Does Corruption Increase Financial Development? A Time Series Analysis in Pakistan

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Abstract:
The aim of present paper is to investigate the effect of corruption on financial development in Pakistan by using ARDL bounds testing approach to cointegration. The direction of causal relationship between the variables is examined by using VECM granger causality approach. Our empirical findings indicate that corruption promotes financial development. Causality analysis reveals that corruption and financial development are complementary.

Keyword: Financial Development, Corruption, Cointegration

Introduction

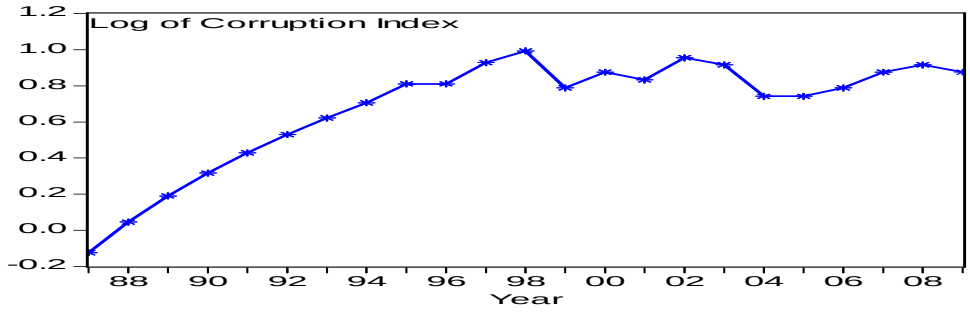
Just as it is impossible not to taste the honey or poison that one may find at the tip of one's tongue, so it is impossible for one dealing with government funds not to taste, at least a little bit, of the king's wealth.

Arthashastra Kautilya, 4 B.C.

The existing literature deliberates certain preconditions that augment corruption in a given social or economic system. Aburime (2009) suggests that a corrupt society leads to a corrupt government and a corrupt president cares for a corrupt government. Frisch (1996) and Aburime (2009) discussed the imperatives and incentives, for indulging in corruption, such as widespread societal craze with materialism, high income inequality and poverty, exaltation and esteem of ill-gotten wealth by the general public and, low and irregular salary packages for government employees with large families to cater for. Corrupt individuals further need to have access and control over the means of corruption including access to offshore accounts and practices of money laundering (Aburime, 2009). Ineffective taxation systems that are unable to track down financial activities further promote corruption. Finally, corruption spreads in a society with poor legal systems presenting little to no risk of penalties for the crime.

Corruption is a serious problem in developing economies like Pakistan. In 1995, Corruption Perception Index (CPI) was 2.25 and Pakistan was considered among the most corrupt countries of the globe. Certain anticorruption initiatives by the government improved the index to 2.7 in 1998 from 2.53 in 1997 (International Transparency Report, 2007). During president Musharraf regime, the situation further improved through implementation of better governance mechanisms. According to World Economic Forum's Global Competitiveness Report (2007-08) government bureaucracy, poor infrastructure and corruption are major hurdles for companies to settle their business in Pakistan. Although corruption is a major problem in the country but still Pakistan is rated as a better place for new and running business compared to other countries in the region (International Transparency Report, 2007). The corruption perception index ranked Pakistan as the 47^{th} most corrupt country among the 180 ranked countries. In 2009, the corruption perception index score worsened further to 2.4 with the country ranking declining to 42^{nd}. Figure-1 shows CPI (corruption perception index) trends in Pakistan.

Figure-1



Economic literature shows that researchers have made investigations into the impact of corruption on different macroeconomic variables. Corruption plunders economic development through at least three channels. Corruption impedes economic growth by droping the competence of infrastructure, government revenues are decreased and government expenditures on health and education are lowered (Tanzi and Davoodi, 1997). On the other hand, corruption enhances the gains for rich people on the cost of the poor segments of population (Gupta et al. 1998). Ehrlich and Lui (1999) reported that government size and corruption are inversely correlated to economic growth. Mo (2001) used the data of 67 countries to analyse the link between corruption and economic growth and reported that corruption affects economic growth inversely by lowering human capital and private investment.

