TOWARDS A GRADUAL APPROACH TO LIBERALIZE INTEREST RATE: HOW THIS PROCESS IS BENEFICIAL ON CREDIT ALLOCATION AND INVESTMENT?

Benhabib Abderrezak & Mostéfaoui Sofiane & Prof. Yousfat Ali
University of Adrar, **ALGERIA**

ABSTRACT

One of the many indicators that conduct the investment decision is the interest rate. The latter has been generally defined via different channels of conception. The financial conception states that interest rate is the time value of money or the reward to put aside your money in attempt to get revenue in the future. The economic conception means that the interest rate is a proxy showing how well the credit allocation mechanism and the mobilization of financial resources are. In this context two mechanisms are adopted: the economic mechanism and the official one. The former considers the movements of the interest rates as conducive to the various investment decisions (independent variable) while the second view regards the interest rate as dependant variable following the investment behavior (dependant variable). This paper sheds light on the venues through which the difference between the deposit and lending interest rates impact the investment decision via credit allocation mechanism.

Keywords: Interest rate, deposit rate, lending rate, investment.

INTRODUCTION

The philosophy of credit allocation refers to the meaning of rationality and choice earlier laid down by philosophers of political economy. In this sense, credit is an economic item exploited in an attempt to satisfy a want. Therefore, the rationality implies the good direction of this mean towards its best uses. The economic theory suggests that individuals need to maximize the benefits from the usage of their credits, the fact that enhances these agents to expand their economic activities by a recurrent incentive (the psychological incentive of doing business). Investment is one of the important determinants of growth and prosperity. It generates value added, technology and realizes the social welfare by decreasing the unemployment rate and achieving the social harmony. The conception resides in mapping the ways on which the economy attains the high levels of investment both in terms of quality (allocation paradigm) and quantity (efficiency paradigm). In this context, interest rate plays a major role in determining the magnitude of the investment decision because it is the capital driver of the financial resource needed to engage in business activities. Herein there is a controversy about managing the interest rate in such a way that increases at maximum the benefits of its manipulation strategy. The issue is to determine the behavior wanted of the interest rate whether to liberalize it or to fix it. The purpose of all this is to find out the optimal interest rate that directs the financial resources towards their best allocation which implicitly mean a high degree of investment benefits.

Interest rate and investment: ways of transmission

The relationship between investment and investment is a fertile groundwork for research and investigation both at micro or macro levels. Macroeconomics considers that the investment volume decreases with the increase of the interest rate. The reason behind this is that the interest rate is a cost of borrowed funds necessary for doing investments and as the costs

increase, the incentive of individuals to make business decreases automatically (psychological analysis of the investment behavior). This view contradicts with the institutional consideration of the interest rate. The latter means that the economic agents responsible for lending (financial institutions) find it advantageous for them when the interest rate increases because it is the reward of the funds provided (institutional analysis of the investment behavior). The market law is applicable in which the individual and institution incentives are the major forces. Therefore, the interest rate does not conduct the investment activity *per se* but it influences the behavior and changes the incentives of the investment agents. In this context, the behavior of the interest rate has an impact on the individuals' attitudes whether this behavior refers to the level of the interest rate (impact of the variable extent) or its comportment (liberalized *versus* fixed trend).

Interest rate levels and credit allocation

This point stresses on the levels of the interest rate that realize a good allocation of the financial resources. For this reason, two rates are distinguished: deposit rate and lending rate. The former means the reward got by the saver when he keeps his funds in a financial institutional. The relationship between the saver reward and the money put aside in the financial institution is presumed to be positive. The harder the incentive to save money and the bigger the money volume as well as the saving period, the bigger the reward will be in one hand. In another hand, the reward is a cost incurred by the financial institution. Hence, the latter tries to manage efficiently the costs paid in a way that enables this institution saves more and lends more (strengthening the organizational strategy of the financial firm). To this purpose, the institution keeps the spread between the deposit and lending rates organized in favor of the organization aspiration both in short and long terms. The implication from this is to specify the level of the interest rate spread that keeps the interaction between the institution and its clients (depositors and lenders) positive. Consider the following random utility model:

$$E_{0,t}\left\{\sum_{t=0}^{\infty}\beta^t\left[(U_{j,t})-\frac{1}{n_j}\int_{\lambda_i}^{\infty}V(N_{j,t}(i))di\right]\right\} \Big/ \ (U_{j,t})=\frac{C_{j,t}^{1-\sigma}-1}{1-\sigma} \ \Lambda \ V(N_{j,t}(i))=\frac{N_{j,t}(i)^{1+\varphi}}{1+\varphi}$$

In which: $E_{0,t}$ is the level of the utility from the initial period to the time point t, β^t is the discount factor of the utility model (measures the coefficient of the utility function at the initial period), $(U_{j,t})$ is the utility deterministic function (combines the utility indicators), n_j is the population size according to its different agents, $V(N_{j,t}(i))$ is the deposit and lending behavior based on the movement of the interest rate (i).

