Information Transmission in Emerging Markets: The Case of a Unique Financing Instrument

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Abstract

Information flows are necessary for well-functioning financial markets. However, in many emerging markets, the legal and institutional preconditions for proper information flow are not met. How do such markets respond? We argue that they respond by developing innovative information transmission mechanisms. We identify one such mechanism associated with the evolution of equity markets in South Asia. The mechanism operates through a financing instrument unique to India and Pakistan, called *badla* in local parlance. We develop a signaling model in which a broker-financier signals his private information to investors by choosing various levels of financing to provide in the *badla* market for stocks. A fully separating equilibrium exists allowing full discrimination of various types of stocks. Hence, information transmission takes place through this channel.

***Keywords*:** Signaling, Information Transmission, Separating Equilibrium, *Badla-Financing,* Emerging Markets

***JEL Classification Codes*:** D82, D80, G10, G20, G15

Information Transmission in Emerging Markets: The Case of a Unique Financing Instrument

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 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. Debt-signaling as in Ross (1977) cannot be the mechanism in many emerging markets since this framework requires truthful reporting of the debt level. Just as one example, weak governance allows firms in Pakistan to disguise equity as debt for tax advantages.[1] It is common knowledge that weak governance in many emerging economies allows significant tax evasion to occur. Entrepreneurs interested in hiding their wealth from tax authorities are not likely to use the amount of self-financing as a signal, neutralizing the mechanism identified in Leland

[1] "The Puzzle of High Banking Sector Spread", *Economic and Business Review*, Dawn, Jan.8, 2007.

and Pyle (1977). Or, in many emerging markets, transmission through the choice of dividends as in John and William (1985) is not likely to work due to the corporate norm of not paying dividends. 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+3, which means that the payment and delivery takes place three days after the transaction. That means, in our example, the investor is required to pay Rs 100,000 on Thursday to the seller in exchange for the shares. If he does not have enough funds on Thursday, he could defer settlement till the next settlement date (Tuesday) 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. Typically, the *badla* rate is determined through the forces of supply and demand, independently of the type of investor or stock. The financier holds the shares as collateral till settlement.

Essentially, *badla* is an instrument that facilities a carry over transactions (COT) through a repurchase agreement. An investor engaged in *badla* is simultaneously selling

[2] The per-share amount paid by the financier depends on the closing price on Thursday. 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 small margin (2 to 5% in case of Pakistan) with the investor coming up with the difference.

and buying (a repurchase agreement) without changing his net position. The financier is simultaneously buying and selling (a reverse repurchase agreement). However, the financier 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 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.

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 altogether from Indian markets in 2001. In Pakistan, *badla* continues under the name of Continuous Funding System (CFS).

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. The lack of a proper theoretical framework to guide empirical work may have been a reason for insufficient study of *badla* financing. This paper is an initial attempt at providing such a framework.

This paper is organized as follows. In the next section, a brief description of South Asian equity markets is provided in the context of *badla* financing. Afterwards, a signaling model of *badla* financing is presented followed by a discussion of policy implications of the model. The following policy recommendations arise from our model. *Badla* rates must be capped and a broker-financier interested in this market must commit a minimum amount in every stock in which he wishes to provide financing. *Badla* market should not be segmented. Moreover, broker-financiers should not be allowed to trade on their own account in shares for which they provide *badla* in order to prevent price manipulation.

South Asian Equity Markets and *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 two-third of daily transactions are rolled over through *badla*. The amount of funds available in the *badla* market is estimated to be

around $1 billion.[3] 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 brokers. *Badla* remains in KSE in the form of CFS.

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.[4] 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 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* for good. For a description of tussle between SEBI and broker community over *badla*, see Echeverri-Gent (2002).

National Stock Exchange of India[5] (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.

[3] For details of *badla* (CFS), and further information about KSE visit www.kse.org.pk
[4] www.bseindia.com

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

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*. [6]

The Model

Consider a broker who has superior information about the value of various stocks being traded. It is a likely scenario since many brokerage houses have research wings engaged in the business of analyzing the fundamentals as well as the price trends of various stocks. Research resources at their disposal combined with access to real time data due to the market making function may lead to a better understanding of price dynamics.

The key idea of the model is that by providing *badla* financing, the broker-financier undertakes counterparty risk. In equilibrium, such risk is justified if there is sufficient increase in value as perceived by the market since this increase in value translates into higher commission income for the broker.

The following assumptions are made:

Assumption 1 *The broker-financier is strictly an intermediary.*

Assumption 1 states that the broker only trades on behalf of his clients and not on his own account in shares in which he provides *badla* financing. This assumption is needed to ensure that the broker does not engage in price manipulation through *badla* financing.

Assumption 2 *The return X of each firm is a random variable uniformly distributed on* [0, K], *where K characterizes the type of each firm and varies over the interval* [Y, Z].

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

Assumption 3 *The broker knows each firm's K type.*

Assumptions 2 and 3 operationalize the concept of superior information possessed by the broker.

