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The impact of monetary policy on bank lending rate in South Africa

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Abstract

The pass-through of the policy rates to bank lending rate is an important subject matter because it measures the effectiveness of monetary policy to control inflation or stabilize the economy. This study investigates the long-run interest rate pass-through of the money market rate to the bank lending rate and asymmetric adjustment of the bank lending rate. The study applies the momentum threshold autoregressive and asymmetric error correction models. The asymmetric error correction results reveal that bank lending rate adjusts to a decrease in the money market rate in South Africa. The findings suggest that the South African commercial banks adjust their lending rate downward but the lending rate appears rigid upward, which supports the customer reaction hypothesis.

JEL classification: G21; G15; G28; E52; E58

Keywords: Monetary policy; Interest rate pass-through; Asymmetric co-integration

1. Introduction

Embedded in the monetary transmission mechanism is the pass-through of the policy rate to a retail rate. The speed of the pass-through rate is usually taken as an indication of the effectiveness of monetary policy or how rapid the impact of monetary policy would be felt (Becker, Osborn, & Yildirim, 2012). Monetary policy is effective, when a change in policy rate is transmitted to bank lending rates, which in turn influence aggregate domestic demand, investment, and eventually output (Xu & Chen, 2012). The recent downturns in economies worldwide have put monetary policy in a new spotlight. Economists view monetary policy as the first line of defense against economic slowdowns, especially if quick action is needed to stabilize the economy. In a recent study that focuses effectiveness of monetary policy, Kandil (2014) and Jain-Chandra and Unsal (2014) highlight the importance of monetary policy to stabilize the economy of developing countries. However, how fast economic stability is achieved depends on the pass-through to bank lending rate and financial market development among others.

The issue of pass-through rate is important in South Africa that has experienced financial reforms over the years, which may influence the effectiveness of monetary policy. Financial reforms in South Africa led to an increase in the number of banks and competition between banks and other financial intermediaries. However, due to the small profit margins, many banks consolidated in order to operate more efficiently. Thus the banking sector has become concentrated (South African Reserve Bank, 2013). This may affect the efficiency of the banking sector and thus influence the effectiveness of monetary policy to stabilize the economy. Despite the changing financial environment in South Africa, a systematic study of the long-run interest rate pass-through of the money market rate (MMR) to bank lending rate (BLR) and asymmetric

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adjustment of the BLR rate within the framework of Enders and Siklos (2001) model is hard to find in South Africa. The asymmetric error correction results reveal that bank lending rate adjusts to a decrease in the money market rate in South Africa. The findings suggest that the South African commercial banks adjust their lending rate downward but the lending rate appears rigid upward, which supports the customer reaction hypothesis.

The rest of the study is organized as follows. Section 2 explains policy rates and structure of South African banking. Section 3 reviews the literature on the interest rate pass-through. Section 4 describes the data and methodology. Section 5 discusses the results. Section 6 concludes the paper.

2. Overview of policy rate changes in South Africa

South Africa official interest rate is the repo rate. The repo (repurchase) rate is the rate at which the South African Reserve Bank buys back securities it has previously sold in the money markets. This is the rate at which central banks lend or discount eligible papers for deposit money banks. The South African Reserve bank (SARB) raises the repo rate to curb expected inflationary pressure. Increasing the repo (repurchase) rate make it more expensive for the banks to borrow money and should lower the bank lending activities. A reduction in bank lending reduces money supply in circulation, then inflation should fall, and vice versa (SARB, 2013).

The South African Reserve Bank (SARB) adopts various policy instruments in its attempt to effectively influence the quantity of money or interest rates. In contrast to the direct measures applied in earlier decades, the emphasis is now on market-oriented policy measures which seek to guide or encourage financial institutions to take certain actions on a voluntary basis. SARB repo (repurchase) rate is a good example of such a policy instrument. The repo rate is the rate at which the Reserve Bank grants assistance to the banking sector and therefore represents a cost of credit to the banking sector. When the repo rate is changed, the interest rates on overdrafts and other loans extended by the banks also tend to change. In this way the Reserve Bank indirectly affects the interest rates in the economy (SARB, 2013). Prior to the deregulation era of the late 1980's; monetary policy was conducted using direct control measures. The extensive controls of the 1970's period left little room for financial markets development and the system were from time to time characterized by extensive disintermediation.