The economic agent (borrower or lender) tries to maximize his benefit through his rational behavior in dealing with the private indicators of the utility function (endogenous factors) and the exogenous determinants of the utility function revealed here by the correlation between deposit, lending and the interest rate behavior. Thus, the objective of the economic agent is:

$$(U_{j,t})=\left\{\max\frac{C_{j,t}^{1-\sigma}}{1-\sigma}\Big/ C_{j,t}\geq 0 \ \Lambda \ 0\leq\sigma\leq 1\right. \tag{1}$$

$$V(N_{j,t}(i))=\left\{\max\frac{N_{j,t}(i)^{1+\varphi}}{1+\varphi}\Big/ \ \varphi\geq 0\right. \tag{2}$$

$(1) \Rightarrow (U_{j,t}) = \dfrac{1}{1-\sigma} \displaystyle\int_{t=0}^{t=\infty} C_{j,t}^{1-\sigma} dt \ / \dfrac{1}{1-\sigma}$ is a parameter of direction (it directs the utility function towards it optimal level by respecting the impact of the exogenous). Thus:

$\sigma \square 1 \Rightarrow \lim \dfrac{1}{1-\sigma} = \infty$ (As far as σ approaches the number 1, the capacity of the parameter to absorb the external shocks affecting the function will be strong).

$(2) \Rightarrow V(N_{j,t}(i)) = \dfrac{1}{1+\varphi} \displaystyle\int_{t=0}^{t=\infty} N_{j,t}(i)^{1+\varphi} dt \ / \dfrac{1}{1+\varphi}$ is a parameter that absorbs the negative impact of the shocks on the external utility function. In that case:

$\varphi \square \infty \Rightarrow \dfrac{1}{1+\varphi} \square 0$ (The absorption capacity is strong as φ takes big values)

As the external utility function comprises the lending and the deposit behavior, the objective of the agent is to maximize the external utility. Thus:

$$E_{0,t} \left| V(N_{j,t}(i)) = \max \left\{ V(N_{j,t}(i))^+, V(N_{j,t}(i))^- \right\} \right. \qquad (3)$$

The credit allocation takes the following form:

$C_{1,t} = E_{1,t} \left\{ \displaystyle\sum_{t=1}^{\infty} \phi^t \left[(I_{i,t}) \right] \right\} \quad / C_{1,t}$ is the credit allocation, $I_{i,t}$ is the investment function

(4)

And as the investment behaves according to the variations of the interest rate, the credit allocation will be accompanied by both lending and deposit behaviors:

$$C_{1,t} = E_{1,t} \left\{ \sum_{t=1}^{\infty} \phi^t \left[V(N_{j,t}(i))^- - V(N_{j,t}(i))^+ \right] \right\} \qquad (5)$$

The objective of the financial agent is to allocate credits efficiently according to the behavior of the interest rate:

$$C_{1,t} = \int_{t=1}^{\infty} e^{\frac{1-\gamma}{\gamma}} \left[(I_1 - \alpha_t(i_t))^{\frac{1-\alpha}{\alpha}} - (I_1 + \alpha_t(i_t))^{\frac{1-\alpha}{\alpha}} \right] \qquad (6)$$

Therefore, the interest rate liberalization has objectives widening gradually the gap between the interest rate as cost $(I_1 - \alpha_t(i_t))^{\frac{1-\alpha}{\alpha}}$ and the interest rate as a reward $(I_1 + \alpha_t(i_t))^{\frac{1-\alpha}{\alpha}}$. This fact strengthens the capacity of the financial institution to manage efficiently the credits and reduce the risks of defaults:

