

THE BEHAVIORS OF LENDING, DEPOSIT RATES AND INTERMEDIATION PREMIUM OF PAKISTANI BANKS WITH DIFFERENT TYPES OF OWNERSHIP STRUCTURES**Chu V. NGUYEN***University of Houston-Downtown
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alexandrun@seap.usv.ro***Abstract**

This study applies Enders and Siklos' (2001) procedure to test for the long-run asymmetric co-integrating relationship and short-run dynamic Granger causality between Pakistani lending and deposit rates set by public, private, foreign, specialized, and all banks combined over the period January 2004 to December 2013. Terrorist activities on the money market plays negative role. The empirical results suggest a long-run asymmetric co-integration relationship between the rates. The Granger causality tests suggest bidirectional and asymmetric causality between lending and deposit rates set by Pakistani public and private banks, while the lending rates set by the country's foreign, specialized and all banks combined are exogenous from their deposit rates. The unusually fast and overshoot adjustments of the lending rates in response to increases in the intermediation premium of public banks are interpreted as graft maximization. The asymmetric and different nature of the Granger causalities exhibited by banks with different ownership structures should be of special interest for the Central Bank in formulating and implementing its countercyclical monetary policy and for corporations in determining their capital structures.

Key Words: *Asymmetry, co-integration, lending rate, deposit rate, intermediation premium, TAR Model, Pakistan.*

JEL Classification: *E58, G21*

I. INTRODUCTION

Pakistani is a country where economic indiscipline is prevailing. Terrorist activities on the money market plays negative role. The spread between the lending rate banks charge borrowers for consumer loans and the deposit rate they pay savers is defined-henceforth as "intermediation premium". This premium not only provides interest income to financial intermediaries, but it also influences a country's level of savings, investment, economic development and social progress. This intermediation premium also reveals how commercial banks respond to counter cyclical monetary policy, economic shocks and hence the effectiveness of the central bank's monetary policymaking. Consequently, analysis of this intermediation premium illuminates and provides insight into banking behavior. Moreover, modern economic theory articulates that nominal interest rates can be decomposed to the real rate premium, and the inflation expectation premium; hence, the difference between these two nominal rates is the real spread. In this context, the intermediation premium may be considered as a real measure in nature.

Accordingly, this paper examines the behaviors of Pakistani banks of different types of ownerships, i.e., public, private, foreign, special, and all banks, with a focus on their consumer lending deposit rate setting and the behaviors of their intermediation premium, and in turn ,the dynamic inter relationship of the elements that determine them. The empirical finding should be of special interest to policy makers as well as all other economic agents in the economy. The contribution of this investigation to the literature is the finding that the interest rate setting behaviors of banks with different ownership structures in a country is different from that of all banks combined.

From the theoretical perspective of interest rate settings, banks in a free market economy would incorporate all elements of risk and set a risk-free equilibrium spread between threats paid savers and the rates charged consumer borrowers, i.e., the intermediation premium. If banks set a premium either too high or too low, market forces would force an adjustment back to some equilibrium spread. Monopolistic or oligopolistic concentration, or specific conditions in which the bank operates, thwart the operation of such free market forces and lead to wider , asymmetric spreads and larger intermediation premium. Asymmetries in any of the four types of ownership banks illustrate this process as economic or specific conditions that separately influence the rate

charged consumer borrowers and the rate paid savers, resulting in a premium larger than a free market determined spread maintained by other types of Pakistani banks.

As stated in the Pakistani Central Bank policy statement *“State Bank of Pakistan decides about its policy rate in the light of inflation prospects in a short to medium horizon along with likely developments and outcome in major macroeconomic variables. Other market interest rates follow the suit and adjust accordingly. The most immediate impact is on the short term interbank rate while the other major market rates include Karachi interbank offer rate, banks’ deposit and lending rates, government securities auction rate etc...”* The focus of this paper explores that theoretic proposition and more specifically probes the question: do asymmetries exist in loan/deposit rate spreads in banks of any of the aforementioned types, and if such asymmetries are present, how do lending rates and deposit rates set by these banks respond to these asymmetries? Are the responses independent or dynamically interrelated? The remainder of this study is organized as follows: the following section briefly reviews the literature on asymmetries in lending-deposit rate setting behavior by commercial banks ;the next section presents the methodology and models to be used in the investigation ;the section that follows describes the data and the descriptive statistics used in the analysis ;the next section reports the empirical results ;the concluding section provides observations and remarks.

II. REVIEW OF LITERATURE

2.1 Asymmetric Adjustment

The rational effort theoretically hypothesizing asymmetric responses to the national countercyclical monetary policy can be attributed to the documented asymmetric rate-setting behavior of the commercial banks in the context to rates of return on financial market instruments. Dueker(2000) and Tkacz(2001) have reported asymmetries in the U.S. prime lending rate in the past. Thompson(2006) found asymmetries in the U.S. prime lending-deposit rate spread. Sarno and Thornton(2003)found asymmetries in U.S. Treasury securities in their studies. Frost and Bowden (1999)and Scholnick(1999)reported asymmetries in mortgage rates in New Zealand and Canada. Hofmann andMizen(2004)indicated asymmetric behavior of retail rates in the United Kingdom. Hannan and Berger (1991),and Neumark and Sharpe(1992))examined various deposit rates for the same behavior. Several studies have found asymmetric co- integration between bank lending and deposit rates. For instance, Nguyen et al.(2008)documented similar asymmetries in Mexican lending and deposit rates .Nguyen and Islam(2010)reported asymmetries in the Thai bank lending and deposit rates. Nguyen et al.(2013) found asymmetries in the Colombian lending deposit rates. Chang and Su(2010)reportednonlinearcointegrationbetweentheendingandthedepositrateinten Eastern European countries. Lately ,Haug and Basher (2011) found non linear cointegration in the purchasing powerparity relationships for Canada, Japan, Switzerland, theUK, Belgium, France, Germany, Ital yand the Netherlands. For Bangladesh economy the estimation results reveal the unidirectional Granger causality from the real GDP growth rate to the countercyclical monetary policy, i.e., the real GDP growth rate is weakly exogenous from the Bangladeshi countercyclical monetary policy actions (Nguyen, Islam and Ali,2012).

Three main approaches help explain the rate-setting behavior of the banking sector: the bank concentration hypothesis, the consumer characteristic hypothesis, and the consumer reaction hypothesis. The bank concentration hypothesis posits that oligopolistic banks raise lending rates quickly in reaction to favorable market forces but are much slower in raising deposit rates. The reverse is the case in declining markets as they react quickly to adjust downward the rates paid depositors and slower to reduce the rates charged borrowers (Neumark and Sharpe, 1992;Hannan and Berger, 1991).The consumer characteristic and consumer reaction hypotheses posit that a greater proportion of unsophisticated consumers ,coupled with higher search and switching costs, provides bankers with heightened opportunities to adjust rates and widen the spread ,thereby increasing the banks’ advantage and producing incrementalprofits(CalemandMester, 1995; Hutchison,1995; Rosen,2002).

Interestingly, the asymmetric adjustment in lending rates may be influenced by a further asymmetry. Banks may be reluctant to raise rates to the full extent allowed by a rising market because to do so could lead to an adverse selection pool of predominantly higher risk loans. Restraint in maximizing lending rates encourages abroad base of loans with an inherent lower detrimental risk pool(StiglitzandWeiss,1981).

