

INFLATION AND STOCK MARKET PERFORMANCE: A CASE STUDY FOR PAKISTAN

Khalid Nadeem Khan

National Institute of Public Administration, Karachi

1. Introduction

Saving and investment are the most important ingredients for long run economic growth; availability of both these not only results in high rate of growth in the current period but it also guarantees long run sustainable rate of growth and development. The East Asian experience depicts that the high rate of saving and investment can change an unnoticed story of economic performance in a miracle. However, financial sector is the corner stone to generate and collect saving; and efficiently allocate investable funds. In this way, financial sector not only increases the rate of saving and investment but also makes possible the most productive use of the recourses.

Financial system consists of banks, non-bank financial institutions, stock markets and various kinds of other institutions. However, with the passage of time financial system converts from bank based system towards stock market based financial system. Stock markets dominate banks because of their high liquidity; effectiveness to exchange information among shareholders, business community, and perspective investors; high degree of facilitating transactions and so on. Stock market is often considered as a barometer to measure the general investment climate and future rate of growth. In developing countries, stock markets are more important because of their pivotal role to break the vicious cycle of low rate of saving and investment.

In Pakistan, like other developing countries, stock market plays its important role to finance investment needs of the different sectors of the economy. The prosperous period for Pakistani stock market starts after 1990, when it was opened to international investment. Since then, the market shows considerable progress and it developed in size, depth and functioning. As far as the index of the market is concerned, from 1960 to 1981, the State Bank of Pakistan's index of share prices increased at an annual rate of 3.3 percent; where as between July 1981 and 1992 it grew at an annual compound rate of 19.74 percent. In 1991, Pakistani stock exchange is declared third after Argentina and Colombia in terms of one-year performance. However, stock market's due role is hindered because of interventionist economic policies, over reliance on debt financing and domestic economic factors.

Policy makers took various steps to provide conducive environment for stock market development. The policies of financial liberalization; reforms for achieving a fair, transparent and efficient stock market; and overall financial sector reforms are the part of the commitment to ameliorate the stock market progress. One important issue,

though not properly addressed, is to quantify the impact of high rate of inflation on stock market performance--despite the presence of high rates of inflation in different periods. Therefore, the main purpose of this study is to empirically test whether there is a long-term equilibrium relationship (cointegration) in inflation and stock market development or not.

The remaining paper is structured as follows. The following section reviews theoretical and empirical literature on inflation and stock market performance relationship. Section 3 explains methodological issues. Section 4 covers data, empirical results and their explanations, and concluding remarks are given in Section 5.

2. Review of literature

The impact of inflation on growth is widely contemplated, on both theoretical and empirical grounds, but its impact on stock market performance is not taken into account for a long period. After 1995, economists and policy-makers scrutinize it. Theoretical literature explains that inflation exacerbates friction in the stock market and second, inflation has negative consequences on the return of financial assets. Levine (1997) asserts that stock market and other financial markets emasculate the intensity of market frictions, which includes: the cost of acquiring information, enforcement of contracts, exchange of financial goods and claims. It also allocates resources in the presence of information asymmetries--adverse selection, moral hazard and costly state verification.

In the presence of inflation the intensity of market-frictions are augmented, because inflation creates an endogenous volatility in all the economic variables. In the presence of inflation, economic agents cannot rely on the current signals--because of volatility in the value and return of financial assets. Consequently, long-term fund providing ability of stock market is negatively affected. In inflationary environment investors rely more on debt instruments because their rental rate decreases. This conversion, from equity instruments to debt instruments, has negative consequences for the functioning and depth of the stock market (Marquis, 2000). Since, inflation and inflation variability are positively related, therefore, the future rate of inflation becomes unpredictable or it is costly to predict that rate of inflation. Uncertainty about the rate of inflation distorts information-providing function of market--through prices--and infor-

mation asymmetries are strengthened as a result.

