities of manipulation by brokers

and by reducing systematic risk. Elimination of *badla* financing and demutualization (policy maker driven reforms which the brokers are stalling) are also aimed at reducing manipulation and systematic risk. If all the reforms have the same objective, how come brokers forcefully argue for some and stall the others?

It is also a common perception among participants and commentators that most of the benefits of market manipulation go to big brokers who are not more than a dozen in number. However, the reputational costs are shared by the entire broker community. There are 200 brokers in KSE alone (about 140 are active). If most of the gains go to only a dozen and the costs go to all, why don't the other brokers out-vote the manipulating bloc and elect directors who would check such manipulation?

Here, we argue that all three questions raised above have a common answer. The answer lies in understanding the interactions between announced formal rules and historically developed informal rules. If we consider the process of reforms as a mere transplantation of formal rules from developed markets to our markets, the questions remain unanswered. But, if we consider the interactions of these transplanted rules with existing informal rules underlying our markets, then things appear to fall into place and coherent answers to the questions raised above are found. Along the way, we will see that the underlying 'rent structure' that shapes the informal rules is very different from what one typically sees in developing countries. Normally, rent-seekers aim to gain privileged positions through favorable government interventions. The "SRO culture" in the industrial sector of emerging economies is a case in point. But as far as the stock market is concerned, the privileged positions have arisen endogenously through market interactions. Hence, the rent-seekers of the stock market do not want government interference in their affairs. Consequently, the politics of rent-seeking is very different in the stock market.

Let's consider the third question first. Consider two games, one with formal rules and another with informal rules. Initially, assume that the two games are not linked. The formal game has legally spelled out procedures for election of 5 member directors. There are about 200 brokers who can vote. The informal game is one in which few large brokers decide how to allocate *badla* funds to other brokers. *Badla* is lucrative to all brokers since it magnifies their trading volumes and consequently their incomes. Of course, large brokers with *badla* funds have complete freedom to decide who gets *badla*. If the two games are separate, it is optimal for the majority of small brokers to unseat member directors who

favor large brokers in the formal game. But, by strategically linking the two games, that is, by making *badla* availability in the second game conditional on cooperative voting in the first game, a few powerful brokers can manipulate the outcome of elections. No wonder, the governing board of the exchange does not act to check manipulation.

The second question is now fairly easy to answer. Broker-driven reforms are exactly those that increase the component of the informal game in the pooled incentive constraint across the two games. "Dematerialization of shares", "*badla* market operating in parallel with the spot market" and "rolling settlements", all increase the efficiency with which the *badla* funds can be employed along with some mitigation of systematic risk. Both outcomes are favorable to *badla* financiers. That is, broker-driven reforms are exactly those that increase the de facto power of already powerful brokers. In contrast, regulator-driven reforms are those that, if implemented, will weaken the component of the informal game in the pooled incentive constraint across the two games. No wonder such reforms are stalled. Hence, the brokers' response to the two sets of reforms is entirely consistent.

The first question can now be answered. The institution of *badla* creates microstructure rents (through strategic linkage across the two games) as described above. Such microstructure rents are exploited to control the management of KSE. Consequently, regulators cannot negotiate their way to success with KSE management because powerful brokers who run the show will never accept elimination of their source of power through negotiations. In short, when the institution of *badla* is targeted for reforms, powerful brokers strengthen their hold on the governing institution and use their increased power to stall the attempted reforms. That is, the institutions of *badla* and governance are inter-dependent. Furthermore, the microstructure rent associated with the institution of *badla* has arisen endogenously in the market and no government action was involved.

In the next section, we formalize these ideas in a simple framework.

The Model

Suppose small brokers (S) have two voting options; they can either vote for the directors who are in league with large brokers who engage in market manipulation (V) or vote for the directors who would check manipulation (N). For simplicity and without loss of generality, we assume that the small brokers act as a group (they have solved their collective action

problem). The way S votes determines the outcome of the election of the governing board of the stock market. The directors (D), once elected, can either move to check manipulation (C) or ignore it (A). Manipulation results in rents equal to R to large brokers, however, there is a reputation cost of manipulation to all brokers. Denote the reputation cost to large brokers as r_l and the cost to small brokers as r_s. Figure 1 shows the extensive form.