Braun and Tella (2000) probed the relationship between corruption and inflation. They reported that "*a 1-percent standard deviation increase in inflation variance from the median can lead to an increase in corruption by 12-percent of a standard deviation and decline in growth rates of 0.33 percentage points*". Bahmani- Oskooee and Goswami (2005) found that higher level of corruption stimulates higher black market premium. Asiedu and Freeman (2009) probed the affect of dishonesty, sleaze and corruption on the firm's level of investment in the case of Latin America, Sub-Saharan Africa, and Transition economies. They concluded that relationship between corruption and investment varies across the regions, and no relationship was found in the case of Latin America and Sub-Saharan Africa, and corruption is found to be a fundamental and crucial determinant of investment in case of transition countries. Ahmad and Ali (2010) attempted to check the impact of corruption on financial development for 38 countries using GMM estimation approach. Their empirical exercise showed that an increase in corruption impedes financial development.

The findings of these studies are not convincing since these studies have used cross-country data with fixed effects. However, in reality economic conditions are not similar and corruption levels are also different in developed and developing economies. The recently developed econometric procedures and methods have given significance to the time series analysis. This study investigates the relationship between corruption and financial development in case of Pakistan by using ARDL bounds testing approach to cointegration. The direction of causal relationship is investigated by applying VECM granger causality approach.

Modeling, Methodological Framework and Data

Log-linear specification is used to investigate the affect of corruption on financial development. Bowers and Pierce (1975) suggested that log-linear function provides better results as compared to linear specification. Latter on Shahbaz (2009, 2010) has proved that log-linear model is better than simple linear specification in case of Pakistan. In the light of above discussion, log-linear equation for the empirical exercise is modeled as following:

$$\ln FD = \alpha_{\circ} + \alpha_1 \ln CUR_t + \alpha_2 \ln GDP + \mu_i \qquad (1)$$

The data for this study is taken from Economic Survey of Pakistan (various issues). Domestic credit to private sector as share of GDP and GDP per capita are used as proxies for financial development (FD) and economic growth (GDP) respectively. Corruption Perceptions Index (CPI) is used for corruption (CUR) and data is collected from Transparency International reports (various issues).

ARDL Bounds procedure to Cointegration

The ARDL bounds testing approach to cointegration developed by Pesaran et al. (2000 2001). The empirical equation of unrestricted error correction version of ARDL is modeled as follows:

$$\begin{aligned}\Delta LFD = {} & \alpha_0 + \alpha_T T + \alpha_{FD} LFD_{t-1} + \alpha_{CUR} LCUR_{t-1} + \alpha_{GDP} LGDP_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta LFD_{t-i} \\ & + \sum_{j=0}^{q} \alpha_j \Delta LCUR_{t-j} + \sum_{k=0}^{n} \alpha_k \Delta LGDP_{t-k} + \mu_i \end{aligned} \qquad (2)$$

The null hypothesis of no cointegration is $H_{\circ}: \alpha_{FD} = \alpha_{CUR} = \alpha_{GDP} = 0$ and alternative hypothesis of cointegration among the variables is $H_1: \alpha_{FD} \neq \alpha_{CUR} \neq \alpha_{GDP} \neq 0$. The ARDL bounds testing approach to cointegration depends upon the critical values tabulated by Pesaran et al. (2001) to take decision whether cointegration exists or not among the variables. The decision is taken in the following way: if calculated F-statistics is more than UCB (upper critical bound) then null hypothesis of no cointegration may be rejected. If LCB (lower critical bound) is more than computed F-statistics then hypothesis of no cointegration may be accepted. Finally, if calculated F-statistics lies between lower and upper critical bounds then decision about cointegration is inconclusive[1].

[1] The diagnostic tests are comprised of serial correlation, ARCH test, functional form of model, normality of residual term and white heteroscedisticity linked with empirical equation. The stability test of long and short run estimates may be checked by using the cumulative sum of recursive residuals (**CUSUM**) and the cumulative sum of squares (**CUSUMsq**) of recursive residuals.