Inflation augments the intensity of adverse selection, moral hazard and costly state verification in both primary and secondary capital markets (Khan, Sanhadji and Smith, 2001). Marquis (2000) and Hung (2000) concluded that in the presence of high rate of inflation sensitivity of costly state verification increases and real return on assets decreases; capital stock, equity market activity and liquidity of secondary capital market are negatively affected. They assert that inflation hurts the ability of the markets to screen out agents of heterogeneous productivity and risk related to the agents--this is because of a noise in the price signaling process, and in increasing prices environment inefficient agents erroneously considered as efficient agents. Apart from exacerbating stock market friction, inflation changes the pool of borrowers and lenders. In the presence of high rate of inflation, more agents are interested to borrow than to lend, because the real value of debt decreases and it is profitable to have debt.

Another source of the impact of inflation is its negative repercussions for equity returns. Feldstein (1980) argues that inflation impacts equity returns in two ways. First, in inflation, prices go up as compared to historical cost; taxable-profit increases and distributable-profit decreases accordingly. This decrease in distributable-profit decreases the prices and return of equities. Second, since tax system is unable to distinguish between real and nominal capital gains, it imposes taxes on nominal capital gains and consequently price and return on equity decrease. Thus, when the prices and return on equities decrease, because of inflation, trading of equities in stock market decreases. Yakov (1996) further explains that the impact of inflation depends on the source of inflation. If inflation is because of aggregate demand shocks, it has a positive impact on equity returns and equity return and liquidity of stock market are seriously damaged when aggregate supply shocks are behind inflation.

There are a number of attempts to test the theoretical findings but this literature is still in infancy. Boyd et al., (1996) claimed that, "somewhat surprisingly, we appear to be among the first to investigate the nature of empirical relationship between inflation and financial sector development". These studies emerged during mid 1990s, and used data of cross section of large number of countries for many decades. Study by Boyd et al. (1996, 2001), Barnes (2000), Khan et al. (2000) and Rousseau and Wachtel (2001) have focused on two tiers of the financial sector, banking and stock market, but here only the details related to stock market are considered.

Boyd et al. (1996) have shown that high rate of inflation have negative consequences for stock market development. They used time-averaged data of 51 countries for the period 1970-93 and seven indicators of stock market development¹. Log of GDP, secondary school enrolment, revolution, black market premium and government final expenditures were used as control variables.

They found that there is a statistically significant and economically substantial negative relationship in inflation and stock market performance. Their results are consistent to various modifications in the specification of the regression equation, the sample period, and the set of countries considered. Their empirical finding supports the hypotheses that increase in the rate of inflation is deleterious to stock market performance.

Boyd et al. (2001) again gauged the impact of inflation on stock market development--they used same set of data and methodology to gauge the impact of inflation on stock market growth. The results reinforced that inflation is deleterious to financial sector development.

Khan et al. (2001) used Non-Linear Least Square (NLLS) method and confirmed the earlier findings. To calibrate the impact of inflation on stock markets, two measures of stock market development were used as dependent variable. The first is the measure of size of stock market, measured as stock market capitalization as a share of GDP. The second is the measure of liquidity and efficiency of stock market, measured as stock market trading volume as a share of GDP. The result supported the earlier finding-- inflation is deleterious to stock market performance. Barnes (2000) and Rousseau and Wachtel (2001) found the same results as the previous studies. [These researchers used the same indicators as used by Boyd et al. (1996, 2001)].

Later, researchers try to determine that particular rate of inflation, which is harmful for stock market development. Boyd et al. (1996, 2001) in their research found that if the threshold level is 15 percent, below this level, stock market is adversely affected and after that level, correlation between inflation and stock market performance disappears. Rousseau and Wachtel (2001) in their study concluded that inflation have a

¹ They used (i) value of listed companies as a percentage of GDP, (ii) turnover in country's stock market, (iii) measure second divided by measure first in the third measure, (iv) volatility of stock market, (v) international capital asset pricing model, (vi) international arbitrage pricing model and (vii) monthly growth of nominal stock market price index.

strong negative impact on stock market performance when the five year average inflation rate is below 15-20 percent. However, Barnes (2000) and Khan et al. (2001) criticize the above findings.

