

# **Asymmetric responses of commercial banks to monetary policy in a transitional economy: the case of Vietnam**

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## **Abstract**

This study investigates how Vietnamese commercial banks respond to countercyclical monetary policy. At first glance, the empirical findings suggest the asymmetrical response of Vietnamese commercial banks to countercyclical monetary policy to be competitive and monetary authority successfully utilizes monetary policy instruments to achieve its objectives. In light of the known characteristics of the Vietnamese economy, the empirical results may be alternatively interpreted as the consequence of graft maximizing behavior of bank management operating in a corrupt and opaque environment. Thus, to correct these problems, a strong political will and commitment to reforming the system and implementing appropriate checks and balances in the political system in the country to formulate policy measures needed to establish a competitive, transparent, and efficient banking and financial system which would be conducive to further economic and social progress.

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## 1 Introduction

Since the late 1930s, Keynesian fiscal policy has played a critical role in macroeconomic management in market economies. Beginning in the 1960s, changes in international economic conditions resulted in persistently large government budget deficits in economies around the world. As articulated by Mishkin (1995, p. 3), partly because of concern over persistent budget shortfalls including large public debts and partly because of doubt about the political system's ability to utilize the fiscal policy instruments in a timely and effective manner to achieve the desirable stabilization outcome, the fiscal policy has thus lost its luster. Consequently, the stabilization of output and inflation has been left largely to monetary policy.

Bernanke and Gertler (1995, p. 27) pointed out that monetary policy, at least in the short-run, can affect the real economy. Recent empirical research (Romer and Romer, 1990; Bernanke and Blinder, 1992; Christiano, Eichenbaum, and Evans, 1994) confirmed earlier findings by Friedman and Schwartz (1963) that monetary policy actions affected the real output of the economy for the succeeding two years or more. Certainly, monetary policy is a powerful tool; however, Mishkin (1995, p. 4) argued that this instrument has unintended consequences. Therefore, to conduct monetary policy successfully, the monetary authorities must have accurate knowledge as to the timing and the effect of their policy actions on the economy. This in turn requires the policymakers to understand the mechanism through which monetary policy affects the economy, which is often known as the monetary transmission mechanism, dubbed by economists as the "black box"!

Clearly, monetary policy becomes more and more important as an instrument for macroeconomic policy-making and macroeconomic management. As pointed out by Bernanke and Gertler (1995, p. 27), the same research that has established that changes in monetary policy are eventually followed by changes in real output, is largely silent about what happens in the interim. To address this void, the fall 1995 issue of the *Journal of Economic Perspectives* arranged a symposium on the monetary transmission mechanism. At this symposium, major papers were presented by prominent economists such as Frederic S. Mishkin, John B. Taylor, Ben S. Bernanke and Mark Gertler, Allan H. Meltzer, and Maurice Obstfeld and Kenneth Rogoff. In summarizing the papers presented at the symposium, Mishkin (1995, pp. 4-9) articulated that these authors identified several important channels through which monetary policy actions are transmitted to real economic activities: the interest rate channel, the exchange rate channel, other asset price effects and the credit channel.

Additionally, commercial banks are an integral part of the monetary policy transmission mechanism. These intermediaries would derive their interest income from the spread between the lending rate charged to borrowers and the cost of funds, which is affected by monetary policy actions. Economic theory has articulated that if the spread is high, it would reflect inefficiency and/or lack of competition, indicating that these institutions would not be able to fulfill their expected role in promoting economic growth and social progress. Furthermore, the commercial banks' behavior in setting their lending and deposit rates significantly influences the effectiveness of the monetary authority in its monetary policymaking.<sup>2</sup>

As discussed in the section on Vietnamese economy and banking sector, across the spectrum of changes that took place in the country in the last thirty years, there is some debate as to whether the Vietnamese banking industry can be

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<sup>2</sup> Sellon (2002) provides a nice overview of the impact of the changing U.S. financial system on the interest rate channel for monetary policy transmission.

characterized as highly oligopolistic and more recently as highly competitive. In light of the above mentioned banking structure changes since the 1980s, Vietnam, with its transitional economy, is of particular interest for empirical research on how commercial banks respond to countercyclical monetary policy. This paper empirically investigates how the Vietnamese commercial banks respond to countercyclical monetary policy actions as reflected in changes in the Central Bank's discount rates and hence the spread between the commercial banks' lending rates and the discount rates. To this end, the study first endogenously determines whether the spread between the commercial banks' lending and Central Banks' discount rates experienced a structural break over the period 1996:01-2011:06. Second, the question of how commercial banks respond to countercyclical monetary policy actions as reflected in symmetric/asymmetric adjustments to the long-term threshold of the spread is investigated. Finally, if the asymmetries exist, do such asymmetries reveal collusive or competitive behavior by the Vietnamese commercial banks?

## **2 A Brief Literature Review**

The rationale for 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 of 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 and Mizen (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 cointegration 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. (2010) found asymmetries in the Bangladeshi lending deposit rates. Chang and Su (2010) reported nonlinear cointegration between the lending and the deposit rates in ten Eastern European countries. Lately, Haug and Basher (2011) found nonlinear cointegration in the purchasing power parity relationships for Canada, Japan, Switzerland, the U.K., Belgium, France, Germany, Italy and Netherlands.

Moreover, there are three main theoretical explanations for the commercial bank interest rate asymmetries: the bank concentration hypothesis, the consumer characteristic hypothesis, and the consumer reaction hypothesis. The bank concentration hypothesis posits that banks in more concentrated markets are slower to adjust deposit rates upward and faster to adjust them downward, while exhibiting the opposite behavior regarding the lending rates (Neumark and Sharpe, 1992; Hannan and Berger, 1991). The consumer characteristic hypothesis asserts that the greater the proportion of unsophisticated consumers relative to sophisticated consumers in the market, together with the potential search-and-switching costs, the greater the banks' ability to adjust interest rates to their advantage (Calem and Mester, 1995; Hutchison, 1995; Rosen, 2002).

