

**Badla Investment in the Karachi Stock Exchange:
An Investigation of Causal Relations**

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I. Introduction

In recent years Karachi Stock Exchange (KSE), the main equity market in Pakistan, has gained a lot of attraction. It has been among the best performing markets. It has achieved new heights as the KSE 100 index crossed the barrier of 10,000 in March 2005 and then the barrier of 12,000 in April 2006. Similarly, the Market Capitalization and Trading Volume increased by more than 800% and 1000% respectively during 2001-2005 in terms of dollars, (Global Stock Markets Factbook, 2006). However, during this period, the market has also experienced few crises that cast doubts on the fairness of the market operations. In particular, the crises started in March 2005 triggered the widely held opinion of speculations and manipulations prevailed in the market and thus forcing Securities and Exchange Commission of Pakistan (SECP), the regulatory body, to set up a task force to identify the causes of market crash. In this context, Badla financing is often blamed for causing instability in the market.

Badla is an informal source of financing, widely used in Pakistan's stock exchanges. This transaction is made when an investor who lacks funds commits to buy certain shares. A Badla financier provides financing against such shares at market determined premium. This short term collateralized lending is very similar to a

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repurchase agreement (REPO) used in the inter bank market. In simple terms, Badla is a credit line against securities; usually brokers and financial institutions provide such Badla funds. For the Badla financier, it provides an easy avenue of fixed return investment. The Badla financier relies heavily on the credibility of the broker through which the transaction is processed.

The impact of Badla financing on the stock prices in Pakistan has not been formally investigated to our knowledge. This paper attempts to do such investigation. In particular, the objective is to investigate the causal relations between Badla investment and market index, such as KSE 100. In this context, we use the standard causality analysis using daily data from 1st July 2003 to 15th September 2006. Specifically we examine whether Badla investment causes and/or is caused by the market index.

The rest of the paper is organized as follows. The next section contains the discussion regarding the data, sample, and methodology. Section III examines the causal relations between Badla investment and Market Index. Section IV extends the analysis to the two sub-samples classified on the basis of March 2005 crises. The final section contains the summary and conclusion.

II. Data and Methodology

We use daily data on Badla Investment (in billion Rs) and KSE 100 index from 1st July 2003 to 15th September 2006. The Badla investment, also known as Carry Over Transaction (COT), reached its peak of more than Rs. 40 billion on 21st February 2005. It started falling after that while the index was still rising. The index reached its peak of more than 10,000 on 16th March 2005. After that both the variables were falling and the

market remained in crises for a long time. On 22nd August 2005, Continued Funding System (CFS) was introduced which is a modified version of COT. To take care of these events, labeled as March 2005 crises, we divide the sample to two sub-samples. The first sub-sample ranges from 1st July to 21st February 2005 covers the period prior to the crises. The second sub-sample consists of the period from 22nd August 2005 to 15th September 2006 and represents the analysis not only for the post crises period but also for the new CFS system. The trends in Badla investment and stock index in the full sample as well as in the sub-samples are clearly seen in Figures 1 and 2.

We start by presenting the descriptive statistics showing the basic characteristics of the variables and correlation coefficient which is an easy and quick way to know the relation between the two variables. The formal investigation starts with examining the stochastic properties of the variables used in the analysis. Hence, the Augmented Dickey Fuller (ADF) test is performed to test the stationarity of the variables. Next, we apply the Engle-Granger Co-integration test to explore the long run relation between the two variables. Finally, the causal relationship is examined through Granger causality and/or Error Correction Models (ECM). In all cases lag lengths are decided on the basis of Final Prediction Error (FPE) and Akaike information criteria (AIC).