They reproach that these thresholds are not statistically tested--so it is hard to believe that these are the best thresholds--and the earlier researchers did not consider the presence of multiple thresholds. Barnes (2000) and Khan et al. (2001) used Hanson's (1999) methodology (panel threshold estimation) to test for and estimate threshold in inflation-stock market performance relationship. Barnes (2000) concluded that there is one threshold at 14 percent rate of inflation. Inflation rate below this threshold is detrimental to stock market performance. Khan et al., (2001) further estimate inflation threshold(s) and use NLLS with and without instruments (lag values of inflation). They found that the relationship is non-linear with threshold effects, the threshold level estimated to be 3-6 percent range, and inflation significantly hinders stock market development beyond this limit.

In short, two main conclusions can be drawn from the empirical review. First, there is a statistically significant and economically meaningful negative relationship between inflation and stock market performance, which confirms the theoretical arguments. Second, there is a threshold at 15 percent rate of inflation, only below this level inflation is harmful to stock market performance.

All the studies, based on cross section data, concluded that inflation is deleterious to the size and functioning of the stock markets. The cross-country result answers that variation in the rate of inflation has relationship with variation in stock market development, but time series question is more important from policy formulation perspective.

The reason is that when we consider time series dimension, we are trying to answer that 'variation in the rate of inflation over the period can explain variation in stock market performance over the period of time'. Therefore, time series dimension is important to devise sound and effective policies. Keeping these issues in consideration it is proposed to test whether there is long run equilibrium relationship (Cointegration) in inflation and stock market development in Pakistan or not. Pakistan is an appropriate case study because it faces high and low rates of inflation and stock market performance, which is helpful to test theoretical hypothesis in time series dimension. The other reason is the unavailability of empirical study—despite the avai-

lability of data—to scrutinize impact of inflation on stock market development. Thus, it is high time to test this hypothesis because a sound, efficient and sustainable financial system is the top priority of governments and international financial institutions.

3. Methodology

The author used the theory of cointegration and ECM to examine relationship between inflation and stock market development. With the help of this procedure it is possible to observe short term and long term relationship between variables. Cointegration test is used to determine the long run or equilibrium relationship between/among variables in economics. From statistical point of view long run relationship means that the variables move together overtime or at least do not move very apart, so that short term disturbances from the long run trend will be corrected (Manning and Andrianacos, 1993). Thus, the basic idea behind cointegration is that if in the long run two or more series move closely together—even if the series are detrended—the difference between them is constant. It is possible to regard these series as defining a long run equilibrium relationship because the difference between them is stationary (Hall and Henry, 1989).

If two series x_t and y_t after differencing 'p' times, have stationary, invertable and non-deterministic ARMA representation they are called integrated of order 'p', denoted as $x_t I(p)$, $y_t I(p)$. If there exists a linear combination of the variable which are integrated of order lower than 'p', that is a_1 and a_2 exists such that $a_1 y_t + a_2 x_t I(q)$, $p < q$, the vector $[a_1, a_2]$ is described as cointegration vector, and the relationship is denoted by $y_t, x_t CI(p, p-q)$. Saying that two series, each are $I(1)$, are in long run equilibrium would be equivalent to saying that a vector exists such that their linear combination is $I(0)$ and both the variable are moving together. Presence of no-cointegration suggests that variables have no long run relationship: in principle, they can wander arbitrarily far away from each other (Dickey et al., 1991).

The long run relationship between inflation and stock market development reflects link between cyclical and long run macroeconomic time series phenomenon of the sort described by Stock and Watson (1988). Stock market development clearly affects an economy's equilibrium growth path because it increases quantity and efficiency of

investment. If cyclical inflation has harmful effects on stock market development in fundamental ways, then the long run growth path of the economy would be altered. Conversely, if inflation and stock market development are not cointegrated, then the plausible counterarguments to the cost of inflation acquires added validity, arguing against policies that inflation has adverse implications for stock market development. Even if inflation is cointegrated, the counterarguments are supported if the direction of the effect of inflation is positive rather than negative, suggesting that inflation ameliorates stock market development. Only if inflation and stock market development are cointegrated and the direction of the effect is negative, the arguments for extreme anti-inflation policies are supported.