After the deregulation period, monetary policy was conducted using the money supply targeting but targeting money supply became very difficult due to financial liberalization, and the increasing openness of the capital account. The SARB shifted to monetary policy guidelines between 1990 and 1995 and used eclectic monetary policy approach which supplements the money supply guidelines by a set of indicators such as exchange rates, asset prices, output gap, balance of payments, wage settlements, total credit extension and the fiscal stance (Aziakpono & Wilson, 2010). In an attempt to introduce more flexibility in the conduct of monetary policy, the SARB introduced repo (repurchase) rate system in March 1998, and adopted informal inflation targeting. From February 2000 to date, the SARB conduct monetary policy using the repo rate and adopted formal inflation rate targeting. South Africa Reserve bank adopts the repo (repurchase) system because it improves efficiency, safety and flexibility of liquidity management (Aziakpono & Wilson, 2010).

2.1. Structure of South African Banking industry

Over the past 20 years, the South African Banking Sector has transformed through consolidation, technology, and legislation. In the early 1990s sector volatility created scope for consolidation through the mergers of several banks. The introduction of the Banks Act (94 of 1990) led to an industry growth spurt with a number of new banking licenses being issued and by the end of 2001 the number of registered banks totaled 43. There are large number of foreign banks establishing branches or representative offices in the country and others acquiring stakes in major banks such as the Industrial and Commercial Bank of China, Standard Bank and Barclay. Legislation, technology, products and the number of participants have changed the banking sector and injected high levels of competition. Thus, the banking sector has become more competitive (Banking Association of South Africa, 2012). Moreover, the South African banking has undergone tremendous changes over the last two decades. But the South African banking system is well developed, very competitive, and compares favorably with many industrialised countries as the World Economic Forum (WEF) Competitiveness Survey 2012/2013 ranks South Africa 2nd out of 144 countries. Generally, the South African banking sector is viewed as world class, with adequate capital, technology, infrastructure and a strong regulatory and supervisory environment. Currently, the SA banking industry consists of 17 registered banks, 2 mutual banks, 12 local branches of foreign banks, and 41 foreign banks with approved local representative offices (Banking Association of South Africa, 2012).

3. Literature review

A close link between bank lending rates and policy rate or money market rate implies a high interest rate pass-through. Higher pass-through from the money market rate to the bank lending rate signals more efficient banking system and effective monetary policy (Fuertes, Heffernan, & Kalotychou, 2010). The effectiveness of monetary policy on the economy has long caught the interest of monetary economists and policy-makers (Mansor, 2005). Bank lending rate may adjust asymmetrically to an increase or a decrease in the policy rate or money market rate (Leuvensteijn, Sorensen, Bikker, & Van Rixtel, 2013). The asymmetric adjustment of interest rate is explainable with two competing theories − the collusive behavior of banks and customer reaction theory.

The collusive behavior hypothesis relate to the degree of competition among banks and the level of concentration of the retail market. The hypothesis states that banks are unlikely to decrease lending rates because they do not want to disrupt their collusive arrangement. The collusive behavior hypothesis implies that lending rates will be rigid downward with a decrease in the policy rate. (De Bondt, 2005). Conversely, the customer reaction hypothesis relates to the reaction of borrowers to policy rate changes. The hypothesis states that banks that operate in a highly competitive environment may not increase the lending rate because they fear negative reactions from customers. The customer reaction hypothesis suggests that lending rates will be rigid upward with an increase in the policy rate (De Bondt, 2005).

Other related theories that explain asymmetric adjustment of interest rates are consumer behavior hypothesis and adverse selection hypothesis. The consumer behavior hypothesis emphasize the degree of consumer sophistication about the financial markets as well as the search and switching costs associated with alternative sources of financing. A high proportion of unsophisticated consumers relative to sophisticated consumers along with the search and switching costs enable banks have greater market power to adjust interest rates to their advantage. Like the collusive behavior hypothesis, the consumer behavior hypothesis suggests that lending rates are rigid downward. Conversely, the adverse selection hypothesis states that information asymmetry creates an adverse selection problem in the loan markets because high interest rates attract riskier borrowers (Stiglitz & Weiss, 1981). Consequently, banks avoid increases in the lending rates and ration credit to circumvent loan default by riskier borrowers. Like the customer reaction hypothesis, the adverse selection hypothesis implies that lending rates are rigid upward.