$Ef_{1,t} \square C_{1,t} - R \ / R_{1,t} = P(C_{1,t} | \alpha = 1)$ is the risk of default and bankruptcy, it occurs when the parameter of deposit and lending equals 1 (the point on which the bank is not able to lend and the depositors do not want to put their funds in the financial institution). Graphically it can be shown by the following curves:
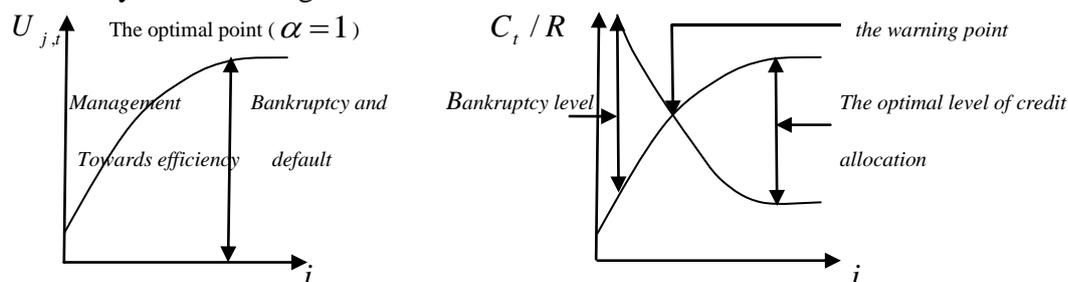

Figure. 1. Interest rate and credit allocation   **Source:** the researchers

Interest rate and institutional efficiency

The institutional efficiency is a term used to denote the capacity of the institution to manage both the current and future events. It is by this meaning referring to any strategy that aims to increase the probabilities of successes and reduce those of failures. In this context, the economic theory suggests for the organizations to conceive a road map as a strategy to strengthen the exploitive capacity of the opportunities and to overcome the weakness burden coming from the different constraints that face the organization. The interest rate is one of the indicators that influence the behavior of the organization both in terms of operation and quality. For instance, the movement of the interest rate has a dimension on the way of how the enterprise takes decisions about the investment intentions (psychological effect of the economic indicator). Moreover, the interest rate manipulates the operation processes taken by the organization concerning the intention to expand or contract. Thus, the organization should know the effect of the interest rate movement on its capacity to develop its operation position of the operation (operational effect) or on the strategy of the organization (strategy effect). Despite the fact that interest rate impacts negatively the intention of the organization when it gets bigger, this does not mean that the indicator *per se* is a damper to achieve the long term intentions. Therefore, it remains to conceive a correlation between the negative impacts and the positive ones on the managerial efficiency of the institution (the managerial meaning of the interest rate). Consider the institution efficiency model:

$$Ef_{0,t}\left\{\sum_{t=0}^{\infty}\lambda^t(\psi_{i,j})-\frac{1}{\eta_i}\int_0^\infty P(D_{i,j}(i))di\right\} / \ (\psi_{i,j}) \text{ is the organization operation function, } \lambda \text{ is}$$

the coefficient of operations, $P(D_{i,j}(i))$ is the function of the organization resources, i is the interest rate, η_i denotes the goals of the organization (short and long terms).

The objective of the institution is to maximize its efficiency behavior according to the movement of the interest rate. This process means that it tends to reach the following point:

$$Ef_t^* = \frac{\partial(Ef_{0,t})}{\partial i} \qquad\qquad \text{(The} \qquad\qquad \text{optimal} \qquad\qquad \text{efficiency)}$$

(7)

$$Ef_t^* = \frac{\partial\lambda^t(\psi_{i,j})}{\partial i} - \frac{1}{\eta_i}\frac{\partial P(D_{i,j}(i))}{\partial i}$$

(8)

Hence, the optimal credit lent by the financial institution is represented by the following model:

$$Ef_{1,t}^* \ \Box \ C_{1,t}^* - R^*$$

(9)

$$(9) \Rightarrow Ef_{1,t}^* = \frac{e^{\frac{1-\gamma}{\gamma}}\partial(I_t - \alpha_t(i_t))^{\frac{1-\alpha}{\alpha}}}{\partial i} - \frac{e^{\frac{1-\gamma}{\gamma}}\partial(I_t + \alpha_t(i_t))}{\partial i} \qquad (10)$$