Engle and Granger (1987) have provided a very detailed exposition to test the presence of cointegration. A test for cointegration in this case is equivalent to testing whether the residual of regression of x_t in y_t is $I(0)$. The trace test is used to identify the relationship. The critical values for the test statistics are used as reported by Osterwald- Lenum (1992). Since cointegration test is applicable only on non-stationary series, therefore the first step is to check for the existence of stationary property of the series.

To determine the non-stationary property of each variable two tests are used: Augmented Dickey Fuller (ADF) test (Dickey and Fuller, 1981) and Phillips-Perron (PP) test (Phillips and Perron, 1988). ADF is used for the following reasons. First, inflation and stock market development indicators are autocorrelated—error terms will be autocorrelated to compensate for the dynamic structure of the variables. Therefore, it is compulsory to control the effects of autocorrelated error terms and capture the dynamic structure of the data generation process (d.g.p). Second, it is generally believed that Moving Average (MA) terms are present in many macroeconomic time series because of various factors, e.g., time averaged data—an index of stock prices with infrequent trading for a subset of index, the presence of error in data and so on. ADF is used to incorporate MA terms and can validly apply when underlying process is quite general (Culver and Papell, 1997). The author used the equation of the form:

$$\Delta x_t = \beta_1 + \pi_1 x_t - 1 + \sum_{i=1}^n \rho_i \Delta x_{t-i} + e_1 t \dots \quad (1)$$

The PP test is applied because it provides better results, as compared to ADF, when series contain serial correlation and time dependent heteroskedasticity, and there is structural break in d.g.p., (Culver and Papell, 1997). Furthermore, it controls autocorrelation in appropriate way and adopts a non-parametric correction procedure to the 't' statistics. For the PP test the author used equation of the form:

$$\Delta x_t = \alpha + \pi 2x_{t-1} + \phi(t - T/2) + \sum_{i=1}^m \phi_i \Delta x_{t-i} + e_{2t} \quad (2)$$

The hypothesis of testing non-stationary is tested using the t-statistics with critical values calculated by McKinnon (1991).

An important point in applying ADF and PP tests is the selection of appropriate lag structure, because too few lags may result in over rejection of null hypothesis when it is true (i.e., adversely effecting the size of test) while too many lags may reduce the power of the test (since unnecessary nuisance parameter reduce the effective number of observation available). The lag length is determined by Akaike's Information Criterion (AIC) to ensure serially un-correlated residuals and "m" (for PP test) is determined according to Newley-West (Newley and West, 1987) suggestions. After completing the procedure—if the hypothesis of no-cointegration is rejected—a stable long run relationship existed between stock market development and inflation. For further scrutiny, the author opts for error correction model (ECM).

According to Engle and Granger (1987), when x_t and y_t are found to be cointegrated, then there must exist an associated ECM that may take the following form:

$$\Delta y_t = \phi_{10} + \sum_{j=0}^s \phi_{11j} \Delta P_t - j + \sum_{i=1}^q \phi_{12i} \Delta Y_t - i + \rho_1 \mu_t - 1 + e_{3t} \quad (3 \& 4)$$

$$\Delta P_t = \phi_{20} + \sum_{j=0}^s \phi_{21j} \Delta Y_t - j + \sum_{i=1}^q \phi_{22i} \Delta P_t - i + \rho_2 \eta_t - 1 + e_{4t}$$

Where Δ is first difference operator, u_{t-1} and n_{t-1} are error correction terms, 's' and 'q' are the number of lag lengths (determined by AIC) and e_{3t} and e_{4t} are random distur-

bance terms. The ECM uses residuals of the cointegration test equation. The coefficient of the error correction term tests the presence of long term relationship, and also shows the speed of adjustment towards the long run equilibrium. For example, if the coefficient has a value closer to one, the greater the response of y_t to the previous period deviation from long run equilibrium and if the value is closer to zero vice versa implied.