2.2 Pakistani Banking Industry

As to the banking industry, IMF Country Report No. 05/157 (2005) posited that Structure of the Pakistani banking sector has substantially changed in the last decade, particularly following the privatization of the state-owned banks. In1990, the banking system was dominated by five commercial banks which were all state-owned. The 1990 amendments to the Banking Companies Ordinance launched the process of financial sector reforms by allowing privatization of the state-owned banks. During the first round of reform, two of the

state-owned banks, Muslim Commercial Bank and Allied Bank, were privatized between 1991 and 1993. The reforms process was subsequently delayed for several years and resumed significantly only in the early 2000s.

As articulated by Burki and Ahmad (2011), Pakistan's banking sector has undergone structural changes as part of the phased reforms in the financial sector that were initiated in 1990/91. These reforms paid attention to, among other things, prudential regulations that authorized: (i) the opening of several new private and foreign banks, (ii) the restructuring and downsizing of state-owned banks before being privatized, and (iii) reforms relating to mergers and acquisitions (M&A) that helped consolidate private and foreign banks. These reforms led to a dramatic decrease in the asset share of state-owned banks, from 93 percent in 1990 to only 22 percent in 2004. In the same period, the share of private banks increased from 0 to 67.5 percent, and that of foreign banks increased from 6.7 to 10.4 percent (State Bank of Pakistan, 2004). The reforms also allowed foreign banks to compete freely with domestic banks.

However, formulating and implementing monetary policy in Pakistan is very challenging due to the weaknesses of the State Bank of Pakistan and the commercial bank system which have been articulated by Pakistani Central Banks and reported by International Monetary Fund's annual country reports. Internally, State Bank of Pakistan's November 2013 Monetary Policy Statement Government borrowing from the banking system has remained the key driver of monetary expansion during FY13. The same trend continues in FY14, so far. Also, Monetary Policy Statement, *September 2013* State Bank of Pakistan stated in terms of controlling growth in money supply, however, SBP's efforts of curtailing liquidity injections did not experience much success. It is because these were offset by an increase in direct fiscal borrowings from the SBP. Specifically, from the outstanding level of Rs691 billion at end-January 2013, the liquidity injections by the SBP through OMOs declined to Rs208 billion by end-June 2013. During the same period, the fiscal authority borrowed Rs687 billion from SBP on flow basis. The trend has continued in FY14 so far and in fact there is Rs296 billion outstanding in terms of liquidity mop-up as of 13th September, 2013. Similarly, the fiscal authority has borrowed another Rs547 billion during 1st July – 30th August, FY14.

State Bank of Pakistan's January 2014 Monetary Policy Statement articulated that as a result of excessive fiscal borrowings from the banking system and a weak external position, net domestic assets to net foreign assets ratio of banking system has increased sharply to 177 as on 27th December 2013 from 32 at end June 2013. This deterioration clearly highlights the risk of substitution of domestic assets with foreign assets, which may have adverse implications for exchange rate as well as inflation outlook.

Externally, IMF Country Report No. 12/35 Pakistan 2011 Article IV Consultation and Proposal for Post-Program Monitoring reported that strengthening central bank autonomy and increasing monetary policy effectiveness should aid in achieving sustained disinflation. The current legal structure, especially the absence of a strong framework for direct government financing, significantly impairs central bank independence. The legal reforms to increase SBP independence are critical, but the draft amendments currently being discussed in parliament do not meet this objective in that they do not ensure the operational independence of the SBP. In addition, increasing financial deepening by fostering competition in the banking sector and improving the functioning of financial markets are important for strengthening monetary policy effectiveness.

In its 2013 Article IV Consultation and Proposal for an Extended Arrangement under the Extended Fund Facility, the IMF Country Report No.13/287 argued that the financial system is dominated by banks that have been relatively healthy but nonperforming loans remain high. Overall capital adequacy remained well above the statutory minimum capital requirement, at 15.1 percent at end-March 2013. The banking system as a whole is liquid and profitable and deposit growth has remained strong (nearly 16 percent) in recent years. Nevertheless, nonperforming loans are high (14.7 percent), and a few banks operating below minimum capital requirement. The high concentration of assets in public debt (around 37 percent of total assets) at a time of weak public finances is another source of risk. While NPLs are relatively well-provisioned for the system as a whole (over 70 percent), the slowdown in economic activity and pressures on the balance of payments continue to affect bank soundness.

International Monetary Fund May 2005 IMF Country Report No. 05/157 Pakistan—Financial Sector Assessment Program—Technical Note—Condition of the Banking System reported that efforts have been made in recent years to promote Islamic banking services. In particular, the State Bank of Pakistan (SBP) exempted Islamic commercial banks from the moratorium on the establishment of new banks, and the first full-fledged Islamic bank, Meezan Bank, was licensed in 2002. Several conventional banks have also opened branches that provide only Islamic financial services. The size of these Islamic banking institutions remains very small. Although legal ambiguities remain regarding the process of Islamization of the financial system of Pakistan, the establishment of new Islamic banking institutions is likely to continue in the coming years. Additionally, IMF Staff urged the authorities to amend the SBP Act in order to establish an independent, decision-making monetary policy committee, which is a pre-requisite for an optimal design and implementation of monetary policy. Staff stressed that full Independence would help pave the way for improved price stability, as SBP's primary objective, and the elimination of future direct financing of fiscal deficits.

III. METHODOLOGICAL ISSUES AND ANALYTICAL FRAMEWORK

Before introducing the methodological and analytical framework to explore the rate setting behaviors of Pakistani banks of different ownership structures further, it is necessary to introduce some algebraic notations or variables. First, let the weighted average of lending rates on new loans that banks having type i ownership, (where i equals to the types of ownership, i.e., i = public, private, foreign, specialized, or all banks combined in Pakistan) originate and the weighted average of deposit rates that these banks pay savers over a given month t , be denoted by $LR_{i,t}$ and $DR_{i,t}$, respectively. These are the rates on new loans and deposits; therefore, their weighted average may be considered as “marginal” rates which better describe how these types of banks respond to changes in financial conditions, including those induced by countercyclical fiscal and monetary policy measures, as compared to the weighted average of the outstanding loans and the total deposits. The difference between $LR_{i,t}$ and $DR_{i,t}$ is defined as the spread between the lending rate and deposit rate or the intermediation premium, and is denoted by $SP_{i,t}$. Throughout this study, $LR_{i,t}$ and $DR_{i,t}$ are referred to as lending rate and deposit rate. Moreover, given a level of the lending rate, an expansionary countercyclical monetary policy measure, or any like change in the economy, would widen the intermediation premium. The opposite is true for a contractionary countercyclical monetary measure or any like change.

Pakistani specialized banks are banks that focus on providing credits to some specific sector or specific segment of a specific sector in the economy. For example: (i) Zaria Taraqiati Bank Ltd. is a major specialized bank, focusing on rural finance and development; (ii) Industrial Development Bank of Pakistan is created with the primary objective of extending term finance for investment in the manufacturing sector of the economy; (iii) The SME Bank was established to cater to the needs of the small and medium enterprise sector.

