African Journal of
Business Management

Academic
Journals

ABOUT AJBM

The African Journal of Business Management (AJBM) is published twice monthly (one volume per year) by Academic Journals.

African Journal of Business Management (AJBM) is an open access journal that publishes research analysis and inquiry into issues of importance to the business community. Articles in AJBM examine emerging trends and concerns in the areas of general management, business law, public responsibility and ethics, marketing theory and applications, business finance and investment, general business research, business and economics education, production/operations management, organizational behaviour and theory, strategic management policy, social issues and public policy, management organization, statistics and econometrics, personnel and industrial relations, technology and innovation, case studies, and management information systems. The goal of AJBM is to broaden the knowledge of business professionals and academicians by promoting free access and providing valuable insight to business-related information, research and ideas. AJBM is a weekly publication and all articles are peer-reviewed.

Contact Us

Editorial Office:	ajbm@academicjournals.org
Help Desk:	helpdesk@academicjournals.org
Website:	http://www.academicjournals.org/journal/AJBM
Submit manuscript online	http://ms.academicjournals.me/

Prof. Joseph Offiong Udoayang
University of Calabar
P.M.B 1115, Calabar. Cross River State, Nigeria.

Prof. Robert Taylor
University of KwaZulu-Natal
Varsity Drive, Westville
South Africa.

Dr. Nazim Taskin
Massey University - Albany
Quad Building A, Room 3.07
Gate 1, Dairy Flat Highway (State Highway 17)Albany,
New Zealand

Prof. João J. M. Ferreira
University of Beira Interior (UBI)
Estrada do Sineiro, Pólo IV 6200 Covilhã,
Portugal.

Dr. Izah Mohd Tahir
Universiti Sultan Zainal Abidin
Gong Badak Campus, 21300 Kuala Terengganu,
Terengganu, Malaysia.

Dr. V. Mahalakshmi
Panimalar Engineering College
7-A,CID Quarters, Mandaveli,Chennai-600028,
Tamilnadu,
India.

Dr. Ata Allah Taleizadeh
Iran University of Science and Technology
Faculty of Industrial Engineering,
Iran University of Science and Technology,
Narmak, Tehran, Iran.

Dr. P.S. Vohra
Chandigarh Group of Colleges, Landran, Mohali, India
#3075, Sector 40 D
Chandigarh, Pin code 160036

Dr. José M. Merigó
University of Barcelona
Department of Business Administration, Av. Diagonal
690, Spain.

Prof. Mornay Roberts-Lombard
Department of Marketing Management,
C-Ring 607, Kingsway campus, University of
Johannesburg, Auckland Park, Johannesburg, 2006,
South Africa

Dr. Anton Sorin Gabriel
Carol I Boulevard, No. 11, 700506, Iasi,
Alexandru Ioan Cuza University Iaşi,
Romania.

Dr. Aura Emanuela Domil
31 Horia Creanga, zip code 300253, Timisoara,
West University from Timisoara,
Faculty of Economics and Business Administration, Romania.

Dr. Guowei Hua
NO. 3 Shangyuancun, Haidian District, Beijing 100044,
School of Economics and Management,
Beijing Jiaotong University, China.

Dr. Mehdi Toloo
Technical University of Ostrava,
Ostrava, Czech Republic

Dr. Surendar Singh
Department of Management Studies, Invertis University
Invertis village, Bareilly -
Lucknow Highway, N.H.-24, Bareilly
(U.P.) 243 123 India.

Dr. Nebojsa Pavlovic
High school "Djura Jaksic"
Trska bb, 34210 Raca, Serbia.

Dr. Colin J. Butler
University of Greenwich
Business School, University of Greenwich, Greenwich, SE10 9LS,
London, UK.

Prof. Dev Tewari
School of Economics and Finance
Westville Campus University of Kwa-Zulu
Natal (UKZN) Durban, 4001
South Africa.

Dr. Paloma Bernal Turnes
Universidad Rey Juan Carlos
Dpto. Economía de la Empresa
Pº de los Artilleros s/n
Edif. Departamental, Desp. 2101
28032 Madrid, España

Dr. Jurandir Peinado
Universidade Positivo
Rua Silveira Peixoto, 306
Zip 80240-120 Curitiba – PR – Brazil

African Journal of Business Management

ARTICLES

African Journal of Business Management

Full Length Research Paper

Study on the interactive mechanism of economic growth, inflation and capital markets using dynamic Bayesian factor graph

Xiaolin Lu[1,2,4]*, Kun Guo[1,2,3] and Xin Tian[1,2]

[1]Research Center on Fictitious Economy and Data Science, Chinese Academy of Sciences, Beijing, China.
[2]School of Economics and Management, University of Chinese Academy of Sciences, Beijing, China.
[3]Key Laboratory of Big Data Mining and Knowledge Management, Chinese Academy of Sciences, Beijing, China.
[4]Post-Doctoral Research Center of Industrial and Commercial Bank of China, Beijing, China.