The interest rate liberalization has an effect on directing both the operation and specificity of the institution towards the optimal point of credit allocation and the appropriate allocation. The optimal value of the interest rate is the value that resolves the equation:

$$\frac{e^{\frac{1-\gamma}{\gamma}}\partial(I_t - \alpha_t(i_t))^{\frac{1-\alpha}{\alpha}}}{\partial i} - \frac{e^{\frac{1-\gamma}{\gamma}}\partial(I_t + \alpha_t(i_t))}{\partial i} = \frac{\partial\lambda^t(\psi_{i,j})}{\partial i} - \frac{1}{\eta_i}\frac{\partial P(D_{i,j}(i))}{\partial i} \qquad (11)$$

The first side of the equation represents the goals of the organization while the second side denotes the organization *per se*. The interest rate which realizes the equation is that which

allows the organization managing efficiently its resources in presence of the various constraints: financial, legal, technical and informational. The optimal interest rate is represented by the following curves:
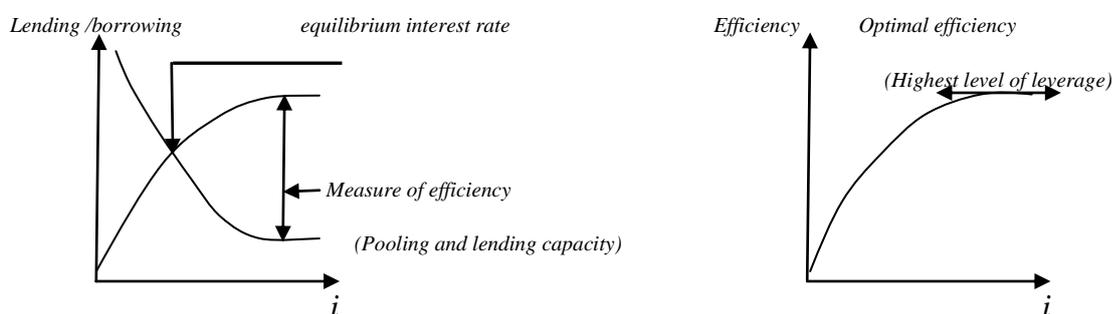

Figure. 2. Interest rate movement and the organization efficiency   **Source:** the researchers

The figure above shows that the liberalized movements of the interest rate increase the organization efficiency because the interest rate obliges the organization to adapt to the different circumstances and predict the potential clients (borrowers and lenders). This issue creates a flexible and continual capacity of the firm to manage the discrepancies occurring within the context of the interest rate (impact of interest rate stochastic behavior on the organization) or at the level of the results emanating from these movement (externalities of the interest rate movements).

Interest rate liberalization and interest rate spread

The interest rate spread is term coined to denote the difference between the lending and deposit interest rate. Moreover, this term also describes the variation between the short term and long term treasury rates as a predictor of the financial system soundness and efficiency. It is by this sense shows how well the banks and the financial system in general is efficient to channel funds from depositors to lenders, pooling funds and managing the asymmetries occurring between the parts of the transaction. A high level of the interest rate spread means a mismatch in the pooling activities of the bank or a deficiency of the information system used by the financial institution or both of them. The issue here is to reveal the importance of liberalizing the interest rate in diminishing the high levels of the spread which mean implicitly one of the onsets of the bankruptcy symptoms (high operating costs, credit spread, high levels of moral hazard and adverse selection). In this context, the liberalization of the interest rate allows banks to adjust the difference between the lending and deposit rates to market based value. This means implicitly that the spread within the market context is conducted by the market behavior (boom or bust cycles). The flexibility emanating from the market power lets the spread fluctuating within a band surrounded by limits of market conditions (the spread snake) as it is shown by the following figure:
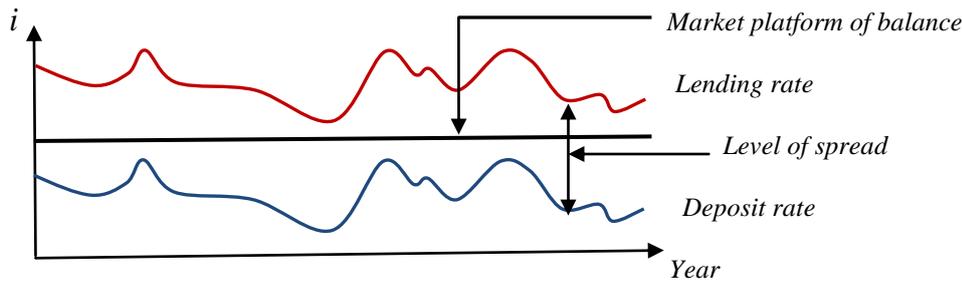
Figure. 3. The spread band   **Source:** the researchers