3.1 Structural Break

Over time, every economy would experience many business cycles caused by internal and external shocks; therefore, countercyclical monetary and fiscal policy measures would be used to bring the economy back to its long-run path. Consequently, the intermediation premium set by banks of any ownership most likely to suffer some structure breaks. To search endogenously for the possibility of any structural break in the intermediation premia maintained by banks of the aforementioned types of ownerships, this study utilized Perron’s (1997) endogenous unit root test function with the intercept, slope, and the trend dummy, as specified by equation (1), to test the hypothesis that the intermediation premia have a unit root.

$$SP_{i,t} = \mu_i + \theta_i DU + \alpha_i t + \gamma_i DT + \delta_i D(T_b) + \beta_i SP_{i,t-1} + \sum_{j=1}^k \psi_{i,j} \Delta SP_{i,t-i} + v_{i,t} \quad (1)$$

where, as previously defined, i = public, private, foreign, specialized, all banks combined, i.e., is the type of ownership; $(DU = 1(t > T_b))$ is a post-break constant dummy variable; t is a linear time trend; $DT = 1(t > T_b)$ is a post-break slope dummy variable; $D(T_b) = 1(t = T_b + 1)$ is the break dummy variable; and $v_{i,t}$ are white-noise error terms. The null hypothesis of a unit root is stated as $\beta_i = 1$. The break date, T_b , is selected based on the minimum t-statistic for testing $\beta_i = 1$ (see Perron, 1997, pp. 358-359).

3.2 Threshold Autoregressive (TAR) model

Additionally, to further investigate the behaviors of lending, deposit rates and intermediation premia of the banks of the aforementioned ownerships, this study uses the threshold autoregressive (TAR) model, developed by Enders-Siklos (2001) that allows the degree of autoregressive decay to depend on the state of the intermediation premium, maintained by each group of banks with the aforementioned four types of ownership as well as all banks combined, i.e. the “deepness” of cycles. The estimated TAR model would empirically reveal if the intermediation premia tend to revert back to their long-run positions faster when the premia are above or below their thresholds. Therefore, the TAR model indicates whether troughs or peaks persist more when shocks or countercyclical policy actions push the premia out of their long-run equilibrium paths. In this model’s specification, the null hypothesis that each of the premium contains a unit root can be expressed as $\rho_{i,1} = \rho_{i,2} = 0$, while the hypothesis that the intermediation premium is stationary with symmetric adjustments can be stated as $\rho_{i,1} = \rho_{i,2}$.

The first step in the Enders-Siklos’ (2001) procedure is to regress the intermediation premium or the spread between the lending rate and deposit rate or the intermediation premium, of the group of i banks, $SP_{i,t}$,

on a constant, a linear trend and an intercept dummy (with values of zero prior to the structural break date and values of one for the structural break date and thereafter), as specified by equation (2).

$$SP_{i,t} = \beta_{i,0} + \beta_{i,1}trend_{i,t} + \beta_{i,2}Dummy_{i,t} + \varepsilon_{i,t} \quad (2)$$

The saved residuals, $\varepsilon_{i,t}$ from the estimation of equation (2), denoted by $\hat{\varepsilon}_{i,t}$, are then used to estimate the following TAR model:

$$\Delta\hat{\varepsilon}_{i,t} = I_{i,t}\rho_{i,1}\hat{\varepsilon}_{i,t-1} + (1 - I_{i,t})\rho_{i,2}\hat{\varepsilon}_{i,t-1} + \sum_{j=1}^p \alpha_{i,j}\Delta\hat{\varepsilon}_{i,t-p} + \hat{u}_{i,t} \quad (3)$$

where $\hat{u}_{i,t} \sim i.i.d.(0, \sigma_i^2)$, and the lagged values of $\Delta\hat{\varepsilon}_{i,t}$ are meant to yield uncorrelated residuals. As defined by Enders and Granger (1998), the Heaviside indicator function for the TAR specification is given as:

$$I_{i,t} = \begin{cases} 1 & \text{if } \hat{\varepsilon}_{i,t-1} \geq \tau_i \\ 0 & \text{if } \hat{\varepsilon}_{i,t-1} < \tau_i \end{cases} \quad (4)$$

The threshold value, τ_i , is endogenously determined using the Chan (1993) procedure which obtains τ_i by minimizing the sum of squared residuals after sorting the estimated residuals in an ascending order, and eliminating 15 percent of the largest and smallest values. The elimination of the largest and the smallest values is to assure that the $\hat{\varepsilon}_{i,t}$ series crosses through the threshold in the sample period. Throughout this study, the included lags are selected by the statistical significances of their estimated coefficients as determined by the *t*-statistics.

In this model specification, $\hat{\varepsilon}_{i,t} > \tau_i$ is indicative an expansionary monetary policy or a like economic/finance shock has lowered the deposit rate, widening the difference between the current lending rate and the new deposit rate and hence widening the intermediation premium. This widening of the intermediation premium initiates a downward adjustment in the lending rate. The reverse of articulation is true for the case when $\hat{\varepsilon}_{i,t} < \tau_i$.

3.3 The Asymmetric Error-Correction Models

Moreover, to investigate the short-run asymmetric dynamic behavior between the lending rate and deposit rate of each of the aforementioned types of ownership banks, this study specifies and estimates the following asymmetric threshold autoregressive vector error-correction model (TAR-VEC), equations (5) and (6). The estimation results of this model will reveal the nature of the Granger causality between the lending rate charged borrowers and deposit rate paid savers. The empirically determined nature of the Granger causality will help evaluate how banks of different types of ownership respond to economic and financial shocks as well as countercyclical policy actions that push their intermediation premia out of their long-run paths, in setting their lending and deposit rates. Additionally, the following TAR-VEC model differs from the conventional error-correction models by allowing asymmetric adjustments toward the long-run equilibrium.

$$\Delta LR_{i,t} = \alpha_{i,0} + \rho_{i,1}I_{i,t}\hat{\varepsilon}_{i,t-1} + \rho_{i,2}(1 - I_{i,t})\hat{\varepsilon}_{i,t-1} + A_{i,11}(L)\Delta LR_{i,t-p} + A_{i,12}(L)\Delta DR_{i,t-p} + u_{1,i,t} \quad (5)$$

$$\Delta DR_{i,t} = \tilde{\alpha}_{i,0} + \tilde{\rho}_{i,1}I_{i,t}\hat{\varepsilon}_{i,t-1} + \tilde{\rho}_{i,2}(1 - I_{i,t})\hat{\varepsilon}_{i,t-1} + A_{i,21}(L)\Delta LR_{i,t-p} + A_{i,22}\Delta DR_{i,t-p} + u_{2,i,t} \quad (6)$$

where $u_{1,2,i,t} \sim i.i.d.(0, \sigma_i^2)$ and the Heaviside indicator function is set in accord with (4). Δ denotes the change in, i.e., $\Delta LR_{i,t}$ is the change in the lending rate set by the banks of ownership *i.p* is the time period. $A_{i,kl}(L)$ represents the first-order polynomials in the lag operator *L*. This model specification recognizes the fact that the lending rate and deposit rate respond differently depending on whether the intermediation premium is widening or narrowing, i.e. contractionary or expansionary monetary policy as well as economic and financial shocks.

IV. DATA AND DESCRIPTIVE STATISTICS

This study uses data on the lending rates charged borrowers and deposit rates paid by each type of the above specified banks, reported by the Pakistani Central Bank over the period from January 2004 to December 2013. The sample period is constrained by the availability of the data. As previously defined, the marginal

lending rate and deposit rate and the intermediation premium of banks of ownership i are denoted by $LR_{i,t}$, $DR_{i,t}$, and $SP_{i,t}$, respectively. The descriptive statistics of the data set are summarized in Table 1.