With the deepening of economic globalization and financial liberation, capitalization degree can no longer be ignored for its influence on the relationship between economic growth and inflation. In consideration of the evolvement from the period of industrialization to economic financialisation of the U.S., through the Bayesian network learning of rolling time window, the study concentrate on the dynamic transmission mechanism between economic growth, inflation and capital markets. It turns out that the interactive relationship between capital markets and economic operation is becoming closer and closer. Furthermore, in the order of bond, stock and real estate markets, indicators related to capital markets gradually enter into the transmission mechanism of economic growth and inflation.

Key words: Economic growth, inflation, capital markets, Bayesian network.

INTRODUCTION

The relationship between economic growth and inflation has long been an important and hot topic in macroeconomics. In particular, the relationship is dynamic and conditional, which is bound up with social and economic environment, macro policies and exogenous shocks, and so on. Moreover, with the rapid development of capital markets, financial assets keep expanding while financial innovations keep emerging, which means that the capitalization degree can no longer be ignored any more. According to incomplete statistics,

the last two decades saw an explosion in the scale of global financial assets represented by stock, bond and derivative markets, which increased from 80 trillion in 1998 to 247 trillion in 2014, about three times as much as global GDP.

The development of capital markets has brought about a series of phenomenon that is difficult to explain, which put forward great challenge for the modern theories of economic growth and inflation under the classical among money supply, economic growth and inflation has begun

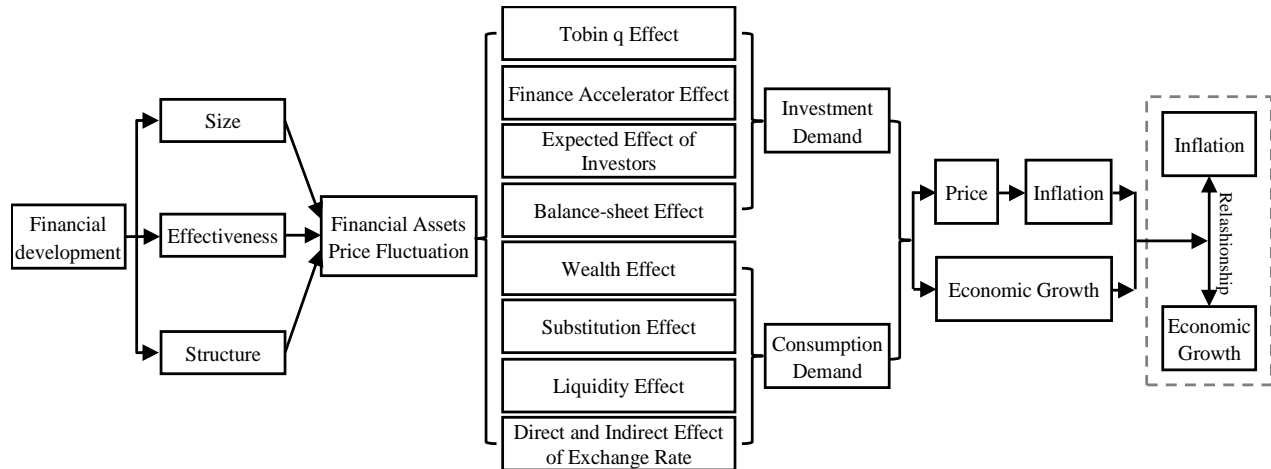*Corresponding author. E-mail: luxiaolin@126.com.

Figure 1. The effect of financial development on the relationship between economic growth and inflation.

to come out in some developed countries such as framework. Back in the 1970s, the deviating phenomenon the U.S. Not only that, jobless recovery even took place in the U.S., which is associated with the overall transformation in the ways of economic growth and economic operation. In addition, financial activities including speculating transactions by leverage and asset securitization are playing a more and more important role in its economic growth at present, which has fundamental difference with that based on resource input and technological progress.

Capital markets are developing so fast that we are curious about its effect on the relationship between economic growth and inflation. Take finance as the typical representative of capital markets for example, as shown in Figure 1, its development will influence investment and consumption through the following channels: Tobin q effect, finance accelerator effect, expected effect of investors, balance-sheet effect, wealth effect, substitution effect, liquidity effect, direct and indirect effect of exchange rate; which can then exert influence on price and output, and further the relationship between economic growth and inflation. Therefore, after taking full consideration of capital markets, the coordinated development of economic growth and inflation should be the main goal of macroeconomic policies, which means that study on the interactive mechanism of economic growth, inflation and capital markets, is of great importance.