However, the asymmetric adjustment in lending rates may actually benefit consumers. As articulated by Stiglitz and Weiss (1981), the presence of asymmetric information may create an adverse selection problem in lending markets such that higher interest rates will tend to attract riskier borrowers. Therefore, banks would be reluctant to raise lending rates, even if the market rates rise. The expected cost to the banks of not raising the lending rates, when their

marginal cost of fund increases, will be offset by the benefits of not encouraging the higher-risk consumers to borrow.<sup>3</sup>

### **3 Vietnamese Economy and Banking Sector**

#### **3.1 The Transition**

The current Vietnamese banking structure was initiated by the banking reforms in 1988-1989 as an integral part of the transition from a planned to a market economy and when the monobank system that served the need of the centrally planned economy was split into a two-tier banking system. This system consists of the State Bank of Vietnam as the Central Bank and four state owned commercial banks. The National Assembly approved in December 1997 two new laws relating to the operations of the Central Bank and commercial banks, which became effective in October 1998. In 1990, the rule on sectorial specialization of these banks was abolished and entry into the banking system was liberalized.

This liberalization precipitated the formation of the joint-stock joint-venture banks mostly in early 1991-1993. Shareholders of joint-stock banks are state-owned commercial banks, state-owned enterprises, and private entities. Joint-venture banks are partnerships between a state owned commercial bank and a foreign bank which are subject to the same restrictions on deposit taking as foreign banks. Operations of commercial banks and other financial institutions are supervised by the State Bank of Vietnam. Prudential Regulations provide for off-site and on-site inspections, set prudential limits on lending, and stipulate minimum capital requirements.

In subsequent years, interbank markets were introduced for both foreign exchange and short-term domestic funds, and guarantees and other procedures

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<sup>3</sup> Scholnick (1999) provides the survey on these three types of explanations for commercial banks' interest rate asymmetries in the literature.

were initiated to help secure lending. The structure of interest rates was rationalized. Real interest rates on household deposit and lending for both working and fixed capital have been consistently positive since 1988. Real interest rates on enterprise deposits have also been positive since 1995. The authorities removed the turnover tax on banks in 1995 but placed a limit on the banks' net interest income (limiting it to an effective level of 0.35 percent per month). Bank loans became subject to an interest rate ceiling for short-term loans at 1 percent per month in 1997.

Beginning in mid-1995, some treasury bills were auctioned off to allow market forces a greater role in determining interest rates. These bills were mostly bought by the state owned commercial banks. Other bills and bonds issued by the State Treasury of Vietnam for the most part are sold to the non-bank public. The required reserve ratio was unified across institutions and types of deposits.

As a result of these reforms, the banking sector expanded considerably and banks began offering a broader range of services. With these developments, Vietnam seems to be well on its way to having a market economy. However, the reforms moved more quickly on the surface than at their core. We argue that if inefficient state owned enterprises are not completely privatized, the Vietnamese banking system cannot be liberated. Therefore, the national monetary policy must still be guided by multiple, and at times conflicting policy objectives.

### **3.2 The Policy Inconsistency, Constraints, and Attendant Difficulties**

The conduct of an effective monetary policy in Vietnam has been circumscribed by the following institutional and structural constraints. In early 1998, state owned commercial banks still accounted for 80 percent of deposits and their lending remained subject to political direction. State owned enterprises

continue to receive borrowing privileges, including obtaining loans without collateral, easier access to foreign currency loans, and subsidized interest rates. Accounting practices rendered credit evaluations problematic and off-balance sheet liabilities, such as letters of credit, emerged as a major source of risk. Collateral rules excluded urban land and made foreclosure virtually impossible. A number of joint-stock banks experienced difficulties as a result of fast credit expansion based on inadequate risk appraisal (IMF Staff Country Report NO 98/30, p. 4).

The State Bank of Vietnam supervisors encountered difficulties enforcing the rules and regulations. Moreover, excessive loans to shareholders are a particular problem for joint-stock banks as regulations limiting credit to a single borrower could be easily circumvented. The national monetary policy has been guided at times by conflicting policy objectives. Domestically, these conflicting objectives include economic growth, price and currency stability, financing the inefficient state owned enterprises through policy directed lending, and financial system stability.

The Vietnamese banking system is segmented into two segments: the four dominate large state owned commercial banks, and a number of small and more dynamic foreign-owned and joint-venture banks. The state owned commercial banks frequently operate on a non-commercial basis, with a culture of policy lending which is subject to direct government interference. However, the rest of the banking system is more market-oriented. Transparency in banking operations, especially in the lending decisions, is always a thorny issue. These complicate the transmission of monetary policy, which operates under a mix of direct channels (through the state owned commercial banks) and market mechanisms (through other banks) in an opaque environment. Additionally, the structure of the financial system has been rapidly transformed. Growing monetization and increasing internationalization of the banking system make it very difficult to estimate stable relationships between key monetary and credit aggregates, interest rates, and other



economic and financial variables. Consequently, these problems make the determination of the true risk profile of the financial institutions' portfolios virtually impossible.

Despite increases in inflation pressures, the State Bank of Vietnam must continue to focus its operations on the need to meet the economic growth objectives set by the National Assembly. As a result, Open Market Operations at times have been used primarily to inject liquidity into the banking system as needed to support the state owned commercial banks' own budget shortfalls and the financing of large public infrastructure projects. One of the consequences of the above policy action has been the increase in the non-performing loans, mostly from the state-owned enterprises accumulated in the financial institutions' balance sheets. By 2000, the dominant four state owned commercial banks were characterized by weak balance sheets, which amount to VND 23 trillion (Vietnamese Dong). This represents about twice their capital, five percent of the GDP, and fifteen percent of all outstanding credit to the economy. About two thirds of the non-performing loans were to state owned enterprises and much of these non-performing loans were in the form of directed lending. (IMF Country Report No 99/55).