Table 1: Descriptive Statistics.

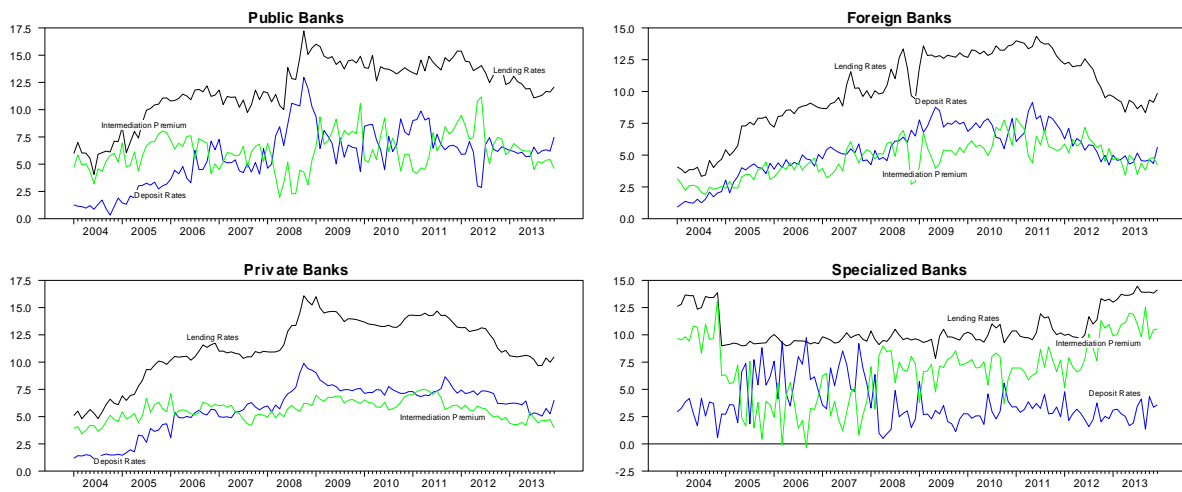
	Public Banks		Private Banks		Foreign Banks		Specialized Banks		All Banks	
	Lending rate	Deposit rate	Lending rate	Deposit rate	Lending rate	Deposit rate	Lending rate	Deposit rate	Lending rate	Deposit rate
Mean	11.884	5.676	11.353	5.769	9.990	5.294	10.581	3.797	11.185	5.697
Median	12.132	6.160	11.035	6.200	9.835	5.195	9.830	3.250	10.960	6.035
Maximum	17.230	12.970	16.090	9.880	14.340	9.140	14.460	9.740	15.540	9.530
Minimum	4.060	0.330	4.810	1.140	3.330	0.910	7.830	0.500	4.630	1.120
Std. Dev.	2.752	2.593	2.779	2.150	2.987	1.895	1.652	1.998	2.797	2.073
Skewness	-0.836	-0.005	-0.690	-0.780	-0.573	-0.362	1.057	1.049	-0.736	-0.784
Kurtosis	3.126	2.818	2.821	2.817	2.458	2.707	2.642	3.597	2.785	2.827
Jarque-Bera	14.056	0.166	9.694	12.343	8.026	3.058	22.993	23.799	11.069	12.450
Observation	120.00	120.0	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00

Source: Monthly Data from January 2004-December 2013, reported by the Pakistani Central Bank.

Figure 1 displays the behaviors of the respective lending rate, deposit rate and their spread—the intermediation premia of public, private, foreign, and specialized banks—over the sample period. These diagrams suggest that the intermediation premia of these aforementioned types of banks, in fact, experienced structure breaks over the period under consideration.

PAKISTANI LENDING, DEPOSIT RATES AND INTERMEDIATION PREMIA

January 2004 - December 2013



Source: Pakistani Central Bank and calculations by the author.

V. EMPIRICAL RESULTS

5.1 Results of the Test for Structural Break

The estimation results of Perron’s endogenous unit root tests are summarized in Exhibit 1. Procedurally, the signs and the statistical significances/insignificances of the post-break constant dummy variable, $(DU = 1(t > T_b))$; the linear time trend, t ; the post-break slope dummy variable, $DT = 1(t > T_b)$; the break dummy variable, $D(T_b) = 1(t = T_b + 1)$ empirically determine whether the intermediation premium follows a stationary trend or non-trend process. The testing procedure also endogenously determines if the intermediation premium experiences a structural break over the sample period. The test statistic for this determination is the calculated value of $t(\alpha = 1)$. If the Perron’s procedure suggests a structural break date but

the calculated value of $t(\alpha = 1)$ is not large enough to confirm the suggested break date, a Chow's test for structural break will be carried out to confirm or reject the suggested break date.

Exhibit 1: Perron's Endogenous Unit Root Test, Vietnamese Data 2004:01 to 2013:12

a. Public Banks

$$SP_{i,t} = 3.2442 + 0.0411DU - 0.0011t + 0.0039DT + 3.7175D(T_b) + 0.4615SP_{i,t-1} + v_{i,t}$$

(3.5374*) (0.0307) (-0.1198) (0.2438) (2.7729*) (3.4289*)

No. of augmented lags: $k = 9$ Break Date: November 2009 $t(\alpha = 1) = -4.0013$

b. Private Banks

$$SP_{i,t} = 2.1342 + 4.2103DU + 0.0074t - 0.0460DT - 0.6247D(T_b) + 0.5670SP_{i,t-1} + v_{i,t}$$

(5.1125*) (4.3856*) (2.3373**) (-4.3965*) (-1.3439) (6.4598*)

No. of augmented lags: $k = 6$ Break Date: August 2008 $t(\alpha = 1) = -4.9326$

c. Foreign Banks

$$SP_{i,t} = 1.5908 + 7.0491DU + 0.03417t - 0.0820DT - 0.3081D(T_b) + 0.3071SP_{i,t-1} + v_{i,t}$$

(5.3951*) (4.4191*) (5.7068*) (-4.8298*) (-0.4016) (2.9410*)

No. of augmented lags: $k = 1$ Break Date: October 2010 $t(\alpha = 1) = -6.6359^*$

d. Specialized Banks

$$SP_{i,t} = 5.6793 - 4.8253DU - 0.0500t + 0.0895DT + 7.5664D(T_b) + 0.4610SP_{i,t-1} + v_{i,t}$$

(2.8948*) (-2.5165**) (-0.1936) (0.3466) (4.2179*) (5.3338*)

No. of augmented lags: $k = 1$ Break Date: October 2004 $t(\alpha = 1) = -6.2371^*$

e. All Banks Combined

$$SP_{i,t} = 1.7355 + 3.7061DU + 0.0084t - 0.0409DT - 0.4177D(T_b) + 0.6195SP_{i,t-1} + v_{i,t}$$

(4.4701*) (3.9692*) (2.5129*) (-4.0069*) (-0.9861) (6.8760*)

No. of augmented lags: $k = 06$ Break Date: October 2010 $t(\alpha = 1) = -4.2224$

Notes: Critical values for t -statistics in parentheses: Critical values based $n = 100$ sample for the break-date (Perron, 1997). "*" and "**" indicate significances at 1 percent and 5 percent levels.

Based on the above procedure, the suggested break dates for the intermediation premia of Pakistani foreign and specialized banks are confirmed by their corresponding value of their $t(\alpha = 1)$'s. The suggested break dates for other three premia were confirmed by Chow's tests for structural break. Additionally, Perron's testing procedure support the hypotheses of stationarity of the intermediation premia of all banks of different ownerships in Pakistan.