III. Stock Index and Badla Investment in Pakistan

We start by presenting the descriptive statistics and correlation coefficients in Table 1. The table shows the information both at the levels and at percentage changes. Thus the average index during the sample period is around 7000 while the average badla investment is around Rs 23 billion. On the other hand, the average daily return in the

Table 1: Stock Index and Badla Investment
July 1, 2003 - September 15, 2006

Descriptive Statistics				
	KSE 100	B. INV	D(KSE)	D(BI)
Mean	7066.04	23.07	0.0013	0.0006
Std. Dev.	2409.28	5.79	0.0162	0.0411
Skewness	0.42	0.14	-0.48	2.27
Kurtosis	1.9	3.47	4.38	26.95
Jarque-Bera	62.74	9.91	94.06	19674.27
Observations	796	796	795	795
Correlations				
	KSE 100	B. INV	D(KSE)	D(BI)
KSE 100	1.000		1.000	
B. INV	0.196	1.000	0.305	1.000

KSE is 0.13% whereas the average percentage change in Badla is 0.06%. The standard deviation shows that change in Badla investment is much more volatile. It is also highly skewed to the positive side and departs significantly from normal distribution. The table also shows that the two variables are more correlated in terms of percentage changes.

The formal investigation of causal relations is done with the help of Co-integration and Error Correction Model framework. At the first step, the variables used in the analysis are tested for the unit roots by applying the Augmented Dickey Fuller (ADF) test. The results are reported in Table 2 which indicate that the variables are, in general, first differenced stationary, i.e., I(1).

Table 2: Unit Root Tests (ADF) for Variables
July 1, 2003 - September 15, 2006

	Levels		First Difference	
	W/O Tr	W/Trend	W/O Tr	W/Trend
KSE 100	-1.528	-2.515	-12.178***	-12.206***
B. INV	-2.686*	-2.639	-11.730***	-11.732***

The investigation for causal relation between the two variables starts by estimating the co-integrating regression suggested by Engle-Granger followed by Error Correction Models and/or Granger causality equations. Table 3 shows the results.

Table 3: Stock Index and Badla Investment

Co-integration (Engle-Granger)			
	Const.	Coeff.	ADF
KSE on BI	7.747***	0.341***	-1.140
Conclusion: No Cointegration			
Granger Causality			
	D(KSE)	D(BI)	
Const.	0.001	0.001	
D(KSE(-1))	0.092	-0.007	
D(KSE(-2))	-0.069	0.157	
D(KSE(-3))	0.066	0.067	
D(KSE(-4))	-0.004	-0.150	
D(KSE(-5))	-0.002	-0.075	
D(KSE(-6))	-0.068	-0.052	
D(KSE(-7))	0.031	-0.005	
D(KSE(-8))	-0.069	-0.082	
D(KSE(-9))	0.116	-0.027	
D(BI(-1))	0.011	0.123	
D(BI(-2))	0.026*	-0.014	
D(BI(-3))	-0.009	0.038	
D(BI(-4))	-0.025*	-0.052	
D(BI(-5))	0.004	0.064	
D(BI(-6))	0.063***	0.048	
D(BI(-7))	0.002	0.071	
D(BI(-8))	-0.004	0.017	
D(BI(-9))	0.022	0.011	
F- Value	3.359***	0.926	
Conclusion: Unidirectional Causality from BI to KSE in the short run			

The ADF test in co-integrating regression is insignificant rejecting any long run relation between Badla investment and market index. On the other hand, the Granger equations indicate a unidirectional causality from Badla investment to KSE index in the short run. There is strong evidence that Badla affects the market index with 6 day lag. There are also weak evidences that it affects the index with 2 and 4 days lags. Hence the analysis clearly suggests that Badla investment does affect the market index in the short

run. However, one can see the break in the relation between the two after the March 2005 crises from Figure 2. We now proceed to do the analysis for the sub-samples.

IV. The March 2005 Crises and CFS System

As mentioned above the Badla investment reached its peak on 21st February, 2005 making the basis to divide the sample into two. Figure 2 clearly shows similar trends in the two variables, Badla investment and KSE index, suggesting a close association between the two. Once again we start by presenting the basic information reported in Table 4.

**Table 4: Stock Index and Badla Investment
July 1, 2003 - February 21, 2005**

Descriptive Statistics				
	KSE 100	B. INV	D(KSE)	D(BI)
Mean	5035.88	23.57	0.0020	0.0025
Std. Dev.	831.62	6.41	0.0123	0.0334
Skewness	0.48	0.33	-0.53	-0.56
Kurtosis	3.43	2.82	5.19	5.04
Jarque-Bera	18.53	7.91	100.09	91.23
Observations	407	407	406	406
Correlations				
	KSE 100	B. INV	D(KSE)	D(BI)
KSE 100	1.000		1.000	
B. INV	0.950	1.000	0.194	1.000

It can be seen that the average daily index during the first sample is around 5000 whereas the average Badla investment is around Rs 23 billion. In percentage form, the two variables behave almost similarly except that the Badla is more volatile. The correlation coefficients indicate that the two variables move together while in percentage form the coefficient is not that high.