The model is defined within two points in time. There are a number of firms. At time 0, the broker's commission in each stock, $\pi 0$, is a fraction of the total transaction value processed in that stock by him. With $f0$ as the fraction and $T(V)$ as the total transaction value as a function of the value of the stock, the time-0 commission (profit) in the stock is

$$\pi 0 = f0 \times T(V) \qquad (1)$$

where $T'(V) > 0$.

Brokerage commission, in the real world, is typically a fraction of total transaction value as in (1).

Apart from earning commissions at time-0, the broker also chooses the amount of *badla* financing to provide at time-0. Time-1 profits to the broker depend on his choice of the amount of *badla* financing to provide at time-0 as well as the realization of the return X at time-1. As explained in the introduction, *badla* financier is exposed to the counterparty risk. A relatively low value of X may lead to the borrower defaulting since, in that case, the shares for which *badla* has been given would have declined in value. Consequently, the financier-broker would lose a part of his investment.[7] We assume that higher the amount of *badla* financing provided, higher the realized returns of the firm must be before the financier could earn *badla* profits. By providing large amounts of badla financing, the broker-financier takes more risk. Market perceives more risk as signaling greater value, so price rises by more. Unless the subsequent returns are higher

[7] The broker-financier will be able to recover a part of his investment since shares for which *badla* is given are pledged with him as collateral.

as well to justify the price increase, the price will fall and the broker-financier will suffer a loss due to investor defaults. Specifically,

$$\pi 1 = i \times B \quad if \;\; X \geq \Psi(B)$$
$$\pi 1 = -e \times B \quad if \;\; X < \Psi(B) \qquad (2)$$

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.
As B increases, $\Psi(B)$ also increases, reducing the probability of X taking a value larger than $\Psi(B)$. Consequently, the chances of suffering a loss go up as B increases for a given K . By taking, $\Psi(B) = B$ with $0 < B < K$, the expected value of time-1 profits can be expressed as:

$$E[\pi 1] = iB \times \frac{K - B}{K} - eB \times \frac{B}{K} \qquad (3)$$

If type K of the firm is known then the value of its share at time-0 is:

$$V = \frac{K - \lambda}{2N(1 + r)} \qquad (4)$$

where λ is a risk adjustment parameter and N is the number of shares outstanding.

Investors do not know the true value of K . They perceive its value to be $a(B)$. That is, a function of the amount of *badla* financing provided. So, in the eyes of investors, the per-share value of the firm is:

$$V_p = \frac{a(B) - \lambda}{2N(1 + r)} \qquad (5)$$

By choosing B, the amount of *badla* financing to provide, the broker maximizes[8]:

$$\pi = f0 \times T(Vp) + \frac{1}{(1+r)}\left\{iB \times \frac{K-B}{K} - eB \times \frac{B}{K}\right\} \tag{6}$$

with $Vp = \dfrac{a(B)-\lambda}{2N(1+r)}$

The first order condition is:

$$f0.T'(.)a'(B) \times \frac{1}{2N} + i = \frac{2B(i+e)}{K} \tag{7}$$

Assuming that $T'(.)$ is constant, replacing $T'(.)/N$ with a constant w, and recognizing that the broker will want the signal to be efficient, which means that the market perceives the correct type K through $a(B)$ in equilibrium, we arrive at the following differential form:

$$a(B)da(B) + \frac{2i}{f0w}a(B)dB = \frac{4B(i+e)}{f0w}dB \tag{8}$$

Integrating both sides:

$$\frac{a(B)^2}{2} + \frac{2i}{f0w}\int a(B)dB \;=\; \frac{2B^2(i+e)}{f0w} + c \tag{9}$$

$\int a(B)dB$ in (9) can be expressed as:

$$\int a(B)dB = a(B)B - \int a'(B)B\,dB$$

[8] Maximization is done separately for each stock.

$$= a(B)B - a'(B)\frac{B^2}{2} + \int a''(B)\frac{B^2}{2}dB \tag{10}$$

Assuming that $a''(B)$ is negligibly small and ignoring $\int a''(B)\frac{B^2}{2}dB$, the approximation becomes:

$$\int a(B)dB = a(B)B - a'(B)\frac{B^2}{2} \tag{11}$$

Using the linear approximation, $a'(B) = {a(B) - a(0)}/{B}$, (11) becomes:

$$\int a(B)dB = \frac{a(B)B}{2} + \frac{a(0)B}{2} \tag{12}$$

Suppose i is sufficiently small such that

$$iB \times \frac{K - B}{K} < e \times \frac{B^2}{K}, \text{ that is, } \frac{i}{e} < \frac{B}{K - B} \quad \forall B > 0 \tag{13}$$

If the true value of K is Y then the broker has no incentive to signal and the optimal choice of B in that case is 0. So, (12) becomes:

$$\int a(B)dB = \frac{a(B)B}{2} + \frac{YB}{2} \tag{14}$$

Substituting (14) in (9):

$$\frac{a(B)^2}{2} + \frac{iB \times a(B)}{f0w} + \frac{iB \times Y}{f0w} = \frac{2B^2(i+e)}{f0w} + c \tag{15}$$