However, given the interaction between capital markets and economic operation, the dynamic evolutionary relationship between economic growth and inflation is becoming more and more complicated, which is difficult for traditional methods to find dynamic change of key influential factors and transmission mechanism. Dynamic Bayesian factor graph as a part of the Bayesian network, which is first put forward by Wang et al. (2015), illustrates a good way to solve this problem. With the characteristics

of effectiveness and concision, it provides a unified framework for intricate dependencies among multiple variables.

A direct benefit of the method is that we can actually start with a very large initial factor set, and the adaptation process through given data set will eliminate irrelevant or unimportant factors to deliver a right topo-logical model structure with the dominant factors as a solution. In such a data-driven approach, expert knowledge is no longer essential, although it can still be helpful at various stages of an adaptation to reduce irrelevant or unimportant factors. The change in key influential factors and transmission mechanism can be found in time through the Bayesian network learning of rolling time window.

In consideration of the period of industrialization and economic financialisation from the U.S., the study concentrated on the dynamic interactive mechanism between economic growth, inflation and capital markets.

LITERATURE REVIEW

There are numerous theoretical and empirical contributions that investigate the interactive mechanism among money supply, economic growth and inflation. As a typical model to study the relationship among unemployment, inflation and economic growth, Phillips curve, which was first put forward by Phillips in 1958, has received a lot of attention for a long time. And with the emergence and replacement of new economic problems, the original Phillips curve was constantly being modified by different schools of thought (Samuelson and Solow, 1960; Friedman, 1967; Lucas, 1972; Calvo, 1983; Gail and Gertler, 1999; Manki and Reis, 2003), the development and evolvement of which constitutes the most fundamental theoretical basis for research on the relationship among money supply, economic growth and inflation. Then considering that money played a more and

more important role in economic development, it was introduced into the traditional models through different forms. According to the difference in the methods that monetary variables were introduced into the models and the emphasis on the role that monetary variables played, there were five categories of models such as monetary growth model (Tobin, 1965), money-in-the-utility model (Sidrauski, 1967), cash-in-advance model (Clower, 1967), monetary stock effect (Palley, 1996) and transaction cost model (Itaya and Mino, 2003).

At present, with the integration of global finance and deepening of economic financialisation, financial markets contribute a lot and play a very important part in the macro-economic operation. Thus the links between financial development and macro-economic variables have drawn considerable attention and received enormous research, which can be divided into three following categories.

Interaction between financial development and economic growth

Financial development is considered as a key to economic growth, and the last two decades have witnessed a resurgence of interest in the relationship with the emergence of endogenous growth theory. Some studies have focused on testing the effect of financial development on economic growth, the general findings of which indicate that the financial sector has significant and positive impact on growth (for example, Jahfera and Inoueb, 2014; Ang, 2008; Levine, 2005).

Furthermore, some studies aim at determining which category of financial markets most explains economic growth. For instance, Montes and Tiberto (2012), Cole et al. (2008), and others in this body of literature all stress that stock market development is important in fostering long-run economic growth since it facilitates efficient inter-temporal allocation of resources, capital accumulation, and technological innovation. On condition that there is a positive relationship between financial development and economic growth, other studies, however, have been interested in examining the direction of causality between the two variables, yet have not reached a consensus: studies such as Kolapo and Adaramola (2012), Akinlo and Egbetunde (2010), Estrada et al. (2010), and Enisan and Olufisayo (2009) insist that financial development induces economic growth, while Kar et al. (2011), Panopoulou (2009), Odhiambo (2008) and Ang and McKibbin (2007) in their empirical studies achieve opposite conclusion.

Effect of inflation on financial development

By creating uncertainty and financial market frictions, high rates of inflation make the financial system inefficient in allocating resources (Keho, 2009; Naceur and

Ghazouani, 2005). A large number of empirical works have provided significant contributions to the finance-inflation nexus recently, which mainly indicates that sustained inflation and financial sector performance display a strongly negative association (Almalki and Batayneh, 2015; Kim and Lin, 2010). In their pioneering work, Boyd et al. (1996, 2001) concentrate on the links and find the above negative relationship between inflation and financial development regardless of the time period considered and inclusion or exclusion of countries that have experienced extraordinarily high rates of inflation. Naceur and Ghazouani (2005) examine the impact of inflation on the financial sector performance in the case of 11 MENA countries, which asserted a negative and significant incidence of inflation on financial development. There are also studies which examines the inflation-finance nexus on a single country bias. Bittencourt (2011) makes empirical analysis of 10 economically diverse regions in Brazil and concludes that inflation is detrimental to financial development, which is significant and robust for different data sets, different measures of financial development and different estimators. Ozturk and Karagoz (2012) investigate the abovementioned relation empirically in the case of Turkey, which also supports the previous findings.