The above hypotheses are used to interpret empirical findings on the interest rate pass-through and adjustment process. Following the early work of Hannan and Berger (1991) and Neumark and Sharpe (1992) that focuses on interest rate adjustment in the USA banking industry, there has been a rapid growth of empirical studies that explore the degree of stickiness of interest rates and their asymmetric adjustment (e.g. Greenwood-Nimmo et al., 2011; Kwapil & Scharler, 2010; Liu, Margaritis, & Tourani-Rad, 2008; Marotta, 2009; Tai, Kun Sek, & Har, 2012; Wang & Lee, 2009). However, available evidence from this literature remains inconclusive. Firstly, most studies find slow and incomplete interest rate pass-through. Secondly, there are substantial differences in interest rates pass-through across countries and over time. Third, interest rates pass-through varies depending on the type of interest rate used. Fourth, studies that examine asymmetric adjustment, often finds evidence of asymmetric adjustments, but the evidence varies across countries and over time.

Kwapil and Scharler (2010) carried out a comparative analysis of the interest rate pass-through from money market rate to bank lending rates in the Euro area and the United States using monthly data and Engel–Granger co-integration as well as autoregressive distributed lag (ARDL) method. They find that interest rate pass-through is faster in the United States compared to the European countries. Similarly, Wang and Lee (2009) employ asymmetric co-integration test in their study. They argue that there are differences in the degree of interest rates pass-through between deposits and bank lending rates in the United States and nine Asian countries. They discover an asymmetric adjustment in lending rates for three out of ten countries. Wang and Lee (2009) empirical findings show evidence of complete pass-through in the United States deposit rate, and that the lending rates in Hong Kong, Philippines, and Taiwan are rigid downward.

In Europe, Marotta (2009) investigate nine European countries and the UK. He confirms presence of asymmetric adjustment in only France and Netherlands. Liu et al. (2008) apply Engel–Granger co-integration and autoregressive regressive distributed lag in New Zealand. They document weak evidence of interest rate pass-through and short-term rate show the highest degree of pass-through as well as faster degree of adjustment than long-term rates.

Turning to emerging markets, Tai et al. (2012) examine the effectiveness of interest rate pass-through from the money market rates to the retail rates in Asian countries. Their results reveal that there are no much differences between the money market pass-through rate into deposit and lending rates, but the money market rate pass-through into deposit rate is slightly higher than that of the bank lending rate. In addition, most Asian countries have slower adjustment rates, especially after the Asian 1997 financial crisis (Tai et al., 2012). Charoenseang and Manakit (2007) apply asymmetric error correction modeling and report very low and incomplete pass-through in all interest rates in Thailand, except the inter-bank rates where the pass-through is complete. Moreover, they do not find significant asymmetric adjustment, but short-term deposit rates and short-term lending rate are more rigid downward.

In Africa, Jankee (2004) use threshold autoregressive model (TAR) and momentum autoregressive model (M-TAR) with monthly data and their results indicate that asymmetric adjustment is present for the bank lending rates in Mauritius. Specifically, the bank lending rates adjust slowly when there is an increase in the money market rates, but it adjusts faster when there is a decrease in the money market rates. In South Africa, De Angelis, Aziakpono, & Faure (2005) use Engel–-Granger and error correction modeling to examine the interest rates pass-through, but they focus on the relationship between wholesale interest rate and money market rate, and they did not explore the possibility of asymmetric adjustment in bank lending rates. In this study, we allow for asymmetric adjustment in South African bank lending rates.

In most previous studies (e.g. Payne & Waters, 2008; Tai et al., 2012; Wang & Lee, 2009; Wang & Thi, 2010) the bank lending rate tends to adjust faster when there is an increase than when there is a decrease in the policy rates. Put differently, bank lending rates exhibits downward rigidity with respect to a decrease in the money market rates. Becker et al. (2012) note that the asymmetric money market rate pass-through is determined by a number of factors such as adjustment costs, volatility and uncertainty conditions about the future market.