The figure above reveals the extent of the fluctuation of both deposit and lending according to the equilibrium level offered by the market conditions. Consider the market level M^*, lending rate i_L, deposit rate i_D. The behavior of the interest rate according to the market behavior follows the following equation:

$$i_L - i_D = \int_0^t (L(i) - M^*)di - \int_0^t (D(i) - M^*)di \tag{12}$$

$L(i)$ Lending behavior, $D(i)$ deposit behavior, t : the time frame

The objective of the financial institution is to reach the point at which the institution gets the highest level of credit allocation in respect of the market movements. It follows that:

$$Ef_{0,t}^* = \frac{\partial \left[\dfrac{\partial (L(i) - M^*)}{\partial i} - \dfrac{\partial (D(i) - M^*)}{\partial i} \right]}{\partial i} \tag{13}$$

The last equation means that the target fulfills the efficiency of the lending and the deposit behaviors by respecting the market conditions as it is illustrated by the following figure:
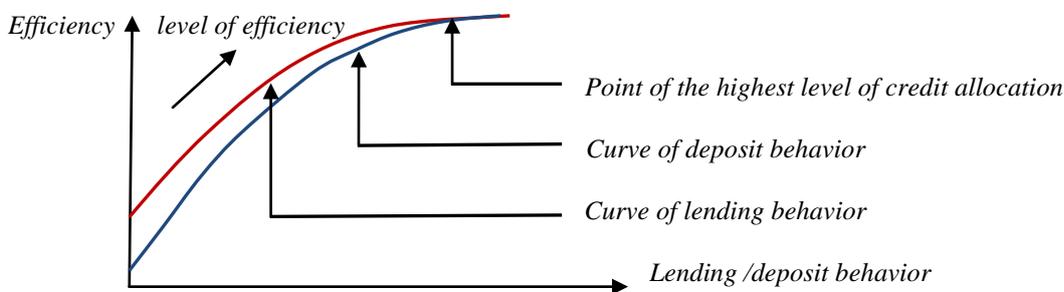

Figure. 4. The highest point of credit allocation   **Source:** the researchers

CONCLUSION

The paper shows the relationships between the movement of the interest rate and the movement of the markets. In this context, the management of interest rate is a strong indicator of the performance and the efficiency of the institution. By presenting the different models that explain the behavior of the interest rate in terms of efficiency, three important insights emerge:

-   The institution should take into consideration the market situations when it conceives the strategies of dealing with deposits and credits.
-   The liberalized behavior of the interest rate is beneficial for the firm to confine the limits of interest rate fluctuation in favor of the financial and economic targets of the institution.

- The highest level of credit allocation depends on the realization of both the efficiencies: the lending efficiency and the deposit one.

The research on the interest rate liberalization on the efficiency of the financial institution and the credit allocation is a fertile groundwork which necessities and paves the way for further research both at theoretical and empirical levels.

REFERENCES

Ahmad Zubaidi Baharumshah, Siew-Voon Soon, Nor Aishah Hamzah. (2013), Parity Reversion in Real Interest Rate in the Asian Countries: Further Evidence Based on Local-Persistent Model, *Economic Modeling* 35, 634-642

Alberto Martin, Jaume Ventura. (2015), The International Transmission of the Credit Bubbles: theory and policy*, Journal of Monetary Economics*, 1-43

Barry Eichengreen , Rachita Gullapalli, Ugo Panizza. (2011), Capital Account Liberalization, Financial Development and Industry Growth: A Synthetic View, *Journal of International Money and Finance* 30, 1090-1106

Brian Burgoon, Panicos Demetriades, Geoffrey R. D. Underhill. (2012), Sources and legitimacy of financial liberalization, *European Journal of Political Economy* 28, 147-161

Chaiporn Vithessonthi, Jittima Tongurai. (2012), The Impact of Capital Account Liberalization Measures, Int. Fin. *Markets, Ins. And Money* 22, 16-34

Chih-Te Yang, Chung-Yuan Dye, Ji-Feng Ding. (2015), Optimal Dynamic Trade Credit and Preservation Technology Allocation for a Deteriorating Inventory Model, *Computers and Industrial Engineering* 87, 356-369