4. Data and results

The writer uses two indices of stock market development: MCAP and Tindex. Where, MCAP equals the value of listed domestic companies shares on major stock exchange. In terms of economic significance, the assumption behind market capitalization is that market size is positively correlated with ability to mobilize capital and diversify risk (Demirguc-Kunt and Levine, 1996). This is a measure of overall size of markets and many observers use capitalization as an indicator of market size development (Levine and Zeros, 1998). MCAP, however, does not measure stock market activity because large markets do not necessarily function effectively and taxes may distort incentives to list on the stock exchange.

Therefore, turnover index of shares (Tindex) is used to check consistency of the results and to assess the impact of inflation on the shares' turnover. The rate of inflation is measured as changes in the consumer price index. The period of analysis is from 1980:1 to 1999:12, and chosen because of availability of data. The date is taken from the Statistical Bulletin, and Index Number of Stock Exchange Securities—publications of the State Bank of Pakistan. The result of ADF and PP tests are reported in Table 1A and 2A.

Table 1A: Test on level

Variable	lags ¹	ADF result	PP result	Exogenous variables ²
Inflation	3	I(1)*	I(1)* T lags 4	Constant & trend
MCAP	3	I(1)**	I(1)* T lags 4	Constant & trend
T index	1	I(1)*	I(1)** T lags 4	Constant & trend

¹ lags are chosen on AIC's minimum value

*, **, *** indicates significance on 1%, 5% and 10%

² the decision is taken on the basis of Likelihood Ratio (LR) test

The result shows that inflation, MCAP, and Tindex are integrated of order one I

(1)—when the Unit Root test is applied on the level of the variables. It is evident, from the table, that both the ADF and PP test are unable to reject the hypothesis of Unit root.

Table 1B: Test on first difference

Variable	lags ^Y	ADF result	PP result	Exogenous variable [⊖]
Inflation	2	I(0)*	I(1)* T lags 4	Constant & trend
MCAP	1	I(0)*	I(1)* T lags 4	Constant & trend
T index	8	I(0)*	I(1)* T lags 4	Constant & trend

^Y lags are chosen on AIC's minimum value

*, **, *** indicates significance on 1%, 5% and 10%

⊖ the decision is taken on the basis of Likelihood Ratio (LR) test

Table 1B shows results of ADF and PP tests on the first difference of the variable, and the hypothesis of unit root is rejected for all the series—which implies that series are stationary—at first difference. The results implies that cointegration tests can be applied on these series, because all these are integrated of the same order and any relationship estimated between the variables is not spurious.

Next, the author investigates the presence of cointegration relationship between inflation and MCAP, and inflation and Tindex, using Johnson Maximum likelihood procedure. It is assumed in testing that the data contains linear deterministic trend, while the assumption is chosen on the minimum AIC's value from five test summary computed in Eviews.

Table 2 reports eigenvalues and the likelihood ratio (LR) statistics for determining the number of cointegration vector 'K' using Johnson's Maximum Likelihood approach. The author systematically tests the null hypothesis of no cointegration ($K=0$) against the alternative of $K \leq 1$ and $K \leq 2$; the results show that the hypothesis of no cointegration is rejected in both cases. Therefore, the results confirm that inflation and MCAP and inflation and Tindex are cointegrated, although Johnson's test indicates that there could be a third integrating vector in inflation and Tindex.

Cointegration between inflation and MCAP and Inflation and Tindex implies that the series move together in the long run, and a potential link exists between them. Without considering the fundamental link between the variables, these findings support the earlier theoretical and empirical cross-section findings—the persistent inflation have serious consequences on stock market performance.

Error Correction Model was estimated to find evidence on cointegration and to test the direction of causality between inflation and stock market performance indicators. The lags are decided according to AIC's criteria. Table 3 presents estimated coefficients of the error correction term (long run effects) and the lagged values of the series (short run effects).