4. Data and methodology

The sample consists of South African (BLR) and money market (MMR) rate monthly data from January 1978 to December 2012. The data sources for the analysis were obtained from Datastream. The years chosen cover interest rate liberalization period in South Africa. The bank lending rate (BLR) data represent the rates the banks charge on loan to customers (Becker et al., 2012). The money market rate is chosen because changes in the policy rate affect money market rate, then bank lending rates. Thus, changes in money market rate would be more closely related to bank lending rate. Prior to testing for co-integration, the bank lending rates and money market rates are shown to be integrated of order one, using conventional augmented Dickey—Fuller and Philip—Perrons tests.

Augmented Dickey—Fuller (ADF) and Philip—Perrons (PP) unit root test are used to determine the stationary of the bank lending rate (BLR) and money market rate (MMR) variables. If the paper cannot reject the null hypothesis of a unit root at level, then the paper tests whether the variables are stationary at first difference. When the null hypothesis is rejected after taking first difference, the corresponding variable is said to be integrated of order one, that is I (1).

4.1. Asymmetric co-integration test using consistent threshold model

The traditional linear cointegration and error correction model (ECM) are common methods to test for long-run and short-run relationship. These methods only capture the linear relationship between variables, but ignore the nonlinear relationship between the bank lending rate and policy rate or money market rate (Enders & Siklos, 2001; Payne & Waters, 2008). Therefore, the linear methods do not explain the asymmetric adjustment process of the interest rates in the short-run. Recent models, such as threshold autoregressive and momentum threshold autoregressive have been developed to capture and explain asymmetric adjustment process. These methods are extensively used by influential studies (e.g. Becker et al., 2012; Wang & Lee, 2009). These methods are considered as appropriate techniques to determine how effectively the money market rate (MMR) pass-through to the bank lending rate (BLR) and they have the potential to capture endogenous and exogenous threshold values. The main strength of the threshold techniques is that, it allows banks' lending rate to respond differently to positive and negative disequilibrium changes in the money market rate or the policy rate (Becker et al., 2012; Enders & Siklos, 2001).

However, asymmetric adjustment may exist. Enders and Siklos (2001) momentum threshold autoregressive (M-TAR) model modify the Engel and Granger (1987) test strategy and it has good power and size properties relative to the assumption of symmetric adjustment. In asymmetric adjustment, we established two partitions for the residuals by classifying them as above threshold and below threshold (Enders & Siklos, 2001). To allow asymmetric adjustment in the residuals we follow Enders and Siklos (2001) and specify the equation below:

$$\Delta\mu_t = I_t\rho_1 + (1 - I_t)\rho_2\mu_{t-1} + \sum_{i=1}^{p-1}\gamma_i\Delta\mu_{t-1} + \varepsilon_t \tag{1}$$

In order to determine the above and below threshold (τ), a dummy variable called Heavy side indicator function is used, where

$$T_t = \begin{cases} 1 & \text{if } \mu_{t-1} \geq \tau \\ 0 & \text{if } \mu_{t-1} < \tau \end{cases} \tag{2a}$$

$$M_t = \begin{cases} 1 & \text{if } \Delta\mu_{t-1} \geq \tau \\ 0 & \text{if } \Delta\mu_{t-1} < \tau \end{cases} \tag{2b}$$

Equations (1b) and (2a) develop the threshold autoregressive model (TAR) while Equations (1) and (2b) form the momentum threshold autoregressive Model (M-TAR). The TAR model captures the deviation from the equilibrium in level while M-TAR captures accumulation of change in the deviation. The M-TAR model is more important when the adjustment is believed to exhibit more momentum in one direction than the other (Payne & Waters, 2008). The model above assumes that threshold value (τ) is known but it has to be estimated by a grid search (Al-Gudhea, Kenc, & Dibooglu, 2006; Enders & Siklos, 2001). Firstly, the residual from the TAR (μ_t) and MTAR ($\Delta\mu_t$) model is sorted in sequence, in an ascending order. Secondly, to ensure that the number of observation in each regime is reasonable, each (μ_t) that falls between the lowest 15 percent and highest 85 percent of the series are considered as potential threshold. Third, we run regression on Equation (1) and use each (μ_t) as a potential value of the threshold. Finally, the value that has the lowest residual sum of squares is taken as the consistent estimate of the threshold. M-TAR model is the choice model of our analysis and in the presence of asymmetric co-integration; it is used to estimate asymmetric error correction models for lending rates. If $\Delta\mu_{t-1}$ is above the threshold, the adjustment coefficient is $\rho_1\mu_{t-1}$, and if μ_{t-1} is below the threshold, the adjustment coefficient is $\rho_2\mu_{t-1}$. Within the M-TAR model, the null hypothesis of no co-integration is $\rho_1 = \rho_2 = 0$ while the null hypothesis of symmetry is $\rho_1 = \rho_2$.