5.2 Results of Cointegration Test with Asymmetric Adjustment

An important implicit assumption of the Dickey-Fuller standard unit root tests and their extension is that the adjustment process is symmetric. If the adjustment process is asymmetric, then, the implicitly assumed restrictive symmetric adjustment is indicative of model misspecification. To examine whether or not the lending rate and the deposit rate of the group of i banks are co-integrated when allowing for asymmetric adjustments, the intermediation premium is regressed on a constant, a linear trend and an intercept dummy with values of zero prior to the confirm structural break date and values of one for the break date and thereafter. The estimation results for all types of Pakistani banks are reported in Exhibit 2. The empirical results, summarized in Table 2, are the final estimation results after eliminating the insignificant variables based on t -statistic at 5 percent significant level.

Exhibit 2: Estimation Results for Equation, Pakistani Monthly Data 2004:01 to 2013:12

Public Banks

$$SP_t = 5.9020 + 0.7492Dummy_t + \varepsilon_t$$

(30.2317*) (2.4523**)

$\ln L = -228.9922$ $R^2 = 0.0404$ DW statistic^(a) = 0.7426 $F_{(1,118)} = 6.0136^{**}$

Private Banks

$$SP_t = 5.0185 + 0.0128Trend_t - 0.6335Dummy_t + \varepsilon_t$$

(25.8496*) (3.1288*) (-2.1019**)

$\ln L = -155.9212$ $R^2 = 0.0660$ DW statistic^(a) = 0.3374 $F_{(2,117)} = 5.2023^*$

Foreign Banks

$$SP_t = 2.7899 + 0.0373Trend_t - 1.0984Dummy_t + \varepsilon_t$$

(12.4214*) (8.0227*) (-3.1756*)

$\ln L = -173.9095$ $R^2 = 0.4392$ DW statistic^(a) = 0.6631 $F_{(2,117)} = 47.5968^*$

Specialized banks

$$SP_t = 9.5183 + 0.0618Trend_t - 7.0592Dummy_t + \varepsilon_t$$

(14.5650*) (9.9713*) (-9.0925*)

$\ln L = -255.6962$ $R^2 = 0.5055$ DW statistic^(a) = 1.3486 $F_{(2,117)} = 61.8133^*$

All Banks Combined

$$SP_t = 4.6522 + 0.1726Trend_t - 0.6244Dummy_t + \varepsilon_t$$

(25.7563*) (4.5214*) (-2.2266**)

$\ln L = -147.2599$ $R^2 = 0.1730$ DW statistic^(a) = 0.2847 $F_{(2,117)} = 13.4422^*$

Note

s: “*” and “**” indicate significances at 1 percent and 5 percent levels, respectively.

- As articulated by Enders and Siklos (2001, p. 166), in this type of model specification, ε_t may be contemporaneously correlated.

The residuals from these estimations for each type of Pakistani banks are used to estimate the TAR model, specified by equations (3) and (4). The estimation results for the TAR model for all five different groups of banks are reported in Exhibit 3. Statistically, the Ljung-Box statistic is used to test the serial correlation and the overall F-statistic is used to test the predicting power of the model. The value of the partial F-statistic tests the null hypothesis of symmetry, $\rho_{i,1} = \rho_{i,2}$. Rejection of the null hypothesis of symmetry indicates statistically that adjustments around the threshold value, τ_i , of the intermediation premium, $SP_{i,t}$, are asymmetric. The calculated value of Φ_μ (also an F-statistic) tests the null hypothesis of no co-integration, $\rho_{i,1} = \rho_{i,2} = 0$. Rejecting the null hypothesis of no-cointegration indicates that the intermediation premium is stationary. With regard to the stationarity of the intermediation premium, Ewing, et al. (2006, pp. 14) pointed out that this simple finding of stationarity is consistent with the two underlying series comprising the premium being co-integrated in the conventional, linear combination sense.

Exhibit 3: Unit Root and Tests of Asymmetry, Pakistani Monthly Data 2004:01 to 2013:12

a. Public Banks

ρ_1	ρ_2	τ	$H_0 : \rho_1 = \rho_2 = 0$	$H_0 : \rho_1 = \rho_2$	aic	sic
-1.4599*	-0.2772*	1.70803	$\Phi_\mu = 11.6188^*$	$F = 10.9126^*$	0.4827	0.6001
$Q_{(12)} = 16.9850 [0.1502]$		$\ln L = -190.9135$	$F_{(4,113)} = 9.6630^*$	DW = 2.0473		

b. Private Banks

ρ_1	ρ_2	τ	$H_0 : \rho_1 = \rho_2 = 0$	$H_0 : \rho_1 = \rho_2$	aic	sic
-0.2001*	-0.2120**	-0.8410	$\Phi_\mu = 6.7662^*$	$F = 4.0583^{**}$	-1.4707	-1.3259
$Q_{(12)} = 13.8480 [0.3105]$		$\ln L = -71.2450$	$F_{(5,107)} = 6.8297^*$	DW = 2.0020		

c. Foreign Banks

ρ_1	ρ_2	τ	$H_0 : \rho_1 = \rho_2 = 0$	$H_0 : \rho_1 = \rho_2$	aic	sic
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-0.3864 -0.2901* 0.9288 $\Phi_{\mu} = 4.1586^{**}$ F = 0.0730 -0.4226 -0.3052
 $Q_{(12)}=19.3160[0.3812]$ $\ln L = -137.5011$ $F_{(4,113)}=5.2758^*$ DW = 1.9974

d. Specialized Banks

ρ_1	ρ_2	τ	$H_0 : \rho_1 = \rho_2 = 0$	$H_0 : \rho_1 = \rho_2$	aic	sic
-0.4412*	-0.0634	-1.3047	$\Phi_{\mu} = 4.555^*$	F = 0.9311	1.3881	1.5329
$Q_{(12)}=11.4460[0.4911]$		$\ln L = -232.7675$		$F_{(5,107)}=13.4917^*$	DW = 2.0353	

e. All Banks

ρ_1	ρ_2	τ	$H_0 : \rho_1 = \rho_2 = 0$	$H_0 : \rho_1 = \rho_2$	aic	sic
-0.2529*	-0.1915	-0.34041	$\Phi_{\mu} = 4.0520^{**}$	F = 0.1009	-1.6747	-1.5573
$Q_{(12)}=13.5290[0.3318]$		$\ln L = -63.6263$		$F_{(4,113)}=4.0977^{**}$	DW = 1.9960	

Notes: The null hypothesis of a unit root, $H_{i,o} : \rho_{i,1} = \rho_{i,2} = 0$, uses the critical values from Enders and Siklos (2001, p. 170, Table 1 for four lagged changes and $n = 500$). “*” and “**” indicate 1 percent and 5 percent levels of significance, respectively. The null hypothesis of symmetry, $H_{i,o} : \rho_{i,1} = \rho_{i,2}$, uses the standard F distribution. τ_i is the threshold value determined via the Chan (1993) method. $Q_{(12)}$ denotes the Ljung-Box Q-statistic with 12 lags.