From the boundary condition, $a(0) = Y$, it follows that $c = \frac{Y^2}{2}$. So, (15) becomes:

$$\frac{a(B)^2}{2} + \frac{iB \times a(B)}{f0w} + \frac{iB \times Y}{f0w} = \frac{2B^2(i+e)}{f0w} + \frac{Y^2}{2} \tag{16}$$

Hence,

$$a(B) = \frac{-iB}{f0w} + \sqrt{\left(\frac{iB}{f0w}\right)^2 + \frac{4B^2(i+e)}{f0w} + Y^2 - \frac{2iB \times Y}{f0w}} \tag{17}$$

The signal in (17) permits full discrimination of types and there is no incentive to signal a false type. Hence, a broker-financier can successfully use *badla* financing to signal his private information to investors. If the signaling mechanism disappears, as happened in India after the badla was banned, there will be a decline in value of stocks. Indeed, this is exactly what Berkman and Eleswarapu report (1998).

Implications of the Signaling Mechanism

The signaling mechanism operates through the choice of the amount of *badla* financing provided by the broker-financier. By providing *badla* financing, the broker-financier undertakes counterparty risk. In equilibrium, this risk is compensated by an increase in the commission income due to the increase in prices of shares in which *badla* is provided. By choosing different levels of *badla* financing in each stock, the broker financier allows the market to distinguish high value stocks from low value stocks. Following policy recommendations arise from this model:

Badla rates must be capped

There is a threshold rate after which the signaling mechanism breaks down. If this threshold is crossed, then the broker-financier will start providing *badla* financing in the lowest K type of stock. There will not be any increase in commission income due to the signaling of the lowest K type. However, with *badla* rate above the threshold, returns from *badla* financing alone are sufficient to entice the broker-financier. The threshold rate can be seen in equation (13) and is given by

$$i < \bar{i} = \frac{e\hat{B}}{Z - \hat{B}} \tag{18}$$

where $\hat{B}$ is the lowest non-zero value of the amount of *badla* financing. The cap can be enforced by making it mandatory for any financier wishing to provide *badla*, to commit a minimum level of funds given by $\hat{B}$ and by ensuring that the *badla* rate does not cross $\bar{i}$.

The cap ensures that $iB \times \frac{K - B}{K} < e \times \frac{B^2}{K} \; \forall K \; and \; \forall B \geq \hat{B}$

Badla market must not be segmented

If there are different *badla* rates in different stocks, that is, if *badla* market is segmented, then the signaling mechanism will not work. Market segmentation changes the incentive structure of the broker-financier, clouding the signaling mechanism in the process. Suppose there are two stocks with different *badla* rates, different amount of *badla* financing in these stocks could be due to different K types, different *badla* rates, or due to a combination of these factors. Hence, *badla* market segmentation is detrimental to a well-functioning information transmission mechanism operating through this mode of financing.

Margining System

$$\frac{\partial a(B)}{\partial e} = \frac{\frac{4B^2}{f0w}}{2\sqrt{\left(\frac{iB}{f0w}\right)^2 + \frac{4B^2(i+e)}{f0w} + Y^2 - \frac{2iYB}{f0w}}} > 0, \forall B > 0 \qquad (19)$$

Due to a number of payment crises caused by *badla* financing, the demand for clearing house involvement through a strong margining system has grown. A strong margining system surely reduces the counterparty risk. However, this risk reduction comes at a cost. The cost can be seen in equation (19). A strong margining system reduces e.

Since $\frac{\partial a(B)}{\partial e} > 0$, more *badla* financing is needed to signal the same K type after a reduction in e. Hence, efficiency of the signaling mechanism declines with a strong margining system. Of course, both the benefits as well the costs of a margining system must be considered.

Financiers trading on their own account

If broker-financiers are allowed to trade on their own account, perverse incentives are created. Surely, they will have an incentive to falsely signal a price increase and cashing in, leading to the break-down of information transmission. The regulator must ensure that broker-financiers act strictly as intermediaries in stocks in which they choose to provide *badla* financing.

Conclusion

Information transmission is necessary for a properly functioning equity market in a world of asymmetric information. However, legal and institutional preconditions necessary for a large number of information transmission mechanisms to work do not exist in many

emerging markets. In this paper, we argue that such markets may be responding by developing information transmission mechanisms unique to them. Since such mechanisms are custom-made for the emerging markets in which they operate, the likes of them may not be seen in developed markets. We present an example of one such mechanism associated with South Asian equity markets. That mechanism operates through a unique financing instrument called *badla*. If brokers have superior information about the true value of various stocks then by providing *badla*, the broker-financiers can transmit this information to investors.

The idea is that by providing *badla*, a broker-financier undertakes counterparty risk. In equilibrium, this counterparty risk is matched by an increase in commission incomes leading to a separating equilibrium allowing full discrimination of various types of stocks.

Following policy recommendations can be seem from our model. *Badla* rates must be capped. There must be a lower-bound to the amount of funds committed by a financier in any stock he chooses to finance. The *badla* market must not be segmented. Furthermore, broker-financiers must not be allowed to trade on their own account in stocks in which they choose to provide *badla*.

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