Threshold effect of inflation on the finance-growth nexus

Given that high inflation could adversely affect the operations of financial markets, and thus change the finance-growth nexus, there is a large body of literature devoted to investigate the effect of inflation on the relationship (Tiwary and Thampy, 2015; Pradhan, 2011; Huang et al., 2010; Giedeman and Compton, 2009; Rousseau and Yilmazkuday, 2009; Lee and Wong, 2005; Rousseau and Wachtel, 2002). The existing studies have reached a consensus: there is a strong positive relation between finance and growth when inflation is low; however, at moderate inflation levels, this finance-growth relationship declines in magnitude as well as in significance and finally becomes insignificant at high levels of inflation. The threshold values of inflation vary with different countries. For instance, Kremer et al. (2013) find out separate thresholds for developed and developing countries, and note that the threshold for developed countries is much lower (2.5%) than for developing countries (17.2%). Raheem and Oyinlola (2015) confirm the existence of threshold with estimates, and suggest that the threshold level of inflation is between 5 and 10% per annum for Ghana, and 15% per annum for Nigeria and Cote d' Ivoire.

Main contribution of this paper

From the above, the relationship among money supply,

economic growth and inflation has drawn considerable attention and received enormous research, the shortcomings of which, however, demonstrate in two aspects: on one hand, large majority of previous study tends to be static empirical analysis, that is, a certain period of one country or different countries is taken into account in general, which ignores the influence of capitalization degree on the evolutionary relationship; on the other hand, stock market index is often chosen to measure the financial development in studying the linkage between financial development and macroeconomic variables, which is short of representativeness and comprehensiveness.

As one of the most effective models to deal with uncertain problems, Bayesian network was first put forward by Pearl in 1988, which has drawn a lot of attention so far, and has been widely used in many practical fields such as biology, medical treatment and psychology, and so on. Now it has begun to be applied to macroeconomics. For instance, Zhu and He (2015) used the dynamic Bayesian network to measure the pass through of RMB exchange rate to prices of different stages and industrial prices. Therefore, unlike the earlier studies, this paper avoids the subjective judgments for the complicated selection of key influential factors. The dynamic interactive mechanism between economic growth and inflation with reference to capital markets is explored through the Bayesian network learning of rolling time window.

DYNAMIC BAYESIAN FACTOR GRAPH

We will start by briefly reviewing some basic concepts of Bayesian factor graph followed by expanding it to dynamical Bayesian factor graph to include time. The dynamic Bayesian factor graph adapted from an initial factor set is then used as the model structure to capture the change in interactive mechanism of economic growth, inflation and capital markets.

Bayesian factor graph

Being a subclass of Bayesian network (Pearl, 2000), Bayesian factor graph (Wang et al., 2008) is a probabilistic qualitative modeling structure that captures and represents relationships among a set of factors in a graphical format. The inter-factor relationships, by way of causality, relevance, or independence are qualitatively represented by edges in a graph.

Mathematically, a Bayesian factor graph is a directed acyclic graph encoding the joint probability distribution for a set of factors in the form of random variables $X = \{x_1, x_2, \cdots, x_n\}$, where n is the number of factors in the set. The sample of factor X_i can be denoted by $D_i = \{x_i^1, x_i^2, \cdots, x_i^{r_i}\}$, where r_i is the number of nominal

values of factor X_i, and the whole dataset can be indicated as D. This structure represents the qualitative information of a problem domain. The nodes in the graph represent random variables, and the absence of an edge between any two nodes represents conditional independency between the corresponding variables. If there is an edge from X_i to another node X_j, then X_i is a parent of X_j, and X_j is a child of X_i. The probability distributions between each node and its parents represent the quantitative information of a Bayesian factor graph.