5. Analysis of results

The results of the unit root tests are presented in Tables 1A—1C. The order of the lag length in ADF is selected by

Table 1A
Unit root tests.

Variables	Level			
	ADF − C	PP − C	ADF − $C + T$	PP − $C + T$
BLR	−1.058838	1.100642	−1.446995	−1.524865
MMR	−1.904744	−1.874500	−2.122891	−1.805907

Notes: For ADF test, Schwarz Info Criteria (SIC) is used to select the optimal lag length. For PP test, Barlett Kernel is used as the spectral estimation method. The bandwidth is selected using the Newey—West method.

Table 1B
Unit root tests.

Variables	First difference			
	ADF − C	PP − C	ADF − C + T	PP − C + T
BLR	−62.54862***	−62.62931***	−62.54111***	−62.62205***
MMR	−54.66672***	−55.16795***	−54.66690***	−55.19593***

Notes: For ADF test, Schwarz Info Criteria (SIC) is used to select the optimal lag length. For PP test, Barlett Kernel is used as the estimation method. The bandwidth is selected using the Newey−West method. ADF − C = ADF test with constant only. ADF − $C + T$ = ADF test with constant and Trend. *** indicates significance at 1% level.

Schwarz Info Criteria (SIC). The results of the ADF and PP unit root tests are consistent where we fail to reject the null hypothesis at level. However, all the variables are stationary after first differencing where we reject the null hypothesis at the 1% significance level. Thus, all the variables are integrated of same order one − that is I (1) and this permit us to proceed with co-integration test.

The residuals specification in the Engel and Granger (1987) co-integration assumes symmetric adjustment in the long-run. The Engel−Granger two step procedures is the simplest co-integration test for a bivariate model. The first step is to estimate a static OLS regression. The second is a test for stationary of the residuals, using a Dickey−Fuller test, with the critical values adjusted to account for the fact that the co-integrating coefficients have been estimated. Letting LR be the lending rate and letting MMR be the money market rate, the co-integrating regression or the degree of interest rate pass through in the long-run between the lending rates and the money market rates can be expressed as: $BLR_t = \beta_1 + \beta_2 MMR_t + \mu_t$

The Augmented Dickey−Fuller tests of the residual from the regression of the lending rates (BLR) on money market rate (MMR) are contained in Table 1C. The null of no co-integration can be rejected at the 1% level. The intercept is 3.677 while the slope coefficient (β_2) estimates that measures the degree of interest rate pass through, is 0.748. The slope coefficient is significantly less than 1, which indicates a high, but incomplete pass through from the money market rates (MMR) to the bank lending rates (BLR). Furthermore, the residuals in Equation (1) are examined with ADF stationary test without including intercept and trend. The ADF unit root test of the residuals from the co-integrating equation is significant at 1% level (i.e. the residual is stationary). Our result is consistent with Wang and Lee (2009) that finds evidence of high but incomplete interest rates pass-through for the USA and nine Asian countries. Conversely, our result is inconsistent with Charoenseang and Manakit (2007) that report low and incomplete pass-through in all interest rates except the interbank rates where the pass-through is complete in Thailand.

Table 1C
Co-integration results.

Engel and Granger co-integration test		
$BLR_t = 3.677 + 0.748MMR_t$	ADF Test on Residual	K
(0.016)*** (0.002)***	−10.57***	3

Notes: For ADF test, Schwarz Info Criteria (SIC) is used to select the optimal lag length (K). *** indicates significance at 1% level.

Table 2 reports the results of the threshold autoregressive (TAR) consistent model and the momentum threshold autoregressive (M-TAR) consistent model for South Africa. The TAR and M-TAR consistent models allow for asymmetric adjustment which is more realistic. The paper uses the maximum lag automatically selected by the system. Moreover, the Monte Carlo experiment is used to search for the critical value of 5%.