Next, we proceed with the co-integrating regression and causal equations. The results are reported in Table 5.

Table 5: Stock Index and Badla Investment

Co-integration (Engle-Granger)			
	Const.	Coeff.	ADF
KSE on BI	6.801***	0.548***	-2.264**
Conclusion: Cointegration Exist			
Error Correction			
	D(KSE)	D(BI)	
Const.	0.002	0.002	
e(-1)	-0.017	-0.029	
D(KSE(-1))	-0.133	-0.106	
D(KSE(-2))	-0.124	0.187	
D(BI(-1))	0.155***	0.038	
D(BI(-2))	0.076***	-0.065	
F- Value	45.907***	1.200	
Granger Causality			
	D(KSE)	D(BI)	
Const.	0.002	0.002	
D(KSE(-1))	-0.139	-0.093	
D(KSE(-2))	-0.124	0.183	
D(BI(-1))	0.161***	0.018	
D(BI(-2))	0.080***	-0.079	
F-Value	53.374***	1.094	
Conclusion: Unidirectional Causality from BI to KSE in the short run			

Though the co-integrating equation indicates the presence of a long run relation between KSE and Badla during the period July 2003 to February 2005, it is not verified by the Error Correction Model (ECM) as the error term is not significant in any equation. Both the ECM and Granger equations indicate a uni-directional causality from Badla to KSE. The results clearly indicate that Badla strongly affects the index with one and two

day lags. Hence there is clear evidence of Badla affecting the market index with out any feed back.

As mentioned earlier that the market suffered significantly in the March crises. After couple of months, a modified version with the name of Continued Funding System (CFS) was introduced on 22nd August 2005. We now proceed with the sample 22nd August to 15th September and start by presenting the basic information in Table 6.

**Table 6: Stock Index and Badla Investment
August 22, 2005 - September 15, 2006**

Descriptive Statistics				
	KSE 100	B. INV	D(KSE)	D(BI)
Mean	9945.08	23.42	0.0012	0.0026
Std. Dev.	1190.09	2.75	0.0173	0.0430
Skewness	-0.18	-2.51	-0.63	2.79
Kurtosis	2.2	9.21	4.19	25.22
Jarque-Bera	8.29	697.86	33.05	5753.29
Observations	263	263	262	262
Correlations				
	KSE 100	B. INV	D(KSE)	D(BI)
KSE 100	1.000		1.000	
B. INV	0.064	1.000	0.444	1.000

It can be seen that the average index in the second period is about 10,000, much higher relative to the first period. On the other hand, the average Badla remains the same, i.e, around Rs 23 billion. However, despite the significant rise in the index, the market provides lower return in the second period, 0.12% Vs 0.20%. The percentage changes in Badla remain the same but more volatile, and highly skewed. The correlation coefficients indicate that now the two variables although do not move together they have become much more correlated when expressed in percentage changes.

We now move on to look at the co-integrating regression and causal analysis. The results are shown in Table7.

Table 7: Stock Index and Badla Investment

Co-integration (Engle-Granger)			
	Const.	Coeff.	ADF
KSE on BI	9.045***	0.048**	-2.190**
Conclusion: Cointegration Exist			
Error Correction			
	D(KSE)	D(BI)	
Const.	0.001	0.000	
e(-1)	-0.023***	-0.051***	
D(KSE(-1))	0.117	0.296**	
D(KSE(-2))	-0.019	0.276*	
D(KSE(-3))	0.021	0.260*	
D(KSE(-4))	-0.041	-0.297**	
D(BI(-1))	-0.065**	0.118	
D(BI(-2))	0.017	0.148	
D(BI(-3))	-0.034	-0.033	
D(BI(-4))	-0.032	-0.006	
F- Value	2.212*	3.86***	
Conclusion: Bidirectional Causality between BI And KSE both in the short and long run			

The table indicates a significant change in the causal relation between the two variables. Unlike the one way causation from Badla to KSE before the March crises, we now see the both way causation. In addition Badla appeared to be a short run phenomenon earlier but now it has become a long run too. The results clearly show that now the Badla and KSE affect each other not only in the short run but also in the long run. Moreover KSE seems to be the leader. This implies that the market has now become used to Badla investment which is not an encouraging sign.