Diplomatic efforts have been underway by the Vietnamese government to secure economic and financial assistance in the forms of grants, low interest rate loans, and to find markets for the country's exports. The government has also laid the ground work to join regional and international institutions such as AFTA, US-VN Bilateral Agreement, and eventually WTO. These efforts intensified in 1999, which precipitated many developments in the subsequent years. Successes in the diplomatic arena exacerbated problems in the Vietnamese banking sector because almost all economic, financial or social aid packages by international organizations required, among other conditions, a transparent banking system for the recipient country. The Vietnamese banking sector had difficulty meeting these conditions because of its banking structure and the inconsistent policy objectives

imposed upon the Vietnam state owned financial institutions, including the State Bank of Vietnam. These inconsistent policy objectives forced the Central Bank to follow the re-active modus operandi and the state owned commercial banks to finance the inefficient SOE sector.

To secure financial resources to continue its 1998-2000 National Target Program on Hunger Education and Poverty Reduction, Vietnam negotiated with the IMF to secure a package of US \$280 million Poverty Reduction and Growth Facility loan. This loan package carried an annual interest rate of 0.5 percent payable in 10 years with a 5.5 year grace period on principal payments. This is one of the Vietnamese multiple diplomatic initiatives to secure international economic and financial aids and a conducive environment for favorable evaluation of its applications to be a member of international organizations in the future.

One of the conditions required by these international organizations was the transparency of the banking system which Vietnam can ill afford because of its on-again off-again monetary policy focusing on fulfilling its conflicting objectives. All economic and financial supports from international institutions are structured to have multiple disbursements. Each disbursement is based on the recipient country meeting certain agreed conditions. For example, in the press release announcing the first disbursement of 52 million dollars to the Vietnamese Poverty Reduction and Growth Facility program, the IMF stated: "The authorities' program continues to provide for a restrained credit policy and a cautious fiscal stance. Credit growth has fallen considerably so far in 2001 and a further deceleration is being targeted to help stem nonperforming loans at the state-owned commercial banks and strengthen the financial discipline of state-owned enterprises. The fiscal policy allows room for a slight easing to cushion the impact of the global slowdown on growth, in particular through higher social and infrastructure spending and to meet structural reform costs." (IMF New Brief No 1/119, 11/21/2001).

In 1999 in anticipating these requirements, the State Bank of Vietnam authority temporarily redirected its focus by submitting to the government a plan for strengthening and reorganizing the joint-stock commercial banking system to be implemented in 2000. This plan eventually succeeded in meeting the set of initial requirements for the first disbursement of \$52 million of the PRGF program to Vietnam in 2001 (this PRGF program was subsequently suspended by the IMF for some time).

In assessing the progress of the Vietnamese reform to meet the requirements by the Poverty Reduction and Growth Facility program (PRGF), the IMF Country Report 2/4 (2006) stated: “Reform of the banking system in Vietnam is central to the PRGF-support program. The current reform approach is focused on restructuring the four large state owned commercial banks and putting them on a commercial footing. More broadly, the reform also aims at improving the legal, regulatory, and supervisory frameworks for more efficient and prudential banking, and at consolidating the non-state join-stock banks.”

Even with different reforms, the governmental banking degrees and legislatures modifying the National Assembly 1997 laws relating to the operations of the Central Bank and commercial banks, the internal and external difficulties of the Vietnamese banking system are still problematic. In December 2006, the State Bank of Vietnam was still orbiting on a vicious circle as evidenced in the IMF Country Report 06/421: “The State Bank of Vietnam revised monetary program for 2006 targets a deceleration of credit growth to 20 percent by end-2006. The team supported the authorities’ aim to slow credit growth and welcomed the increased caution exercised by the state owned commercial banks in their new lending. However, given a still large amount of excess bank liquidity, there is a risk that credit growth will resurge during the remainder of the year, especially if this proves necessary to ensure the financing of strategic state owned enterprise projects. Additional challenges may be posed by banks’ potential new off-balance sheet risks, such as the issuance of guarantees for state owned enterprise bonds,

and stock market-related lending. The authorities acknowledged that bank financing for many large state owned enterprise projects was likely to materialize in the coming months.”

As recent as June 2011, the IMF Executive Board observed that “Macroeconomic risks stemming from expansionary policies adopted during the global crisis have materialized. Even as most fiscal stimulus measures expired at the end of 2009, monetary policy has remained accommodative, contributing to continued strong credit growth (35 percent y/y in February), rising inflation (17.5 percent y/y in April), and downward pressures on the exchange rate as residents hoard foreign currency and gold outside the financial system. International reserves declined from already low levels.” Also “To address financial sector risks, elevated by the recent high credit growth, the authorities have introduced new prudential regulations, and are preparing a limit on the credit-to-deposit ratio. They have also requested an assessment under the IMF-World Bank Financial Sector Assessment Program (FSAP)” (IMF Public Information Notice 11/81). This observation is another example of the aforementioned policy inconsistency, constraints, and attendant difficulties of the Vietnamese monetary policy.

## 4 The Data

One of the challenges in empirical studies of transitional economies is the lack of desirable data. This study uses monthly data on the State Bank of Vietnam discount rate to capture the Central Bank countercyclical monetary policy measures and the commercial bank lending rates over the period of 1996:01 to 2011:06 where data is available. The data was collected from the International Financial Statistics, published by the International Monetary Fund. The monthly lending rates and the Central Bank discount rates are denoted by  $LR_t$  and  $DR_t$ ,

respectively. The difference between the lending rate and the discount rate is defined as the lending and discount rate spread, or the spread, and is denoted by  $SP_t$ .