VECM Granger Causality

The modified Granger causality test is employed to examine the causal link among financial development, corruption and economic growth. The Granger causality test with the VECM framework is as follows:

Model-3: Financial development, corruption and economic growth:

$$\Delta LFD = \vartheta_1 + \sum_{i=1}^{p} \vartheta_i \Delta LFD_{t-i} + \sum_{j=1}^{q} \vartheta_j \Delta LCUR_{t-j} + \sum_{k=1}^{n} \vartheta_k \Delta LGDP_{t-k} + \eta_1 ECM_{t-1} + \mu_i$$

Model-4: Corruption, financial development and economic growth:

$$\Delta LCUR = \lambda_1 + \sum_{i=1}^{p} \lambda_i \Delta LCUR_{t-i} + \sum_{j=1}^{q} \lambda_j \Delta LFD_{t-j} + \sum_{k=1}^{n} \lambda_k \Delta LGDP_{t-k} + \eta_2 ECM_{t-1} + \mu_i$$

Model-5: Economic growth, financial development and corruption:

$$\Delta LGDP = \delta_1 + \sum_{i=1}^{p} \delta_i \Delta LGDP_{t-i} + \sum_{j=1}^{q} \delta_j \Delta LFD_{t-j} + \sum_{k=1}^{n} \delta_k \Delta LCUR_{t-k} + \eta_3 ECM_{t-1} + \mu_i$$

Where Δ is a difference operator, ECM represents the error-correction term, which is derived from long run cointegrating equations via ARDL model. ϑ_1, λ_1 and δ_1 are constants and η (i =1, 2, 3) are serially uncorrelated random disturbance term with zero mean. The optimal lag length *p* is determined by the Akaike Information Criterion (AIC) because of its superior performance in small sample data set (Shahbaz et al. 2010). The VECM investigates direction of granger causality. Long run causality is captured by the significance of the lagged *ECM* terms using t test while F-statistics or Wald test is for short run causality.

Findings and Discussion

Ng- Perron unit root test is applied to find the order of integration of the variables[2]. Our empirical analysis shows that all series are non-stationary at level but found to be stationary at first differenced form. We can conclude on the basis of our results that financial development, corruption and economic growth are integrated of order one. In the next step we apply ARDL bounds testing approach to cointegration in order to test the long run relationship between financial development, corruption and economic growth. But it is necessary to choose an appropriate lag order before applying ARDL approach to cointegration. The AIC criterion is used to choose appropriate lag length and to capture the dynamic relationship to choose a best ARDL model. Our selected lag order is 2[3]. The result of the ARDL approach is reported in Table-1.

[2] Results are not reported but available from authors upon request
[3] For more details (see Lütkepohl, 2005)

Table-1: The Results of ARDL Cointegration Test

Panel I: Bounds testing to cointegration		
Estimated Equation	$LFD = f(LCUR, LGDP)$	
Optimal lag structure	(2, 1, 0)	
F-statistics	6.3904**	
Significant level	Critical values ($T = 22$)[#]	
	Lower bounds, $I(0)$	Upper bounds, $I(1)$
1 per cent	7.763	8.922
5 per cent	5.264	6.198
10 per cent	4.214	5.039
Panel II: Diagnostic tests	Statistics	
R-Squared	0.8109	
F-statistics (Prob-value)	4.7676 (0.0113)	
J-B Normality test	0.4450 (0.8004)	
Breusch-Godfrey LM test	1.7238 (0.2486)	
ARCH LM test	0.0015 (0.9690)	
White Heteroskedasticity Test	0.9439 (0.6830)	
Ramsey RESET	0.1701 (0.6896)	

Note: The asterisks *** denote the significant at 10 per cent level. The optimal lag structure is determined by AIC. The probability values are given in parenthesis. # Critical values bounds computed by surface response procedure (Turner, 2006).