The TAR-model specified by equations (2), (3) and (4) essentially describes the long-run behavior of the intermediation premia. Thus, with regard to the estimation results, the statistical significance and the relative absolute values of the estimates of $|\rho_{i,1}|$ and $|\rho_{i,2}|$ describe the long-run adjustment pattern of the intermediation premia around the estimated values of their estimated thresholds, τ_i 's. More specifically, the statistical significances of these estimated $\rho_{i,1}$ and $\rho_{i,2}$ are determined by the t -statistics at the conventional significance levels. As to the adjustment pattern, a finding of $|\rho_{i,1}| > |\rho_{i,2}|$ indicates a faster convergence for positive than for negative disequilibrium. This result implies that this group of banks collectively adjusts their lending rate faster to the threshold value when the Pakistanis Central Bank eases money supply or any like shock, widening the above defined intermediation premium, than when the authority tightens the money supply or any similar shock, narrowing the premium. The reverse is true for contractionary monetary policy measures or economics/finance shocks where the deposit rate increases and the intermediation premium narrows. Symmetrically, a finding of $|\rho_{i,1}| < |\rho_{i,2}|$ indicates a lower convergence for positive than for negative disequilibrium and hence the opposite of the aforementioned articulated attendant consequences would be true.

5.3 Results of the Asymmetric Threshold Autoregressive Error-Correction Models

The TAR-VEC model specified by equations (4), (5) and (6) captures the **short-run dynamic behaviors of the lending rate and deposit rate**, allowing for the **long-run asymmetric adjustment** of the intermediation premium, for each of the groups of Pakistani banks with different ownership structures. Exhibit 4 summarizes the estimation results for. In the summary of the estimation results, the overall fitness of the model is evaluated by the following conventional diagnosis instruments. $Q_{(12)}$ is the Ljung-Box statistics and its significance is in square brackets, testing for the first twelve of the residual autocorrelations to be jointly equal to zero. $\ln L$ is the log likelihood. The overall $F_{(n,m)}$ -statistic testing for the overall fitness of the model, with “*” indicating the significant level of 1 percent. The two subscripts n and m indicate numerator and the denominator of the degree of freedom of the overall $F_{(n,m)}$ -statistic.

As to equation specific, in summarizing of the estimation results, $A_{ij}(L)$ represents the first-order polynomials in the lag operator L . The F_{ij} represents the calculated F -statistics with the p-value in square brackets, testing the null hypothesis that all coefficients of A_{ij} are equal to zero. The t -statistics are reported with “*”, “**” and “***” indicating the 1, 5 and 10 percent significant levels, respectively. The retained estimated coefficients of the polynomial $A_{ij}(L)$ are based on the 5 percent level of significance of the calculated t -statistics. The significance of the partial statistic F_{12} indicates a unidirectional Granger causality from deposit rate to lending rate of the group of i banks while the significance of the partial statistic F_{21} implies a unidirectional

Granger causality from their deposit lending rate to deposit rate. Obviously, the significances of both of these two partial F -statistics signal the bidirectional Granger causality between the lending and deposit rates of this group of banks.

Moreover, as to the long-run adjustment, the estimation results of the TAR-VEC model, the statistical significance (determined by the t -statistic at conventional significance level) of $\rho_{i,1}$ indicates that the lending rate of the group of i banks respond to the positive changes in the intermediation premium while the significance of $\rho_{i,2}$ reveals that these banks respond to negative changes in the intermediation premium spread in the long run. Statistical significances of both $\rho_{i,1}$ and $\rho_{i,2}$ show that lending rate of the group of i banks responds to both positive and negative changes in their intermediation premium. Similar interpretations can be applied to the statistical significances of both $\tilde{\rho}_{i,1}$ and $\tilde{\rho}_{i,2}$, individually as well as collectively.

Exhibit 4: Estimation Results for M-TAR VEC Model, Pakistani Monthly Data 2004:01 to 2013:12

a. Public Banks:

$$\Delta LR_t = 0.0199 - 0.1823I_t\hat{\varepsilon}_{t-1} - 0.2096(1 - I_t)\hat{\varepsilon}_{t-1} + A_{11}(L)\Delta LR_{t-i} + A_{12}(L)\Delta DR_{t-i} + u_{1t}$$

(0.2722) (-2.6536*) (-3.7346*) $F_{11}=7.1372[0.0001]$ $F_{12}=10.1662[0.000]$

$$Q_{(12)} = 5.3850[0.9439] \quad \ln L = -80.4367 \quad \text{Overall } F_{(13,81)\text{-statistic}} = 8.8276^*$$

$$\Delta DR_t = 0.0440 + 0.3500I_t\hat{\varepsilon}_{t-1} + 0.2016(1 - I_t)\hat{\varepsilon}_{t-1} + A_{21}(L)\Delta LR_{t-i} + A_{22}(L)\Delta DR_{t-i} + u_{2t}$$

(0.3246) (3.0761*) (2.0041**) $F_{21}=5.1138[0.0002]$ $F_{22}=8.3797[0.0000]$

$$Q_{(12)} = 2.7220[0.9972] \quad \ln L = -141.1707 \quad \text{Overall } F_{(11,84)\text{-statistic}} = 5.7336^*$$

b. Private Banks:

$$\Delta LR_t = 0.0274 - 0.1089I_t\hat{\varepsilon}_{t-1} - 0.0849(1 - I_t)\hat{\varepsilon}_{t-1} + A_{11}(L)\Delta LR_{t-i} + A_{12}(L)\Delta DR_{t-i} + u_{1t}$$

(0.6213) (-1.8693***) (-0.9600) $F_{11}=8.3369[0.0004]$ $F_{12}=2.1560[0.1451]$

$$Q_{(12)} = 7.6140[0.8145] \quad \ln L = -47.8506 \quad \text{Overall } F_{(6,103)\text{-statistic}} = 3.6272^*$$

$$\Delta DR_t = -0.0167 + 0.0651I_t\hat{\varepsilon}_{t-1} - 0.0289(1 - I_t)\hat{\varepsilon}_{t-1} + A_{21}(L)\Delta LR_{t-i} + A_{22}(L)\Delta DR_{t-i} + u_{2t}$$

(-0.2876) (0.8853) (-0.2668) $F_{21}=4.8568[0.0001]$ $F_{22}=4.9176[0.0013]$

$$Q_{(12)} = 7.4420[0.8271] \quad \ln L = -47.4057 \quad \text{Overall } F_{(13,83)\text{-statistic}} = 3.8337^*$$

c. Foreign Banks:

$$\Delta LR_t = -0.0124 - 0.1400I_t\hat{\varepsilon}_{t-1} - 0.2318(1 - I_t)\hat{\varepsilon}_{t-1} + A_{11}(L)\Delta LR_{t-i} + A_{12}(L)\Delta DR_{t-i} + u_{1t}$$

(-0.1771) (-1.6238) (-2.7760*) $F_{11}=5.0975[0.0026]$ $F_{12}=3.3746[0.0695]$

$$Q_{(12)} = 10.9620[0.5322] \quad \ln L = -83.3738 \quad \text{Overall } F_{(6,91)\text{-statistic}} = 4.9263^*$$

$$\Delta DR_t = -0.1144 + 0.1811I_t\hat{\varepsilon}_{t-1} - 0.0527(1 - I_t)\hat{\varepsilon}_{t-1} + A_{21}(L)\Delta LR_{t-i} + A_{22}(L)\Delta DR_{t-i} + u_{2t}$$