Figure 1 displays the behavior of the respective lending and Central Bank discount rates over the sample period. As Figure 1 suggests, the Vietnamese lending rate oscillated around a steep downward trend while the Central Bank discount rate was held constant in 1996. They both dropped very sharply in late 1996 and then oscillated around a horizontal trend to early 1999. The lending rate fluctuated around a downward trend from early 1999 to the middle of 2002 and then oscillated around an upward trend in early 2008. The Central Bank discount rate dropped sharply from early to the end of 1999 and then followed its flat trend to early 2008 with a hump in the middle of 2003 and a jump of about 2 percent at the end of 2006. Over 2008 both the lending rate and discount rate increased sharply reaching their respective peaks at 20.00 percent and 15.00 percent and then dropped very sharply to 7.50 percent and 5.50 percent respectively. They then oscillated around fairly steep upward trends over the remainder of the sample period.

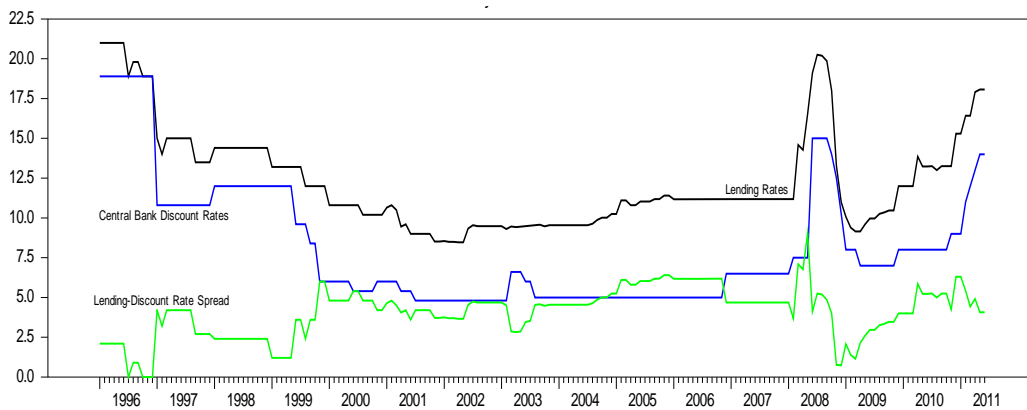


Figure 1: Vietnamese Lending Rate, Discount Rate, and Lending-Deposit Rate Spread, 1996:01- 2011:06.

As a result of the oscillations of the discount and the lending rates, the lending-Central Bank discount rate spread fluctuated between 0.00 and 2.50 percent over most of 1996. It then took a huge jump from 0.00 percent to 4.00 percent and then oscillated around a steep upward trend reaching 5.00 percent in the middle of 1997. After maintaining at about 5.00 percent for a few months, the spread dropped fairly sharply in the middle of 1997 and then stabilized until late 1998. The lending-discount rate oscillated around a fairly steep upward trend from late 1998 to late 1999 and then followed a moderately downward trend until the middle of 2002. It then fluctuated around a moderately upward trend until early 2008 with a trough in 2003 and a drop of about 2 percent at the end of 2007. Over the turbulent year of 2008, it increased sharply reaching its peak at about 7.5 percent then dropped sharply to about 1 percent and then oscillated around a fairly steep upward trend over the remainder of the sample period.

The mean lending rate during the sample period was 12.31 percent, and ranged from 8.46 percent to 21.00 percent with a standard error of 3.19 percent. The mean Central Bank discount rate over the same period was 8.20 percent, and ranged from 4.80 percent to 16.90 percent with a standard error of 3.96 percent. Their correlation was 92.71 percent. The mean lending-discount rate spread during the sample period was 4.10 percent, and ranged from 0.00 percent to 9.03 percent with a standard error of 1.56 percent. Moreover, as suggested by Figure 1, it is likely that the Vietnamese lending-discount rate spread experienced a structural shift over the sample period.

## **5 Methodological Issues and Analytical Framework**

To search endogenously for the possibility of any structural break in the Vietnamese lending-Central Bank discount rate spread, this study utilized Perron's (1997) endogenous unit root test function with the intercept, slope, and the trend

dummy to test the hypothesis that the Vietnamese lending-discount rate spread has a unit root.

$$SP_t = \mu + \theta DU + \alpha t + \gamma DT + \delta D(T_b) + \beta SP_{t-1} + \sum_{i=1}^k \psi_i \Delta SP_{t-i} + \nu_t \quad (1)$$

where  $DU = 1$  ( $t > T_b$ ) 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  $\varepsilon_t$  are white-noise error terms. The null hypothesis of a unit root is stated as  $\beta = 1$ . The break date,  $T_b$ , is selected based on the minimum t-statistic for testing  $\beta = 1$  (see Perron, 1997, pp. 358-359).

Table 1: Perron’s Endogenous Unit Root Test,  
Vietnamese Data, 1996:1 to 2011:06

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$SP_t = 0.75834 - 5.35688DU + 0.00968t + 0.02550DT + 3.79595D(T_b) + 0.64292SP_{t-1} + \nu_t$
(4.4473*) (-2.8525*) (4.6703*) (2.2792*) (4.7349*) (11.5889*)
No. of augmented lags: $k = 5$ Break Date: April 2008 $t(\alpha=1) = -6.4364^*$

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Notes: Critical values for t-statistics in parentheses.

Critical values based n = 100 sample for the break-date (Perron, 1997).

“\*” indicates significance at 1 percent level.

The estimation results of Perron’s endogenous unit root tests are summarized in Table 1. The post-break intercept dummy variable,  $DU$ , is negative and the post-break slope dummy variable,  $DT$ , is positive but only  $DT$  is significant at any conventional level. The empirical results of these tests suggest that the Vietnamese lending-discount rate spread followed a stationary trend process with a break date of April 2008, corresponding to the worldwide financial chaos created by the US subprime mortgage crisis.