Remark 1 In equilibrium, small brokers (S) vote for the directors who check manipulation.

We next describe the *badla* financing game. In this game, the large brokers allocate *badla* funds to small brokers. There are n small brokers. Large brokers who act as a group make *badla* allocation conditional on favorable voting behavior in the election game. The amount of *badla* funds allocated to each small broker every period in the case of favorable voting in the one shot election game is denoted by b. Only large brokers have *badla* funds. The total amount of *badla* funds available with them are B. *Badla* is lucrative to all brokers because they earn a commission income on *badla* facilitated transactions. The commission income on *badla* transactions of b is cb per period. Large brokers, if they engage in manipulation, face an expected penalty of f in the form of fines by regulatory authorities.

Large brokers (who act as a group) earn an interest i on the *badla* funds they provide for lending. If they lend *badla* funds directly to investors they also earn the additional commission income described above. If they lend funds indirectly, that is, they provide *badla* to small brokers and small brokers then lend to investors, large brokers forego commission income, since commission income accrues to small brokers in that case. Providing *badla* involves counterparty risk, hence, large brokers' interest income i is marked down by a term e due to the expected losses arising out of the counterparty risk. Hence, the total per period income to large brokers from *badla* activity of B if they lend directly to investors is:

$$(i-e)B+cB=(i+c-e)B$$

If part of the funds is lent through small brokers and given that there are n small brokers and each small broker gets funds equal to b, the total per period *badla* related income of large

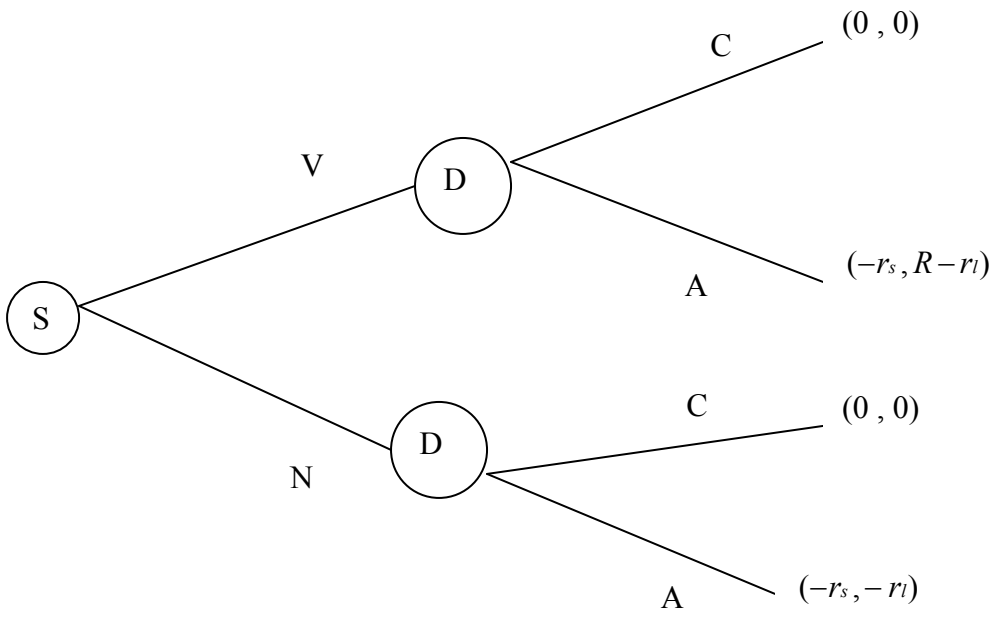

Figure 1

brokers is: $(i+c-e)(B-nb)+(i-e)nb=(i+c-e)B-cnb$. The commission income accruing to small brokers each period is cnb if they get *badla* funds.