The results provide additional evidence that inflation and stock market performance indicators are cointegrated. Since the estimated value of the coefficients of the error correction term shows that the system corrects its previous periods level of equilibrium by '100* error correction coefficient' a year, e.g., the error correction term - 0.658 (in the second column) - implies that 65 percent of the adjustments toward equilibrium occurs within a year. Further results show that there is strong evidence that causality goes from inflation to stock market performance in Pakistan, but are not highly sporting in the reverse direction (at very high level of confidence interval few lagged terms' coefficient implies causality). Thus, based on results, the presence of feed back effects or bilateral causality can not be rejected among the variables.

Finally, the sign of the inflation coefficient is considered. While a complete specification and test of various macroeconomic linkages between inflation and stock market performance is well beyond the scope of the discussion, the results of cointegration test and bilateral causality suggest that the bivariate long run equilibrium relationship between inflation and stock market development is negative.

The results could take place through the reasonable mechanism outlined early in the article. It could happen because inflation creates uncertainty about future rate of return, and exacerbates the stock market frictions. It could also occur because high rates of inflation provide incentive for the government to repress the financial sector to collect inflation tax revenue. However, investigating 'whether stock market debilitated because of high level of inflation', and exactly which mechanism is most important here and abroad are obvious directions for future research.

5. Conclusion

Empirical evidence of linkage on inflation and stock market development has rarely been advanced, despite the critical importance of the topic and the centrality of the presumed link to financial sector policy making. Researchers in their cross section

findings found empirical link between inflation and stock market development, but there is no attempt made to test this relationship in a time series direction.

The study uses cointegration theory and ECM to test the presence of long run relationship between inflation and financial sector performance indicators. Though the results are not all unambiguous, there are substantial evidences that the variables are cointegrated and bilateral causality exists between them. Thus, the results show that inflation matters to stock market performance. The findings are consistent with the interpretation that inflation strengthens frictions in the stock market, decreases real rate of return on financial assets, and consequently decreases trading and capitalization in the stock markets. The second interpretation of financial sector repression that government's desire to collect inflation has negative consequences for stock market development also seems valid.

Establishing that the stock market performance and inflation are cointegrated and negatively related, of course cannot speak directly to the global policy question of the relative cost of inflation. However, recalling the admonitions in Feldstein's Fisher-Schultz lecture, one piece of econometric evidence should never be taken as definitely by itself, but this piece of information may help to move stock market performance and inflation link question beyond a simple "whether" to the important and difficult "how", "which way" and "how much". Further work should be directed to investigating, on the issue, if other countries' experience is similar to that suggested by the data and findings, and if so, which mechanism are likely to be the most responsible for that experience of negative long run relation between stock market performance and inflation.

Table 2: Johansen's maximum likelihood procedure

Cointegration LR test based on maximum eigenvalue of the stochastic metric				
Variable	Eigenvalue	Nul	Alternative	LR statistics
MCAP & inf	0.109	k=0	k=1	35.18658**
	0.041	k<=1	k=2	9.146
TIND & INF	0.524	k=0	k=1	185.0523**
	0.07915	k<=1	k=2	18.470**

*, **, *** are showing significance at 1%, 5% and 10% respectively

Table 3: Error correction model

	Tind & Inf	Inf & Tind		MCAP & Inf	Inf & Mcap
CointEq1	-0.65831 (-15.2092)	-7.11E-05 (-1.69600)	CointEq1	-0.037885 (-1.15183)	2.77E-05 -4.88233
D(TIND(-1))	-0.342001 (-6.88226)	6.71E-05 (-1.395)	D(MCAP(-1))	-0.364207 (-5.09583)	-3.66E-05 (-2.96819)
D(TIND(-2))	-0.252472 (-5.18755)	6.86E-05 (-1.45441)	D(MCAP(-2))	-0.189375 (-2.58881)	-1.05E-05 (-0.83002)
D(TIND(-3))	-0.087333 (-2.20872)	2.77E-06 (-0.0724)	D(MCAP(-3))	-0.062374 (-0.90824)	-1.34E-05 (-1.13315)
D(INF(-1))	-289.7664 (-4.25881)	0.164355 (-2.4941)	D(INF(-1))	459.18 (-1.18517)	0.058297 (-0.87218)
D(INF(-2))	-150.3674 (-2.16885)	0.008042 (-0.11976)	D(INF(-2))	-166.603 (-0.42809)	-0.103405 (-1.54012)
D(INF(-3))	131.7666 (-1.90446)	0.264231 (-3.94313)	D(INF(-3))	-504.8117 (-1.30342)	0.142607 (-2.13429)
C	-454.2438 (-716.913)	2.928216 (-0.69434)	C	2309.27 (-0.51267)	5.186516 (-6.67418)
D2	60424.54 (-23.2137)	3.994065 (-1.5843)	D4	17476.91 (-1.71167)	-0.287281 (-0.16309)