Additionally, as posited by Breitung (2001, p. 331), economic theory suggests in many cases a nonlinear relationship between economic and financial time

series. This implies that  $LR_t$  and  $DR_t$ , may be nonlinearly cointegrated. To discern this possibility, Breitung's nonparametric procedure is applied to test for their nonlinear cointegration.

Breitung's nonparametric testing procedure consists of the cointegration test, known as the rank test for cointegration, and the nonlinearity test, referred to as the score statistic for a rank test of neglected nonlinear cointegration. Following Breitung (2001), this study defines a ranked series as  $R_T(LR_t)$  [of  $LR_t$  among  $LR_1, \dots, LR_T$ ] and  $R_T(DR_t)$  accordingly. Breitung's two-sided rank test statistic, testing for cointegration, denoted by  $\Xi_T^*$ , is calculated as follows:

$$\Xi_T^* = T^{-3} \sum_{i=1}^T (r_i^R)^2 / (\sigma_{\Delta r}^2) \quad (2)$$

where  $T$  is the sample size,  $r_i^R$  is the least squares residual from a regression of  $R_T(LR_t)$  on  $R_T(DR_t)$ . As pointed out by Haug and Basher (2011, p. 187),  $\sigma_{\Delta r}^2$  is the variance of  $\Delta r_i^R$ , which is included to adjust for the potential correlation between the two time series  $LR_t$  and  $DR_t$ . The critical values for this rank test are given in Table 1 in Breitung (2001, p. 334).

Given the positive result of the rank test, the first step in calculating Breitung's score statistic for a rank test of neglected nonlinear cointegration (testing for nonlinearity) is to regress the Vietnamese lending rate,  $LR_t$ , on a constant, the Central Bank discount rate,  $DR_t$ , the ranked series of the Central Bank discount rate,  $R_T(DR_t)$ , and the disturbance  $\zeta_t$ .

$$LR_t = \delta_0 + \delta_1 DR_t + R_t^*(DR_t) + \zeta_t \quad (3)$$

where  $\delta_0 + \delta_1 DR_t$  is the linear part. Under the null hypothesis,  $R_t^*(DR_t) = 0$  implying that  $LR_t$  and  $DR_t$  are linearly cointegrated. Under the alternate hypothesis,  $R_t^*(DR_t) \neq 0$  implying that  $LR_t$  and  $DR_t$  are nonlinearly cointegrated. The score test statistic is given by  $T.R^2$  from the least squares regression of  $\zeta_t$ ,



under the null hypothesis, on a constant, the Central Bank discount rate,  $DR_t$ , the ranked series of the Central Bank discount rate,  $R_T(DR_t)$ , and a disturbance term.  $T$  is again the sample size and  $R^2$  is the coefficient of determination of the regression. As articulated by Breitung (2001, p. 337), under the null hypothesis of linear cointegration, the score statistic for a rank test of neglected nonlinear cointegration is asymptotically Chi-Square distributed with one degree of freedom.

If the results of Breitung's nonparametric tests are positive, this study follows Thompson (2006) to regress the spread,  $SP_t$ , on a constant, a linear trend and an intercept dummy (with values of zero prior to April 2008 and values of one for April 2008 and thereafter) to formally examine the Vietnamese lending, Central Bank discount rates and their spread. The saved residuals from the above estimated model, denoted by  $\hat{\varepsilon}_t$ , are then used to estimate the following TAR model:

$$\Delta\hat{\varepsilon}_t = I_t\rho_1\hat{\varepsilon}_{t-1} + (1-I_t)\rho_2\hat{\varepsilon}_{t-1} + \sum_{i=1}^p \alpha_i\Delta\hat{\varepsilon}_{t-p} + \hat{u}_t \quad (4)$$

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

$$I_t = \begin{cases} 1 & \text{if } \hat{\varepsilon}_{t-1} \geq \tau \\ 0 & \text{if } \hat{\varepsilon}_{t-1} < \tau \end{cases} \quad (5)$$

The threshold autoregressive model allows the degree of autoregressive decay to depend on the state of the lending-Central Bank discount rate spread, i.e. the "deepness" of cycles. The estimated TAR model empirically reveals if the spread tends to revert back to the long run position faster when the spread is above or below the threshold. Therefore, the TAR model indicates whether troughs or peaks persist more when shocks or countercyclical monetary policy actions push the spread out of its long-run equilibrium path. In this model's specification, the

null hypothesis that the lending-Central Bank discount rate spread contains a unit root can be expressed as  $\rho_1 = \rho_2 = 0$ , while the hypothesis that the spread is stationary with symmetric adjustments can be stated as  $\rho_1 = \rho_2$ .

## 6 Empirical Results

Empirical calculations indicate that Breitung's nonparametric rank tests and score test are 0.000105, which fails to reject the null hypothesis of non-cointegration and 22.272105 which rejects the linear null hypothesis, respectively. These statistics reveal that the Vietnamese lending and Central Bank discount rates are nonlinearly cointegrated at all conventional levels of significance. Additionally, the estimation results of the TAR model are summarized in Table 2.