The two games proceed simultaneously and are infinitely repeated.

Proposition 3.1 ***An equilibrium in which small brokers (S) vote for the directors who favor large brokers can be sustained through strategic linkage with the badla game if and only if both of the following conditions hold***

$$cnb - r_s \geq 0 \qquad (3.1)$$

$$R - cnb \geq f + r_l \qquad (3.2)$$

Proof. Consider a grim trigger strategy: Both players cooperate till one player defects. After that, cooperation breaks down forever. If small brokers vote (V) in the election game, the net benefit with the discount factor of δ is given by $\frac{cnb}{1-\delta} - \frac{r_s}{1-\delta}$. If (3.1) does not hold, then small brokers do not vote V. If large brokers provide nb to small brokers in return for

favorable voting, the net benefit to large brokers is $\frac{R - f - r_l}{1-\delta}$, and the cost is $\frac{cnb}{1-\delta}$.If (3.2) does not hold, then the arrangement is too costly for large brokers. Strategic linkage is beneficial to both parties if and only if both conditions hold.

□

Anti-Manipulation Strategies

The punishment and reputation cost parameters f, r_l and r_s are taken as exogenous by the parties. However, one can think of the government as a strategic player that attempts to structure the game so as to reduce the level of manipulation.

If punishment and detection of manipulation is costless to the government, checking and controlling manipulation is trivial; the government only needs to set the parameter f high enough to ensure that $f \geq R - cnb - r_l$. However, in general, it is likely to be costly to the government to monitor and punish those who engage in manipulation. These costs may arise due to monitoring, exacerbated by the difficulty of collecting hard evidence and pursuing a trial. There may also be political constraints and so on. The government may also try to increase the reputation costs of manipulation to brokers; r_l and/or r_s by providing information through media. One way may involve government experts and regulators appearing in front of media and sharing evidence. Another is leaking confidential reports to newspapers. Obtaining such information and disseminating it may entail significant costs. For simplicity, we assume that the reputation costs are equal to both parties, $r_l = r_s = r$. We postulate a function $c(f, r)$ that represents the cost to the government of achieving an expected level of punishment of f and reputation costs to the brokers of r. Assume that c(.,.) is continuous and strictly increasing in both arguments.

There are two distinct ways of preventing manipulation according to proposition 3.1. The government may make manipulation infeasible for large brokers by choosing f and r such that $f + r > R - cnb$. Alternatively, the government may ensure that small brokers have no incentive to vote for the directors who favor manipulation. That is, by ensuring that $r > cnb$. The options available to the government are shown in figure 2.