V. Summary and Conclusion

The purpose of this paper is to examine the causal relations between Badla investment and KSE index. We use daily data from 1st July 2003 to 15th September 2006

and apply the standard causality procedures. The sample is further classified to two sub-samples to take care of the impacts of March crises and the introduction of CFS system. The results indicate that prior to the March crises Badla investment used to affect the market index in the short run only without any feed back. However, now the feedback mechanism has started with both the variables now affect each other not only in the short run but also in the long run.

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Figure 1: Stock Index and Badla Investment
July 1, 2003 to September 15, 2006

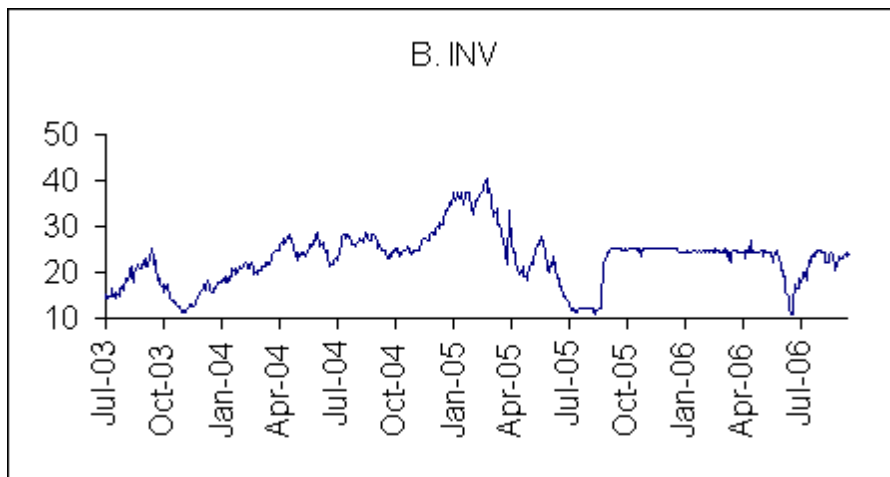
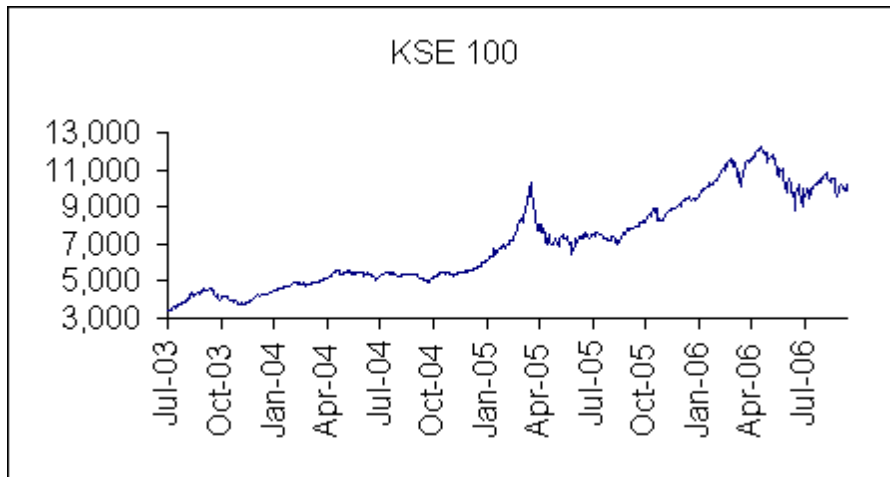


Figure 2: Stock Index and Badla Investment

July 1, 2003 to February 21, 2005

February 22, 2005 to September 15, 2006