Table 2: Unit Root and Tests of Asymmetry,

Vietnamese Monthly Data, 1996:1 to 2011:06

$\rho_1$	$\rho_2$	$\tau$	$H_0 : \rho_1 = \rho_2 = 0$	$H_0 : \rho_1 = \rho_2$	aic
-0.8400*	-0.2500*	0.7023	$\Phi_{\mu} = 16.8543^*$	F = 10.7298*	-0.4663
$Q_{LB(12)} = 17.9910[0.11560]$		$\ln L = 1213.1799$	$F_{(4,179)} = 14.2634^*$		

*Notes:* The null hypothesis of a unit root,  $H_0 : \rho_1 = \rho_2 = 0$ , uses the critical values from Enders and Siklos (2001, p. 170, Table 1 for four lagged changes and  $n = 100$ ). "\*" indicates 1 percent level of significance. The null hypothesis of symmetry,  $H_0 : \rho_1 = \rho_2$ , uses the standard F distribution.  $\tau$  is the threshold value determined via the Chan (1993) method.  $Q_{LB(12)}$  denotes the Ljung-Box Q-statistic with 12 lags

The overall empirical results in Table 2 indicates that the estimation results are devoid of serial correlation and have good predicting power as evidenced by the Ljung-Box statistics and the overall *F-statistics*, respectively. With the calculated statistic  $\Phi_{\mu}=16.8543$ , the null hypothesis of a unit root ( $\rho_1 = \rho_2 = 0$ ) is rejected at the 1 percent significance level (i.e. the spread is stationary). Given the partial test statistic  $F = 10.7298$ , the null hypothesis of symmetry,  $\rho_1 = \rho_2$ , is also rejected at 1 percent significant level. Thus, the empirical results indicate that adjustments around the threshold value of the Vietnamese lending rate and the Central Bank discount rate spread are asymmetric. In fact, the point estimates suggest that the spread tends to decay at the rate of  $|\rho_1|=0.8400$  for  $\hat{\varepsilon}_{t-1}$  above the threshold,  $\tau = 0.7023$ , and at the rate of  $|\rho_2|=0.250$  for  $\hat{\varepsilon}_{t-1}$  below the threshold. Moreover, both  $\rho_1$  and  $\rho_2$  are statistically significant at any conventional level. Furthermore, as shown by Petrucelli and Woolford (1984), the necessary and sufficient condition for the spread to be stationary is:  $\rho_1 < 0$ ,  $\rho_2 < 0$  and  $(1 + \rho_1)(1 + \rho_2) < 1$ ; thus, the estimates of  $\rho_1$  and  $\rho_2$  satisfy the stationary (convergence) conditions

Given  $|\rho_1| > |\rho_2|$ , the Vietnamese lending and the Central Bank discount rate spread adjusts to the long-run threshold value faster when an expansionary countercyclical monetary policy action causes the Central Bank discount rate to fall relative to the lending rate widening the spread than when an contractionary countercyclical monetary action causes the Central Bank discount rate to move in the opposite direction, narrowing the spread. Interestingly, this asymmetric adjusting pattern seems to support the consumer reaction hypothesis, articulated by Stiglitz and Weiss (1981), and contradicts the position of the bank concentration hypothesis and the consumer characteristic hypothesis as well as the observed monopolistic/oligopolistic financial market structure and the dominance of the banking industry in Vietnam.

## 7 Results of the Asymmetric Error-Correction Model

The positive results of the above asymmetric co-integration tests from estimating the above TAR model necessitate the use of a Threshold Autoregressive Vector Error-Correction (TAR VEC) model to further investigate the asymmetric dynamic behavior of the Vietnamese lending rates and the Central Bank discount rates. The estimation results of this model can be used to study the nature of the Granger causality between the commercial bank lending rates and the Central Bank discount rates. The empirical determined nature of the Granger causality will help to evaluate whether, and how, the lending rates and the Central Bank discount rates respond to changes in their spread. The Granger causality from the discount rates to the lending rates indicates that Vietnamese commercial banks respond to monetary policy. The Granger causality from the lending rates to the Central Bank discount rates reveals that the Vietnamese Central Bank reacts to financial market conditions.

$$\Delta LR_t = \alpha_0 + \sum_{i=1}^n \alpha_i \Delta LR_{t-i} + \sum_{i=1}^q \gamma_i \Delta DR_{t-i} + I_t \rho_1 \hat{\epsilon}_{t-1} + (1-I_t) \rho_2 \hat{\epsilon}_{t-1} + u_{1t} \quad (6)$$

$$\Delta DR_t = \tilde{\alpha}_0 + \sum_{i=1}^n \tilde{\alpha}_i \Delta LR_{t-i} + \sum_{i=1}^q \tilde{\gamma}_i \Delta DR_{t-i} + I_t \tilde{\rho}_1 \hat{\epsilon}_{t-1} + (1-I_t) \tilde{\rho}_2 \hat{\epsilon}_{t-1} + u_{2t} \quad (7)$$

where  $u_{i,t} \sim i.i.d.(0, \sigma^2)$ ,  $i = 1, 2$  and the Heaviside indicator function,  $I$ , is set in accord with (5). This model specification recognizes the fact that the mutual responses between the countercyclical monetary policy action of the Vietnamese Central Bank and the lending institutions may be different, depending on whether the policy action causes the discount rate to rise or to decline.

As pointed out by Thompson (2006, pp. 327-328), the above specified TAR-VEC model differs from the convention error-correction models by allowing asymmetric adjustments toward the long-run equilibrium. Also, the asymmetric error correctional model replaces the single symmetric error correction term with two error correction terms. Thus, in addition to estimating the long-run equilibrium relationship and asymmetric adjustment, the model also allows for

tests of the short-run dynamic between the changes in the Central Bank discount rates and the lending rates. This in turn reveals the nature of their Granger causality.

In reporting the estimation results, the partial  $F_{ij}$  represents the calculated partial  $F$ -statistics testing the null hypothesis that all coefficients  $ij$  are equal to zero. “\*” and “\*\*\*” indicate the 1 percent and 5 percent significant levels of both the  $F$ -statistics and the  $t$ -statistics.  $Q_{(12)}$  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  $F$ -statistic tests the overall fitness of the model. The retentions of estimated coefficients  $\alpha_i, \gamma_i, \tilde{\alpha}_i$ , and  $\tilde{\gamma}_i$  are based on the 5 percent level of significance of the calculated  $t$ -statistics.