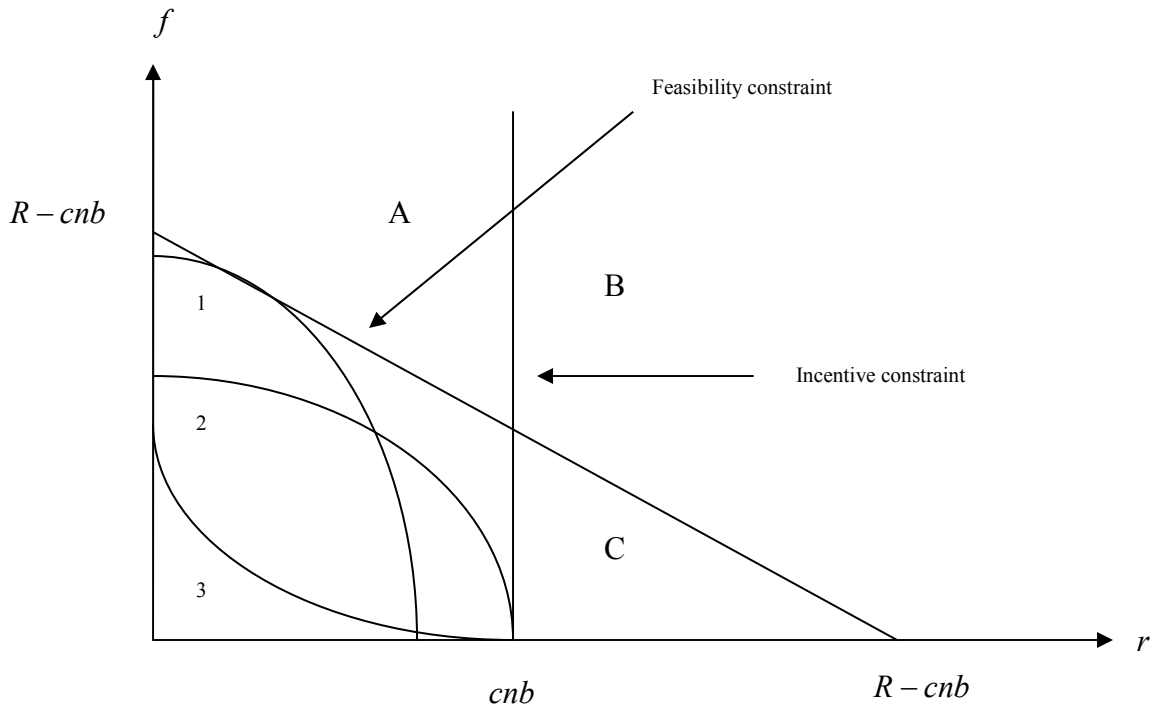

Figure 2

Manipulation will be deterred if the government chooses a combination that lies in the areas A, B, or C. The government's optimal strategy crucially depends on the shape of the function $c(f,r)$ (the shape of its iso-cost curves). As an example, figure 2 shows three iso-cost curves. In case (1), the least cost way for the government to deter corruption is to make it infeasible for large brokers, that is, by ensuring that $f + r > R - cnb$. In cases (2) and (3), the least cost way for the government to deter corruption is eliminate small brokers' incentive to vote for manipulating directors by increasing the reputation costs; $r > cnb$.

Proposition 3.2 ***If***

$c(0,cnb) \leq c(R - cnb - X, X) \;\; \forall X \in [0,r]$

then the least cost way to deter manipulation is to choose $r = cnb$ ***and*** $f = 0$.

Proof. . If the above condition holds then it is costlier to eliminate manipulation by making it infeasible for large brokers ($f + r > R - cnb$) then by making it unattractive to small brokers ($r > cnb$).

□

Proposition 3.2 highlights that it may be worthwhile for the government to pursue a very different anti-manipulation strategy than what is commonly thought. As one example, the government of Pakistan, in one case, had spent million of dollars in trying to carry out forensic investigation of the activities of large brokers after the March 2005 market crash, widely believed to be the result of manipulation by large brokers. However, the difficulty of collecting hard evidence in the presence of confounding factors, as well as constraints arising from political connections of the accused, prevented them from building a case against those involved. Alternatively, another approach may involve increasing the reputational costs of small brokers in various ways including encouraging media coverage of disgruntled small investors, pensioners, and senior citizens who typically are the primary victims of manipulation schemes. The government may encourage publication of hard-hitting articles that analyze how the governing board of director is ineffective in checking manipulation and how small brokers tend to vote for manipulating directors. Regulators may have a better chance of deterring manipulation by discouraging small brokers from voting for the manipulating directors.

Conclusions

We have taken a detailed look at a unique financing instrument associated with prominent equity markets in South Asia. The instrument known as *badla* may be an institutional response to the information gap existing in these markets. The information gaps in these emerging markets tend to be fairly serious since legal and institutional pre-conditions for proper information flows are not present in these markets. *Badla* may serve a useful purpose by eliminating such information gaps. The institution of *badla* also gives rise to 'micro-structure' rents, which are exploited by large borkers/*badla* financiers to gain control of the governing board of directors. The board turns a blind eye to manipulation schemes run by large brokers. It may be worthwhile to pursue an alternative anti-manipulation strategy

compared to what the regulators typically pursue. The alternative strategy involves discouraging small brokers from voting for directors who favor large brokers.

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