In order to settle down the issue of cointegrating association between financial development, corruption and economic growth, an overall F-test for the null hypothesis of no cointegrating relation $H_{\circ}: \alpha_{FD} = \alpha_{CUR} = \alpha_{GDP} = 0$ has been accomplished. The calculated F-statistics i.e. $F_{FD}(FD/CUR, GDP) =$ 6.3904, following Pesaran et al. (2001) F-test, is higher than upper critical bounds (5.898) at 5% level of significance[4]. Our findings reveal that cointegration exists, for long run relationship between financial development, corruption and economic growth in case of Pakistan. Next we estimate the long and short run elasticities. The long run results are reported in Table-2.

[4] We have used critical bounds generated by Turner (2006).

Table-2: Long Run Results

Dependent Variable = LFD_t				
Variable	Coefficient	T-Statistics	Coefficient	T-Statistics
Constant	-5.7737	-5.0305*	-5.7367	-4.9924*
$LCUR_t$	-0.2833	4.4050*	-0.4833	-5.2322*
$LCUR_t^2$	.....	.....	0.2088	1.6750**
$LGDP_t$	0.8996	7.8187*	0.8980	7.8427*
Diagnostic Test	Statistics		Statistics	
R-squared	0.6919		0.7260	
F-statistic	22.4653 (0.0000)		16.7889 (0.0000)	
$\chi^2 NORMAL$	0.7531 (0.6861)		1.4821 (0.4765)	
$\chi^2 SERIAL$	6.3009 (0.0030)		4.3013 (0.0140)	
$\chi^2 ARCH$	1.6560 (0.2128)		2.0023 (0.1640)	
$\chi^2 WHITE$	1.3806 (0.2800)		1.9449 (0.1566)	
$\chi^2 REMSAY$	0.3429 (0.5650)		0.1456 (0.7072)	

Note: $\chi^2 NORMAL$ refers to the Jarque–Bera statistic of the test for normal residuals, $\chi^2 SERIAL$ is the Breusch–Godfrey LM test statistic for no first-order serial correlation, $\chi^2 WHITE$ denotes White's test statistic to test for homoskedastic errors, and $\chi^2 ARCH$ is Engle's test statistic is for no autoregressive conditional heteroskedasticity. $\chi^2 REMSAY$ is model specification test. * and ** represent significance at 1% and 5%.

The long run results point out that corruption is inversely correlated with financial development and it is significant at 1 percent. It shows that 1% increase in corruption reduces the performance of financial sector by 0.2833%[5]. This result further suggests that public-sector corruption is positively related to financial development. The findings are contrary with Ahmad and Ali (2010). Our empirical evidence regarding the impact of corruption on financial development is consistent with Aburime (2009). Aburime (2009) probed the positive impact of corruption on banks profitability, productivity and effectiveness in case of Nigeria. This implies that banks in Nigerian economy are flourishing from rising corruption and vice versa. The affiliation between economic growth and financial development is positive and momentous. The evidence shows that economic growth is a major contributor to enhance financial development in Pakistan. It is noted that a 1 percent increase in economic growth raises financial development by 0.8996 percent. These findings seem to shore up the line of literature, Khan et al. (2005), Shahbaz et al. (2008), Shahbaz (2009) and Shahbaz et al. (2010) in case of Pakistan. The monotonic impact of is also investigated by including the squared term of corruption index i.e. $LCUR_t^2$ which reveals that an increase in corruption is positive associated with financial development but after a threshold level, it impedes financial development. The long run elasticities is -0.4833 $LCUR_t$ +0.2088 $LCUR_t^2$ with threshold level of corruption is 0.956 (in logarithms).

[5] If the value of corruption index increases it means that the public-sector corruption level reduces.

The speed of adjustment from short run to long run equilibrium is estimated by the significance of error correction term. The sign of error correction term (ECM), is according to expectations, is negative and significant at 1% level of significance that provides a support to confirm earlier established long run cointegration.