Geroge Bulkely, Richard D.F. Harris, Vivekanand Nawosah. (2015), Can Behavioral Biases Explain the Rejection of the Expectation Hypothesis of the Term Structure of Interest Rates, *Journal of Banking and Finance* 58, 179-193

Hans Degryse, Olena Havrylchyk, Emilia Jurzyk, Sylwester Kozak. (2012), Foreign Bank Entry, Credit Allocation and Lending Rates in Emerging Markets: Empirical Evidence from Poland, *Journal of Banking and Finance* 36, 2949-2959

Jari Hannikainen. (2015), Zero Lower Bound, Unconventional Monetary Policy Indicator Properties of Interest Rate Spreads 96, *Review of Financial Economics* 26, 47-54

Joseph P. Byrne, Giorgio Fazio, Norbert Fiess. (2012), Interest Rate Co-movements, Global Factors and the Long End of the Term Spread, *Journal of Banking and Finance* 36, 183-192

J. Scott Davis, Adrienne Mack, Wesley Phoa, Anne Vandenabeele. (2015), Credit Booms, Banking Crises, and the Current Account, *Journal of International Money and Finance*, 1-18

Leonardo Lacovone. (2012), The better you are stronger it makes you: Evidence on the asymmetric impact of liberalization, *Journal of Development Economics* 99, 474-485

Lie-Jane Kao. (2015), A Portfolio-Invariant Capital Allocation Scheme Penalizing Concentration Risk, *Economic Modeling* 51, 560-570

Lucia Esposito, Andrea Nobili, Tiziano Ropele. (2015), The Management of Interest Rate Risk during the Crisis: Evidence from Italian Banks, *Journal of Baking and Finance* 59, 486-504

Ludger Linnemann, Andreas Schabert. (2015), Liquidity Premia and Interest Rate Parity, *Journal of International Economics* 97, 178-192

Marco Gallegati, James B. Ramsey, Willi Semmeler. (2014), Interest Rate Spreads and Output: A time scale decomposition analysis using Wavelets 76, *Computational Statistics and Data Analysis* 76, 283-290

Mark J. Holmes, Ana Maria Iregui, Jesus Otero. (2015), Interest Rate Pass Through ad Asymmetries in Retail Deposit and Lending Rates: An Analysis Using Data from Columbian Banks, *Economic Modeling* 49, 270-277

Michael Frommel, Robinson Kruse. (2015), Interest Rate Convergence in the EMS Prior to European Monetary Union, *Journal of Policy Modeling*, 1-15

Mustafa K. Mujeri and Sayera Yonus. (2004), An Analysis of the Interest Rate Spread In the Banking Sector in Bangladesh, *The Bangladesh Development Studies* (XXXII) 4, 1-34

Noh-Sun Kwark. (2002), Default Risks, Interest Rate Spreads, and Business Cycles: Explaining the Interest Rate Spread as Leading Indicator, *Journal of Economic Dynamics and Control* 26, 271-302

Pelin Oge Guney, Mubariz Hasanov. (2014), Real Interest Parity Hypothesis in Post-Soviet Countries: Evidence from Unit Root Tests, *Economic Modeling* 36, 120-129

R. Boucekkine, G. Fabbri, P. Pintus. (2014), Growth and Financial Liberalization under Capital Collateral Constraint: the striking case of the stochastic AK model with CARA preferences, *Economic Letters* 122, 303-307

Saroj Bhattarai, Jae Won Lee, Woong Yong Park. (2015), Optimal Monetary Policy in a Currency Union with Interest Rate Spreads, *Journal of International Economics* 96, 375-397

Shurairu Tian, Shigeyuki Hamori. (2015), Modeling Interest Rate Volatility: A realized GARCH Approach, *Journal of Banking of Finance* 61, 158-171

Xiao-Ping Li, Yun Feng, Chong-Feng Wu, Wei-Dong Xu. (2013), Response of the Term Structure of Forward Exchange Rate to Jump in the Interest Rate, *Economic Modeling* 30, 863-874

Yusuf Tansei Iç. (2012), Development of a Credit Limit Allocation Model for Banks Using an Integrated Fuzzy TOPSIS and Linear Programming, *Expert Systems and Applications* 39, 5309-5316

Zainab Dabo. (2012), The Impact of Financial Liberalization on the Performance of Banks in Nigerian, *Social and Behavioral Sciences* 62, 548-554