*** are showing significance at 1%, 5% and 10% respectively

Figures in parentheses are T values

Note: dummy variables are used to control the influence of aberrant observation

References

- Barnes, Michelle L., "Threshold Relationship Among Inflation, Financial Market Development and Growth," Center for International Economic Studies, Policy Discussion Paper, No. 0036, 2000.
- Boyd, John H., Ross, Levine, and Bruce, D. Smith, "Inflation and Financial Market Performance," Federal Reserve Bank of Minneapolis, Working Paper, 573D, 1996 (October).
- Boyd, John H., Ross Levine, and Bruce D. Smith, "The Impact of Inflation On financial Sector Performance," *Journal of Monetary Economics*, Vol. 47, 2001, pp. 221-248.
- Demirguc-Kunt A., and Levine R., "Stock Market Development and Financial Intermediaries: Stylized Facts", *World Bank Economic Review* 10, 1996, pp. 291-322.
- Engle, R. F., and Granger, C. W. J., "Cointegration and Error Correction: Representation, Estimation and Testing", *Econometrica*, 55, 1987, pp. 251-276.
- Feldstein, Martin, "Inflation and Stock Market," *American Economic Review*, 1980, pp. 839-847.
- Hansen, Bruce, "Threshold Effects in Non-Dynamic Panels: Estimation, Testing, and Inference", *Journal of Econometrics*, Vol. 93, No. 2, 1999, pp. 345-68.
- Hung Fu-Sheng, "Inflation and Economic Growth in Financial Markets with Adverse Selection and Costly State Verification," *Academic Economic Papers*, Vol. 29, No 1, 2000 (March).
- Johansen, S. *Likelihood-based Inference in Cointegrated Vector Autoregressive Models*, Oxford: Oxford University Press, 1995.
- Khan, Mohsin S., Abdelhak S. Senhadji, and Bruce D. Smith, "Inflation and Financial Depth," IMF working paper (April), No. 2001.
- Levine, R., "Financial Development and Economic Growth: Views and Agenda," *Journal of Economic Literature*, Vol. 35, 1997, pp. 688-726.
- Marquis, H. Milton, "Inflation Tax, Financial Intermediation and Home Production," Federal Reserve Bank of San Francisco, Working Paper No. 17, 2000.
- Rousseau Peter L., and Paul Wachtel, "Inflation Thresholds and Finance-Growth Nexus," Paper Presented at X Tor Vergata Financial Conference, Rome, 2001 (November 25).
- Stock J. H., and Watson M. W., "Variable Trends in Economic Time Series", *Journal of Economic Perspectives*, 2 (3), 1988 (summer), pp. 147-174.
- Yakov, Amihud, "Unexpected Inflation and Stock Market Revisited: Evidence from Israel," *Journal on money, credit and banking* vol. 28(1), 1996, pp. 22-23.
-

Abstract

Financial institutions are the most critical factor to keep economies on the trajectory of economic growth and development. Their smooth functioning can guarantee efficient and effective allocation of savings. Therefore, factors detrimental to their efficient functioning should be identified, and policy makers should try to control their deleterious consequences. One important issue, though relatively ignored, is to quantify the impact of inflation on the size and functioning of the stock market. Close observation of literature reveals that inflation creates uncertainty about future rates of return and exacerbates the stock market frictions. It could also provide incentives for the government to repress the financial sector to collect inflation tax revenue.