(0.0871) (2.2818**) (1.9660***) $F_{21}=7.3950[0.0000]$ $F_{22}=7.9863[0.0000]$

$$Q_{(12)} = 5.8130[0.9252] \quad \ln L = -64.5372 \quad \text{Overall } F_{(13,82)\text{-statistic}} = 6.9165^*$$

d. Specialized Banks:

$$\Delta LR_t = 0.1112 - 0.0908I_t\hat{\varepsilon}_{t-1} + 0.0309(1 - I_t)\hat{\varepsilon}_{t-1} + A_{11}(L)\Delta LR_{t-i} + A_{12}(L)\Delta DR_{t-i} + u_{1t}$$

(1.5585) (-1.6482) (0.6556) $F_{11}=6.7478[0.0000]$ $F_{12}=6.0645[0.0035]$

$$Q_{(12)} = 11.3470[0.4995] \quad \ln L = -61.6145 \quad \text{Overall } F_{(10,84)\text{-statistic}} = 5.2307^*$$

$$\Delta DR_t = 0.1200 + 0.2139I_t\hat{\varepsilon}_{t-1} + 0.4550(1 - I_t)\hat{\varepsilon}_{t-1} + A_{21}(L)\Delta LR_{t-i} + A_{22}(L)\Delta DR_{t-i} + u_{2t}$$

(0.6152) (1.1522) (3.1093*) $F_{21}=5.4010[0.0019]$ $F_{22}=3.3913[0.0125]$

$$Q_{(12)} = 5.3250[0.9462] \quad \ln L = -163.6874 \quad \text{Overall } F_{(9,88)\text{-statistic}} = 10.2825^*$$

e. All Banks:

$$\Delta LR_t = 0.0028 - 0.0515I_t \hat{\epsilon}_{t-1} - 0.0933(1 - I_t) \hat{\epsilon}_{t-1} + A_{11}(L)\Delta LR_{t-i} + A_{12}(L)\Delta DR_{t-i} + u_{1t}$$

(0.0513) (-0.6645) (-1.0941) $F_{11}=6.7991[0.0004]$ $F_{12}=2.4756[0.0666]$

$$Q_{(12)} = 6.6860[0.8776] \quad \ln L = -28.7377 \quad \text{Overall } F_{(8,89)\text{-statistic}} = 3.3758^*$$

$$\Delta DR_t = -0.0842 + 0.1706I_t \hat{\epsilon}_{t-1} - 0.1515(1 - I_t) \hat{\epsilon}_{t-1} + A_{21}(L)\Delta LR_{t-i} + A_{22}(L)\Delta DR_{t-i} + u_{2t}$$

(-1.2273) (1.8177^{***}) (-1.4476) $F_{21}=5.1347[0.0004]$ $F_{22}=3.9648[0.0107]$

$$Q_{(12)} = 8.7880[0.7209] \quad \ln L = -42.2685 \quad \text{Overall } F_{(10,86)\text{-statistic}} = 4.0206^*$$

Notes: Partial *F*-statistics for lagged values of changes in the lending rate and Central Bank discount rate, respectively, are reported under the specified null hypotheses. $Q_{(12)}$ is the Ljung-Box *Q*-statistic to test for serial correlation up to 12 lags. “*”, “**” and “***” indicate 1 percent, 5 percent and 10 percent levels of significance of the *t*-statistics, respectively.

VI. DISCUSSION AND A POSSIBLE ALTERNATIVE INTERPRETATION OF THE ESTIMATION RESULTS

6.1 Discussions of the Estimation Results

First of all, graphs in Figure 1 suggest that the intermediation premium of Pakistani public, private, foreign, and specialized banks experience structure breaks at different dates from January 2004 to December 2013. The suggested break dates for the intermediation premium of Pakistani foreign and specialized banks are confirmed by their corresponding calculated value of their $t(\alpha = 1)$'s, while the suggested break dates for other three premium were confirmed by Chow's tests for structural break. This finding tethered with the descriptive statistics summarized in Table 1 and given that all of Pakistani banks face the same economic and financial landscapes in Pakistan and around the world over the sample period suggest that these groups of banks perceive risks differently and have different rate setting behaviors.

As to the long-run adjustment of the intermediation premia of Pakistani banks of different ownerships, the estimated coefficients of equations (2), (3), and (4) reveal the following results. The An analysis of the overall estimation results indicates that the estimation results for all five groups of Pakistani banks are devoid of serial correlation and have good predicting power as evidenced by the Ljung-Box statistics and the overall *F*-statistics, respectively. The value of the partial $\hat{\Phi}_\mu$ -statistics indicate that the null hypothesis of symmetry, $H_{i,0} : \rho_{i,1} = \rho_{i,2} = 0$, should be rejected at conventional levels for all five groups of banks, confirming that their intermediation premia are all stationary.

Additionally, the calculated partial *F*-statistics testing the null hypothesis of no-cointegration, $H_{i,0} : \rho_{i,1} = \rho_{i,2}$, can be rejected for the public banks and the private banks while this hypothesis for foreign banks, specialized banks, and all banks cannot be rejected at conventional levels. These empirical findings indicate that the adjustment of the intermediation premia, $SP_{i,t}$, around their endogenously determined thresholds, τ_i , of the public banks and the private banks in Pakistan are asymmetric; while the adjustments of the premia of other three groups of banks are symmetric. Moreover, for a group of *i* banks, if the adjustment of their intermediation premium around its estimate threshold is asymmetric and if their $|\rho_{i,1}|$ is less than their $|\rho_{i,2}|$, then, these banks are said to exhibit a predatory rate setting behavior. Based on the previous articulation, an analysis of the empirical results for public and private banks, the two groups whose intermediation premia adjust around their endogenously determined thresholds are asymmetric, reveals that only Pakistani private banks collectively exhibit a predatory rate setting behavior.

With regard to the behaviors of the lending rates and deposit rates of the five groups of banks under investigation, analyses of the overall estimation results indicate that the estimated equations (5) and (6) for each of the groups of banks are absent of serial correlation and have good predicting power as evidenced by the by the Ljung-Box statistics and the overall *F*-statistics, respectively. As to the long-run adjustment of the lending rates

of these groups of banks, based on the statistical significances of both $\rho_{i,1}$ and $\rho_{i,2}$, the estimation results of equation (5) of the TAR-VEC model suggest that: (i) the lending rate of the group of public banks respond not only to the narrowing but also to the widening of the intermediation premium; (ii) the lending rate of the group of private banks respond only to the widening but not the narrowing of their intermediation premium; (iii) the lending rate of the group of foreign banks respond only to the narrowing but not the widening of their intermediation premium; but (iv) the lending rates of the group of specialized banks and all banks combined do not respond to either the narrowing nor the widening of the intermediation premium.

As to the long-run adjustment of the deposit rates of these groups of banks, based on the statistical significances of both $\tilde{\rho}_{i,1}$ and $\tilde{\rho}_{i,2}$, the estimation results of equation (6) of the TAR-VEC model indicate that: (i) the deposit rate of the groups of public banks and foreign banks responds not only to the narrowing but also to the widening of the intermediation premium; (ii) the deposit rate of the group of specialized banks responds only to the narrowing but not the widening of their intermediation premium; (iii)) the deposit rate of the group of all Pakistani banks combined responds only to the widening but not the narrowing of their intermediation premium; but (iv) the deposit rate of the group of private banks does not respond to either the narrowing nor the widening of the intermediation premium.