Table 3 reports the results of asymmetric error correction model. A general diagnostic analysis of the overall empirical results indicates that the estimated equations (6) and (7) are devoid of serial correlation and have good predicting power as evidenced by the Ljung-Box statistics and the overall  $F$ -statistics, respectively. As to the short-run dynamic adjustment, the calculated *partial statistics*, partial  $F_{12}$  and  $F_{21}$ , in equations (6) and (7) indicate bidirectional Granger causality between the countercyclical monetary policy action of the Vietnamese Central Bank as reflected in changes in the discount rates and the lending rates charged by lending institutions. These results imply that the countercyclical monetary policy action of the Vietnamese Central Bank and the lending rates affects each other. This bidirectional Granger causality indicates that the Vietnamese Central Bank uses its countercyclical monetary policy to manage the short-run macroeconomic conditions and lending institutions respond to the countercyclical monetary policy actions in the short run.

In addition to revealing the short-run dynamic Granger causality, the asymmetric error correction model also reveals the long-run behavior of the countercyclical monetary policy action of the Vietnamese Central Bank.

Table 3: Asymmetric Error Correction Model, Monthly Data, 1996:01- 2011:06

<b>Independent Variables</b>				
Eq. (6)	<i>Overall</i> $F_{(10,151)} = 9.9851^*$ ; $\ln L = -132.9608$ $Q_{(12)} = 12.618[0.3975]$ ; $\bar{R}^2 = 0.3582$			
$\Delta LR_t$	$\alpha_1 = \alpha_2 = \alpha_{14} = \alpha_{17} = 0$	$\gamma_4 = \gamma_5 = \gamma_{18} = \gamma_8 = \gamma_{23} = 0$	$\rho_1$	$\rho_2$
	<i>Partial</i> $F_{11-tat.} =$ 12.6562*	<i>Partial</i> $F_{12-stat.} =$ 12.3396*	0.0139	-0.1428**
<b>Independent Variables</b>				
Eq. (7)	<i>Overall</i> $F_{(6,160)} = 16.6524^*$ ; $\ln L = -156.3031$ $Q_{(12)} = 7.7390[0.8052]$ ; $\bar{R}^2 = 0.3613$			
$\Delta DR_t$	$\tilde{\alpha}_1 = \tilde{\alpha}_3 = 0$	$\tilde{\gamma}_8 = \tilde{\gamma}_{18} = 0$	$\tilde{\rho}_1$	$\tilde{\rho}_2$
	<i>Partial</i> $F_{21-stat.} =$ 15.3437*	<i>Partial</i> $F_{22-stat.} =$ 4.0541**	0.3639*	0.0349

*Notes:* Partial F-statistics for lagged values of the lending rates and the Central Bank discount rates respectively, are reported under the specified null hypotheses.  $Q_{(12)}$  is the Ljung-Box Q-statistics to test for serial correlation up to 12 lags. Overall F-statistics are for the respective overall equations.

“\*” and “\*\*” indicate 1 percent and 5 percent significance levels respectively.

The results from estimating equation (6) reveal that  $|\rho_2| > |\rho_1|$ , and  $\rho_2$  is significant at 1 percent level; while  $\rho_1$  is statistically insignificant at any conventional level. These findings suggest that that the Vietnamese lending institutions only respond to contractionary countercyclical monetary policy in the long run. However, the estimation results for equation (7) show that  $|\tilde{\rho}_1| > |\tilde{\rho}_2|$ . Also,  $\tilde{\rho}_1$  is significant at any conventional levels; but  $\tilde{\rho}_2$  is statistically insignificant even at 10 percent level. These findings suggest that the Vietnamese Central Bank has been successfully in influencing the commercial lending rates with its expansionary countercyclical monetary policy in the long run.

## 8 Discussion of Empirical Findings, Alternative Explanation, and Policy Implication

### 8.1 Discussion of Empirical Findings

As to the behavior of the Vietnamese lending-Central Bank discount rate spread, the estimation results suggest that the spread converges to its long-run threshold faster when it is above the threshold. With regard to the empirical results from the estimations of equations (6) and (7), these findings seem to suggest that the Vietnamese Central Bank has been able to affect the lending rate in the long run.

As to the empirical results pertaining to the short-run dynamic causality, the calculated partial *F-statistics* from equations (6) and (7) reveal the bidirectional Granger causality from Vietnamese countercyclical monetary policy actions to the lending rates in the country. The obvious and trivial interpretation of this bidirectional causality is that the Vietnamese Central Bank uses its monetary policy instruments to manage the macro-economy. Perhaps, the more conventional interpretation is that money and hence countercyclical monetary policy matters in the Vietnamese economy in the short run.

Another contribution of this study to the literature as well as to the ability of the Vietnamese Central Bank to formulate and implement the countercyclical monetary policy is the empirically determination of the time lags of the bidirectional Granger causality between the Vietnamese countercyclical monetary policy as reflected in changes in the Central Bank discount rates and the lending rates in the short run.

As aforementioned, based on a 5 percent significance level, estimated coefficients  $\alpha_i$ 's and  $\gamma_j$ 's of equation (6) and the estimated coefficients  $\tilde{\alpha}_i$ 's and  $\tilde{\gamma}_j$ 's of equation (7) are retained. Economically, the inclusions of coefficients  $\alpha_{17}$  and  $\gamma_{23}$  of equation (6) indicate that that the countercyclical monetary policy actions in the last twenty three months and the change in the lending rate seventeen

months ago help predict the lending rate in the current month. Likewise, the inclusions of the coefficients  $\tilde{\alpha}_3$  and  $\tilde{\gamma}_{18}$  of equation (7) suggest that the Vietnamese monetary authority looked at the changes in the lending rates back to three months ago and the changes in its discount rate in the last eighteen months to formulate its counter cyclical monetary policy in the current period.