For the TAR consistent model, the threshold value is (0.032). The value of Φ (25.358) is greater than (7.539) at 5% critical value. Given that the bank lending rate and the money market rate are co-integrated, the study tests for symmetric adjustment ($\rho_1 = \rho_2$). The F-equality statistics (0.385) is less than the critical value (7.278) at 5% in South Africa and the F-equality statistics (5.112) is less than the critical value (6.048) at 5%. Thus, the study fails to reject the null hypothesis of symmetric adjustment (See Table 2).

The study turns to the momentum threshold autoregressive (M-TAR) consistent model. The value of Φ (36.788) is greater than the critical value (7.529) provided by Monte Carlo simulation at 5%. Therefore, the null hypothesis of no co-integration is rejected. Again, Given that the bank lending rate and the money market rate are co-integrated, the study tests for symmetric adjustment ($\rho_1 = \rho_2$). The M-TAR consistent F-statistics (22.699) exceed F-critical value (7.822) at the 5% level. Thus, the null hypothesis of symmetric adjustment is rejected at the 5% level. The results indicate that bank lending rates (BLR) and money market rates (MMR) are co-integrated and the adjustment process is asymmetric.

The result supports the empirical findings of Wang and Lee (2009) that the lending rates in Hong Kong, Philippines, and Taiwan are rigid downward. Also, Tai et al. (2012) find that most Asian countries have a slower rate of adjustment, especially after the Asian 1997 financial crisis. The M-TAR consistent results show that bank lending rate adjust faster (in absolute term) when it is below the equilibrium level.

Given the existence of co-integration between the bank lending rate (BLR) and money market rate (MMR) and asymmetric adjustment within the M-TAR consistent models, the study conducts asymmetric error correction model to

Table 2
Estimates of TAR and MTAR co-integration.

	TAR-consistent	MTAR-consistent
ρ_1[a]	−0.051 (−3.620)	−0.051 (−6.033)
ρ_2[a]	−0.061 (−6.575)	−0.159 (−6.927)
τ[b]	0.032	0.089
F-joint stat. (Φ)	25.358** [7.539]	36.788** [7.529]
F-equal:	0.385 [7.278]	22.699** [7.822]

Notes: ** indicates significance at 5% and numbers in parenthesis are test statistics. Numbers in brackets are simulated critical values obtained from Monte Carlo simulation.
[a] Indicates the value of ρ.
[b] Indicates the threshold value of τ.

capture the short-run and long run dynamics. The paper specifies the models below:

$$\Delta \text{BLR}_t = \alpha_0 + \sum_{i=1}^{n} \alpha_i \Delta \text{BLR}_{t-i} + \sum_{i=1}^{q} \gamma_i \Delta \text{MMR}_{t-i} + I_t \rho_1 \mu_{t-1} + (1 - I_t) \rho_2 \mu_{t-1} + \varepsilon_{1t} \quad (3)$$

$$\Delta \text{MMR}_t = \lambda_0 + \sum_{i=1}^{n} \lambda_i \Delta \text{BLR}_{t-i} + \sum_{i=1}^{q} \varphi_i \Delta \text{MMR}_{t-i} + I_t \rho_1 \mu_{t-1} + (1 - I_t) \rho_2 \mu_{t-1} + \varepsilon_{2t} \quad (4)$$

where μ_{1t} and μ_{2t} are I.I.D (0, ∂^2), $\mu_{t-1} = \text{BLR}_{t-1} - (\hat{\alpha}_0 + \hat{\beta}_1 \text{MMR}_{t-1})$ and I_t takes the form given in Equation (2b). With respect to Equation (3), if the bank lending rate is above the threshold value after a decrease in the money market rate, then the lending rate will adjust by ρ_1. Conversely, if the bank lending rate is below the threshold value after an increase in the money market rate, then the lending rate will adjust by ρ_2. The study assumes that the money market rate is exogenous to the lending rate. However, this assumption is supported if the asymmetric error correction terms in Equation (4) are each statistically insignificant. Table 3 summarizes the results of the asymmetric error correction models.