Nevertheless, there are very few studies, which gauges inflation-stock market relationship—the studies are limited to cross-section comparisons. This study tries to disentangle the relationship and uses cointegration theory and (Error Correction Model) ECM to test the presence of long run relationship—between inflation and financial sector performance indicators—in Pakistan.

Though the results are not all unambiguous, there are substantial evidences that the variables are cointegrated and bilateral causality exists between them. The findings are consistent with the interpretation that inflation strengthens frictions in the stock market, decreases real rate of return on financial assets, and consequently decreases trading and capitalization in the stock markets. The second interpretation of financial sector repression seems valid because government collects inflation tax by printing money. Thus, on the basis of results it can be concluded that inflation matters to stock market performance. Therefore, it is neutral and almost obvious that much of the international community's policy focus should be directed to ensure that finance can make its most effective contribution to economic prosperity through sound, market-driven allocation of saving/ investable resources, and policy makers should devise policies to keep inflation in reasonable limits.



While not implying acceptance, payment of fees, responsibility for loss or return, the Editor encourages the submission of manuscripts concerning money, financial intermediaries, financial techniques, and experiments in savings mobilization in developing countries. Manuscripts submitted for publication (two copies) should be in English, 4,000 - 10,000 words in length with a 200-400 word summary, typed on one side only of the sheet and double-spaced. Footnotes should be indicated by consecutive numbers throughout the paper. References in the text should be quoted by the author's last name and year of publication, e.g. Shaw (1973) or (Shaw, 1973). The title should be as compact as possible. Submission of the paper implies that it is an un-published work, not yet submitted for publication elsewhere. Sections and subsections of the paper should be indicated in cardinal numbers (e.g. 1.; 1.1; 1.2; etc.). Mathematical formulas should be numbered consecutively as [1], [2] etc. Figures should be limited in number and submitted in a form ready for the printer. References at the end should be listed alphabetically and quoted as follows:

- for articles: Galbis Vicente, "Monetary and Related Policies in Ministates", *Savings and Development* Vol. VIII, No. 4, 1984, pp.291-350;
- for books: McKinnon Ronald, *Money and Capital in Economic Development*, The Brookings Institution, Washington D.C., 1973. All communications should be sent to the Editor:

"GIORDANO DELL'AMORE" FOUNDATION

Via L. Manara, 15/17 - 20122 MILANO (Italy) - Tel. 02 5418441- Fax 02 55193005
e-mail: publications@fgda.org - <http://www.fgda.org>

Signed articles do not necessarily reflect the opinion of *Savings and Development* or of its Editor and no responsibility is accepted for them.

Bien que cela ne signifie pas l'acceptation ou le paiement de frais, et que toute responsabilité soit déclinée pour la perte ou la restitution, la Rédaction souhaite l'envoi de manuscrits concernant la monnaie, l'intermédiation et les techniques financières, et les essais pour la mobilisation de l'épargne dans les pays en voie de développement. Les articles (deux copies) devraient être rédigés en Anglais, d'une longueur de 4.000 à 10.000 mots avec un résumé de 200 - 400 mots. Toute communication devra être adressée à la Rédaction:

FONDAZIONE "GIORDANO DELL'AMORE"

Via L. Manara, 15/17 - 20122 MILANO (Italie) - Tel. 02 5418441- Fax 02 55193005
e-mail: publications@fgda.org - <http://www.fgda.org>

Les articles portant signature ne reflètent pas nécessairement l'opinion de *Savings and Development* ou bien de la Rédaction et toute responsabilité est déclinée par ceux-ci.

RASSEGNA TRIMESTRALE

REGISTRATA PRESSO IL TRIBUNALE DI MILANO AL N. 102 DEL 27.3.1974
DIREZIONE, REDAZIONE, AMMINISTRAZIONE
FONDAZIONE "GIORDANO DELL'AMORE" - VIA L. MANARA, 15/17 - 20122 MILANO
TEL. 02 5418441 - FAX 02 55193005

Direttore responsabile

FELICE TAMBUSI

Fotocomposizione
Edienne Industria Grafica - Bernareggio (Mi)

Stampa
Edienne Industria Grafica - Bernareggio (Mi)





ISSN 0393 - 4551