Table-3: Short Run Results

Dependent Variable = ΔLFD_t

Variable	Coefficient	Std. Error	T-Statistic
Constant	0.0099	0.0193	0.6133
ΔLFD_{t-1}	0.3922	0.1211	0.0052
$\Delta LCUR_t$	-0.3371	0.0855	0.0012
$\Delta LGDP_t$	0.3292	0.5221	0.5372
ECM_{t-1}	-0.6365	0.1597	0.0011
R-squared = 0.5645 Adjusted R-squared = 0.4556 S.E. of regression = 0.0450 Akaike info criterion = -3.1569 Schwarz criterion = -2.9082 F-statistic = 5.1850 Prob(F-statistic) = 0.0071			

Diagnostic tests	Statistics
J-B Normality test	0.8724 (0.6464)
Breusch-Godfrey LM test	1.2541 (0.3154)
ARCH LM test	0.2687 (0.6104)
White Heteroskedasticity Test	0.3897 (0.9059)
Ramsey RESET	2.2066 (0.1581)

The Table-3 reports short run results. The results signify that corruption is inversely linked with financial development and it is statistically significant at 1% significance level. In short run, financial development is increased by 0.3371 percent due to a 1 percent increase in corruption. Financial development is positively affected by its lag. Almost 40 percent development in financial sector is increased in current period due to financial policies implemented in previous period (Shahbaz et al. 2010). The impact of economic growth on financial development is positive but it is insignificant. It implies that financial development takes time to absorb beneficiaries from economic growth. The empirical evidence reported in Table-3 indicates that the value of ECM is statistically significant at 1% significance level with negative sign. This implies that error correction process converges monotonically to the equilibrium path relatively with high speed. High signification of ECM_{t-1} is further proof of the existence of established stable long run relationship between financial development, corruption and economic growth. The value of is ECM_{t-1} equalant to -0.6365. It implies that digression from the short run towards long run is corrected by almost 63.65 percent over each year. The short run diagnostic tests are reported in lower segment of Table-3. The short-run model seems to pass all diagnostic tests

fruitfully. The results show that residual term is normally distributed and there is no serial correlation between error term and variables. Variance of error term is homoskedastic and model is well specified.

Granger Causality Analysis

The results on the long run and the short run Granger causality are reported in Table-4. The results show a unidirectional causality running from economic growth to financial development in long run while in short run causation is not worth mentioning. This confirms the growth-led-finance hypothesis in case of Pakistan. There is bidirectional causal association between financial development and corruption not only in long run but also in short span of time. These findings are consistent and reliable with views of Ahlin and Pang (2007) that corruption causes the efficiency of financial sector to increase while sound financial sector causes the corruption to rise. Ahlin and Pang (2007) concluded that financial development and corruption are complementary.

Table-4: The Results of Granger Causality (VECM)

	Type of Causation							
	Short Run			Long Run		Joint (short- and long-run)		
Dependent Variable	$\sum \Delta LFD_t$	$\sum \Delta LCUR_t$	$\sum \Delta LGDP_t$	ECM_{t-1}		$\sum \Delta LFD_t$	$\sum \Delta LCUR_t$	$\sum \Delta LGDP_t$
	F-statistics [p-values]			T-statistics		F-statistics [p-values]		
$\sum \Delta LFD_t$	____	17.5263 [0.0002]	1.3937 [0.2805]	-0.6210* [-5.2934]		5.8806 (0.0030)	____	____
$\sum \Delta LCUR_t$	3.9494 [0.0436]	____	0.7718 [0.4809]	-0.4448** [-2.8543]		____	3.3748 [0.0284]	____
$\sum \Delta LGDP_t$	0.2845 [0.7566]	0.0613 [0.7302]	____	0.0613 [0.4670]		____	____	1.0128 [0.4556]

Note: The P-values are given in the parenthesis

There is no causality running from corruption and financial development to economic growth neither in long run nor in the short run.

Conclusion and Policy Implications

We have examined the impact of corruption on financial sector development. For this, ARDL bounds testing to cointegration has been applied and VECM granger causality method to scrutinize direction of causality. The unit root problem is handled by Ng-Perron unit root test.

Our findings confirm the existence of cointegration between the variables which implies long run relationship between financial development, corruption and economic growth. Empirical evidence reveals that rise in corruption has a positive and significant affect on financial development. Economic growth is positively linked with financial development; thus, confirming the existence of growth-led-finance hypothesis. In the context of policy implication, this study

recommends that government should improve and perk up governance to improve financial development predominantly and economic growth by and large in the country.

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