In addition to estimating the long-run equilibrium relationship and asymmetric adjustment, the estimated TAR-VEC model also allows for determinations of the Granger causality between the lending rates and deposit rates of all five groups of Pakistani banks in question. The nature of the Granger causality—bidirectional, unidirectional or mutually exogenous—reveals how these rates react to their own lagged changes and lagged changes of the other's. The partial *F-statistics*, F_{12} and F_{21} , in the estimated equations (5) and (6) reveal that: (i) the lending and deposit rates of the Pakistani public banks and specialized banks respond not only to their own lagged changes but also to lagged changes of their other rates; (ii) the lending rates of the private banks, foreign banks and all banks combined in Pakistan respond only to their own lagged while their deposit rate respond not only to their own lagged changes but also to lagged changes of their lending rate.

6.2 A Plausible Interpretation

The peculiarity of this study is the estimation results using data from Pakistani public banks revealing unusually high absolute values of, respectively, 1.4599 and 0.2772 for the estimated coefficients ρ_1 and ρ_2 of equations (3) and (4) and they are highly statistically significant, as evidenced by the reported *t-statistics*. Economically, these empirical findings indicate that if changes in the economy cause the deposit rate to fall resulting in a decrease in the intermediation premium of the public banks from 4.00 percent to 3.00 percent (4.00 - 3.00 = 1.00), for example, the monthly upward adjustment of the premium is $0.2772 \times 1.00 = 0.2772$ percent, i.e., it would take $1.00/0.2772 = 3.61$ months for the intermediation premium to reach its long-run threshold. However, if the changes in the economy cause the intermediation premium of the public banks to increase by 1 percent, within only one month, the downward adjustment would be $1.4599 \times 1.00 = 1.4599$ percent **which is 0.4599 percent overshoot!**

Possibly, the above findings of this study from the group of public banks suggest underlying problems in a country with the Heritage Foundation index of economic freedom and corruption perceptions index of 55/100 and 2.8/10 respectively. Based on the corruption perception index, the Heritage Foundation ranked Pakistan to be the 126th out of 183 most corrupt countries in 2012. Additionally, in developing countries, public sector and publically owned institutions are the cradles of corruption and also disrupted by terrorist activities. As to economic freedom, Pakistan was ranked 127th out of 179, with 1st being the most free country by Heritage Foundation in 2012.

However, at first glance, the above empirical results seem to support the consumer reaction hypothesis as articulated by Stiglitz and Weiss (1981). It is important to note that the consumer reaction hypothesis is predicated on a high interest rate environment in the context of an advanced market economy, which is critical to understanding the rationale for bank behavior in such an environment. The interest rate is the price of using financial capital or funds, and microeconomic theory demonstrates that in the relatively high price range, the demand for the underlying product is more elastic. Therefore, in the relatively high lending rate environment such as the case of Vietnam, the demand for loans is likely to be relatively more elastic.

Customarily, originating loans would generate some non-interest incomes, such as servicing fees, origination fees, and interest incomes for lending institutions. However, in a corrupt environment there may be some "other benefits" for both the originating institutions and possibly their management as well. Naturally, it is easier to ask for and the borrowers are more likely to agree to providing "other benefits" or "graft" in the declining lending rate environment than when the rate is rising. Certainly, a decline in the deposit rate widens the intermediation premium, which allows lending institutions to originate loans at a *lower lending rate and still*

maintain the old spread. This coupled with the high elasticity of demand precipitates a significant increase in demand for loans which in turn will create opportunities for lending institutions and their management to generate lucrative “other benefits” and hence the observed quicker responses, overshoot in the case of Pakistani public banks.

Asymmetrically, in the rising rate environment, the new loans must be generated at higher lending rates and the possible negative attendant impacts on “graft” do not provide attractive opportunities for lending in situations and their management, and hence the observed slower responses. As a fore mentioned, the corrupt environment, and when counter cyclical monetary policy or economic change causes decreases in the premium, managers of lending institutions must weigh the marginal non-interest benefits to both the originating institutions and themselves against marginal loss in interest income in originating new loans at the new lending rate to restore the spread to the threshold. This benefit and graft maximizing process in the face of high elasticity of demand for loans precipitated by a high rate environment would be a very plausible explanation of the empirical finding of the above pattern of the asymmetric adjustment process in the Pakistani public banks.

The above discussion on the asymmetric adjustment of the intermediation premium of Pakistani public banks may help explain the bidirectional Granger-causality findings in the estimation of the TAR model. More specifically, when a shock widens the intermediation premium, management of public banks will try to increase the loan originations to maximize non-interest income and “other benefits” while maintaining the old spread. Facing high elastic demand for loans, precipitated by a high rate environment, the management may achieve this objective by lowering the lending rate quickly to attract new loans. This phenomenon is consistent with the empirical finding so asymmetric adjustments of the lending rate and the intermediation premium as well as the bidirectional Granger causality.

VII. CONCLUDING REMARKS

This study applies Enders and Siklos’ (2001) procedure to test for the long-run asymmetric co-integrating relationship and short-run dynamic Granger causality between Pakistani lending and deposit rates set by public, private, foreign, specialized, and all banks combined over the period January 2004 to December 2013. The empirical results suggest a long-run asymmetric co-integration relationship between the rates. The Granger causality tests suggest bidirectional and asymmetric causality between lending and deposit rates set by Pakistani public, private banks, while the lending rate set by the country’s foreign, specialized and all banks combined are exogenous from their deposit rates. The asymmetric and different nature of the Granger causalities exhibit by banks with different ownership structures should be of special interest for the Central Bank in formulating and implementing its countercyclical monetary policy and for corporations in determining their capital structures. Terrorism is imposing additional costs on Pakistan’s asymmetric information system.

Perron’s (1997) endogenous unit root test, supplemented by the Chow test for structural break, reveals that even though Pakistani banks of different ownership structures face the same domestic and international economic landscapes, their intermediation premium experience different structural break dates over the sample period. This finding suggests that banks of different ownership structures have different rate setting behaviors. More specifically, the empirical results indicate that private banks collectively exhibit a predatory rate setting behavior while the rate setting behaviors of Pakistani banks with other ownership structures and all banks combined are consistent with the consumer reaction hypothesis as articulated by Stiglitz and Weiss (1981).

The rate setting behaviors of foreign banks, specialized banks and notably the unusually fast and overshoot adjustments of the lending rates in response to increases in the intermediation premium of public banks in the face of Pakistani corrupt opaque operating environment are interpreted as graft maximization. The graft maximizing phenomenon seems to be acute at the public banks which should not be a surprise since public sector and publically owned institutions are the cradles of corruption in developing countries.

Most studies of rate setting behaviors are of macro-nature, i.e., using data from all banks combined. This study contributes to the literature by using data from banks with different ownership structures and by finding differences in their rate setting behaviors. More interestingly, rate setting behaviors of banks of some ownership structures, the public banks and private banks in this study, may be markedly different from that of all banks combined. As compared to the results for all banks combined in this investigation, these differences are glossed over. Therefore, empirical results of this investigation would help policy makers to design and implement proper policy and investors to design their investment strategies.

The limitation of this investigation is that, due to the data limitation, the classification of banks in different ownership structures is not mutually exclusive. For example, the Industrial Development Bank of Pakistan is classified as a public as well as a specialized bank. Our conjecture is that if the classification were mutually exclusive, the different rate setting behaviors of banks with different ownership structure would be more distinctive.

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