The Durbin Watson (DW) statistics and Q-statistics (for higher order lags up to 4) indicate that there is absent of serial correlation in the residuals and show evidence of predictive power because the overall F-statistics are statistically significant. Furthermore, the money market rate is considered weakly exogenous because the error correction terms in Equation (4) are statistically insignificant. The test-statistics of the error correction term in Equation (3) indicates bank lending rate responds faster to a decline than to a rise in the money market rate in South Africa. Thus, the results are inconsistent with the empirical findings in the literature that bank lending rates exhibit downward rigidity. However, the result is consistent with Jankee (2004) that finds asymmetric adjustment in the bank lending rates where bank lending rates exhibit upward rigidity when there is an increase in the money market rates, but it adjusts faster when there is a decrease in the money market rates in Mauritius.

Table 3
Asymmetric error correction using M-TAR consistent model.

	ρ_1	ρ_2	DW	Q-statistics	F-statistics
Equation (3)					
ΔBLR	−0.060**	−0.030	2.044	[0.36]	22.528
	(−2.959)	(−1.189)			[0000]
Equation (4)					
ΔMMR	−0.035	−0.002	2.010	[0.18]	10.147
	(−1.690)	(−1.530)			(0.000)

** indicates significance at 5%. T-test statistics are reported in parenthesis while p-value of the F-test statistics is in brackets. DW is Durbin Watson statistics under the null hypothesis of no serial correlation in the residuals. Q-statistics are the Correlogram Q-statistics to test for serial correlation up to 4 lags, under the null hypothesis of no serial correlation in the residuals. ρ_1 and ρ_2 are speed of adjustment to long-run equilibrium. They are significant in Equation (3), but insignificant in Equation (4) as expected.

The empirical results support the customer reaction hypothesis which states that banks that operate in a highly competitive environment may not increase the lending rate because they fear negative reactions from borrowers or customers. The customer reaction hypothesis suggests that lending rates will be rigid upward with an increase in the policy rate (De Bondt, 2005). Similarly, the adverse selection hypothesis states that information asymmetry creates an adverse selection problem in lending markets because high interest rates attract riskier borrowers (Stiglitz & Weiss, 1981). Consequently, banks avoid increases in the lending rates and ration credit to circumvent loan default by riskier borrowers. Like the customer reaction hypothesis, the adverse selection hypothesis implies that lending rates are rigid upward.

Moreover, the structure of the South African banking industry highlighted in Section 2.1 provides some insight why the bank lending rate may be rigid downward. There are large number of foreign banks establishing branches or representative offices in South Africa and others acquiring stakes in major banks. Also, legislation, technology, products, and the number of participants have changed the banking sector and injected high levels of competition in the banking industry. Thus, the banking industry has become more competitive (Banking Association of South Africa, 2012). This increasing level of competition may partly explain why the lending rates appear rigid upward.

6. Conclusions

This study investigates the long-run interest rate pass-through of the money market rate to the bank lending rate and asymmetric adjustment of the bank lending rate in South Africa. The paper represents one of the limited available studies that investigate asymmetric adjustment in bank lending rate using data from South Africa. The asymmetric error correction results show that bank lending rate responds faster to a decrease in the money market rate. It appears commercial banks are rigid to adjust their lending rates upward in South Africa which supports the customer reaction hypothesis and adverse selection hypothesis.

From a policy perspective, in order to enhance the effectiveness of monetary policy and achieve monetary policy goal, the study suggests the need for more competition and less concentration in the bank markets. The banks in more concentrated markets are likely to exhibit greater interest rates rigidity. Moreover, the study suggests more transparency and further development of the South African banking system to reduce information asymmetry costs in the loan markets. If the information asymmetry costs are low, banks may be willing to raise their loan rates significantly over a short period of time. Another implication is that the speed of monetary transmission is not uniform in period of expansionary monetary policy and contractionary monetary policy. Bank lending rate adjusts during period of monetary expansion or easing but it does not adjust during period of monetary contraction or tightening. One limitation of these findings is that asymmetric impulse response function is not conducted to check the robustness of the findings that bank lending could be rigid upward. Nevertheless, the structure of the South African banking industry and high level of competition in the banking industry partly explain why the bank lending rate appears rigid upward in South Africa. Future research may investigate the interaction between the various interest rates and the response to the policy rates.

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