From the countercyclical monetary policy time lag perspective, the retentions of the estimated coefficients  $\alpha_{17}$  and  $\gamma_{23}$  of equation (6) indicate that countercyclical monetary policy actions, reflected in changes in the Central Bank discount rate, back to twenty three months and the change in the lending rate back to seventeen months ago affect the current change in the lending rate. This finding implies that after implemented, it will take twenty three months for the Vietnamese countercyclical monetary policy to fully affect the market lending rates. The inclusions of the coefficients  $\tilde{\alpha}_3$  and  $\tilde{\gamma}_{18}$  of equation (7) means that when formulating the current countercyclical monetary policy the Vietnamese Central Bank is influenced by its actions taken in the last eighteen months and the change in the commercial bank lending rate back to one quarter ago.

## **8.2 An Alternate Interpretation of the Empirical Findings, and Policy Implications**

As the aforementioned, the empirical finding that  $|\rho_1|$  is greater than  $|\rho_2|$  suggests that the Vietnamese lending and the Central Bank discount rate spread adjusts to the long-run threshold value faster when an expansionary countercyclical monetary policy action causes the Central Bank discount rate to fall relative to the lending rate, widening the spread, than when a contractionary countercyclical monetary action causes the Central Bank discount rate to move in the opposite direction, narrowing the spread. Interestingly, this asymmetric adjusting pattern seems to support the consumer reaction hypothesis articulated by



Stiglitz and Weiss (1981), and contradicts the position of the bank concentration hypothesis and the consumer characteristic hypothesis as well as the observed monopolistic/oligopolistic financial market structure and the dominance of the banking industry in Vietnam.

Possibly, the findings of this study suggest underlying problems in a country with the Heritage Foundation index of economic freedom and corruption perceptions index of 51.6/100 and 2.9/10 respectively. Based on these indices, the Heritage Foundation ranked Vietnam to be the 112<sup>th</sup> out of 183 and 21 out of 33 most corrupt countries in the world and the Asia Pacific region (where Myanmar, Laos, Cambodia and Afghanistan—some of the most oppressed countries in the world—are located) in 2011, respectively. As to economic freedom, Vietnam was ranked 139<sup>th</sup> out of 179, with 1<sup>st</sup> being the most free country by Heritage Foundation in 2010. However, at first glance, the above 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, and key to understanding the rationale for bank behavior in such an environment. 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 besides the 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 Central Bank discount rate widens the spread, 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.

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 institutions and their management, and hence the observed slower responses. As aforementioned, the Vietnamese banking industry operates in the high rate, corrupt environment, and when countercyclical monetary policy causes changes in the spread, 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 high rate environment would be a very plausible explanation of the empirical findings of the above pattern of the asymmetric adjustment process in the Vietnamese banking industry.

The above discussion on asymmetric adjustment of the lending-Central Bank discount rate spread may help explain the bidirectional Granger-causality findings in the estimation of the TAR model. More specifically, when a shock widens the spread, management of lending institutions 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 high rate environment, the management may achieve this objective by a lowering the lending rate quickly to attract new loans. This phenomenon is consistent with the empirical findings of asymmetric adjustments of the lending rate and lending-Central Bank discount rate spreads and the bidirectional Granger causality.

The commercial banking sector is expected to provide efficient intermediation

to mobilize savings and channel those into productive investments and thus promote industrialization, economic development and social progress. These intermediaries would make profit from the spread between the lending rate charged to borrowers and deposit rate paid to savers. In this transmission mechanism, commercial banks' behavior in setting their lending rates significantly influences the effectiveness of the monetary authority in its monetary policymaking. Economic theory has long proved that to maximize social welfare, resources-financial or otherwise-must be allocated in such a manner to assure both allocative and productive efficiencies. Corruption and its attendant characteristics prevent optimal allocation of national resources, which leads to losses in social welfare. Thus, the aforementioned manifestation of the corruption in the economy prevents the banking system from fulfilling its expected role in the economic development process.

Clearly, the root causes of the Vietnamese banking sector problem are the lack of market economy disciplines. *Excessive government intervention and political connections*, management corruption, inefficiency and ineffectiveness are part of a vicious circle that inhibits economic development, industrialization, and social progresses in poor and developing countries in general and in Vietnam in particular. It is well known that these problems exist in the economies without true checks and balances in the political system. These problems cannot be corrected without the infrastructure of a political framework with a true check and balance system that can foster an effective market economy.

## **9 Conclusion**

First, following Perron's (1997) procedure, an endogenous unit root test function with the intercept, slope, and trend were specified and estimated to test the hypothesis that the Vietnamese commercial bank lending-Central Bank

discount rate spread has a unit root. The results of this test suggest that the Vietnamese lending-discount rate spread followed a stationary trend process with a break date beginning in April 2008 in response to the US subprime mortgage crisis. Additionally, that Breitung's nonparametric rank test and score test indicate that the Vietnamese lending and Central Bank discount rates are nonlinearly cointegrated

Secondly, this study estimated the threshold autoregressive (TAR) model, developed by Enders and Siklos (2001), to investigate how Vietnamese commercial banks responded to countercyclical monetary policy. The finding of  $|\rho_1| > |\rho_2|$  in the TAR specification indicates that the adjustments of Vietnamese lending-discount rate spread toward the long-run equilibrium are asymmetric and tend to be faster when the spread is widening than when the spread is narrowing. These findings can also be interpreted to demonstrate that these institutions react differently to expansionary monetary policy than to contractionary policy. More interestingly, this phenomena may be attributable to a benefit and graft maximizing process in the face of high elasticity of demand for loans precipitated by the high rate environment of the Vietnamese banking industry.

Finally, the empirical estimation of the TAR-VEC model reveals a bi-directional Granger-causality from the Central Bank discount rate to the commercial bank lending rate in the short run. The finding of bi-directional Granger causality is important since it reveals that Vietnamese commercial banks respond to countercyclical monetary policy and that the monetary authority successfully utilizes the policy to influence the financial market conditions.

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