The set of parent nodes of X_i is denoted by G_i and the whole graph structure is a vector $G = \{G_1, G_2, \cdots, G_n\}$. Given a graph structure G, the probability of X can be written as the product of the local distribution of each node X_i given its parents:

$$P(X|G) = p(x_1, x_2, \cdots, x_n|G) = \prod_{i=1}^{n} p(x_i|G_i) \qquad (1)$$

For our problem, the graph structure G is not known. Introducing a prior $p(G)$ on the possible structures, we have

$$p(X) = \sum_{G} p(G)p(X|G) \qquad (2)$$

By using the Bayes rule, the posterior distribution of the graph structure becomes

$$p(G|X) = \frac{p(G)p(X|G)}{p(X)} \qquad (3)$$

where $p(G|X)$ is termed scoring functions and can assume various specific forms. Based on discretized data, we use the Bayesian Dirichlet equivalence uniform scoring function (Heckerman, Geiger & Chickering, 1995) for the marginal likelihood of the network $P(D|G, \alpha)$

$$P(D|G, \alpha) = \prod_{i=1}^{n} \prod_{j=1}^{q_i} \frac{\Gamma(\frac{\alpha}{q_i})}{\Gamma(\frac{\alpha}{q_i} + \sum_{k=1}^{r_i} m_{ijk})} \prod_{k=1}^{r_i} \frac{\Gamma(\frac{\alpha}{r_i q_i} + m_{ijk})}{\Gamma(\frac{\alpha}{r_i q_i})} \qquad (4)$$

In (4), q_i is the number of values of G_i. The jth unique value of G_i is devoted by ϕ_{ij}, and m_{ijk} is the number of records where factor X_i equals x_{ik} and G_i equals ϕ_{ij}. α is the equivalent sample size parameter which denotes the prior belief in the uniformity of the conditional distributions of the graph. This scoring function metric guides us to find the maximum posterior structure for the

set of factors under study. Finding the optimal structure is to find a structure that maximizes the posterior probability

$$G^* = \arg\max_G P(G \mid D) \qquad (5)$$

Which is the criterion used in Wang et al. (2008) and also in this study.

Incorporating dynamism in Bayesian factor graph

Reference to the practice of Wang et al. (2015), dynamics can easily be incorporated into the model structure of Bayesian factor graph discussed above by rolling the time window.

Suppose we want to model the structural dynamics of n factors for a time period of (T_1, T_2) with a given data set D over the same time period: $D = \{X_{\tau i} : T_1 \leq \tau \leq T_2, 0 < i \leq n\}$. For each t $(T_1 \leq t \leq T_2)$, there is one Bayesian factor graph G_t generated based on data set $D_t = \{X_{\tau i} : T_1 \leq \tau \leq t, 0 < i \leq n\}$. Then the edges with transmission strength greater than p_1 and transmission probability greater than p_2 are selected to constitute the Bayesian factor graph G_t. For a discrete time t_i of which $i = 1, 2, \cdots, T$, and $T_1 \leq t_i \leq T_2$. This process will lead to a time series of Bayesian factor graphs: G_{ti} where $i = 1, 2, \cdots, T$. These G_{ti} will be termed dynamic Bayesian factor graph that is seen as a dynamical model for an underlying system from the time period (T_1, T_2).

EMPIRICAL ANALYSIS OF DYNAMIC INTERACTIVE MECHANISM BETWEEN ECONOMIC GROWTH, INFLATION AND CAPITAL MARKETS

In consideration of the period of industrialization and economic financialisation from the U.S., this study applies the dynamic Bayesian factor graph to study the evolvement in interactive mechanism between economic growth and inflation with full consideration of the gradual development of capital markets through the Bayesian network learning of rolling time window.

Data and measurements

On account of data availability, the empirical analysis employs quarter-on-quarter data (1991Q1-2014Q4). And detailed information about variables used in our investigations is given in Table 1. In addition, it should be noted that large volume of data is required by Bayesian network. For the purpose of accurate results, here we apply Bootstrap to expand the sample. Bootstrap is a statistical method about resampling, which is based on computer simulation. Without any other assumption about the model or additional new observations, it can make full use of the given information and make an estimate of the overall parameters. Owing to its robustness and high efficiency, Bootstrap is widely used in strict probability distribution assumption or small sample with sophisticated unknown parameters.

In addition, in economic research, irregular elements and seasonal changes usually cover up the objective laws of economic development, which has brought considerable difficulties for studying the relationship evolvement between variables. Therefore, the Census X12 seasonal adjustment is done for all the above variables to eliminate the influence of irregular elements and seasonal changes. What's more, in order to obtain an objective understanding of economic phenomenon, HP filter is applied to the above seasonally adjusted data to distinguish the time trend and cycle sequence, on the basis of which dynamic interactive mechanism can be studied on the cycle component.

Empirical results and analysis

As for the time window, it will be too short to generate regularity or too long to capture the dynamic change. In consequence, through the trial and comparison for time window of three, four, five and six years, length of four years is tested to better reflect the evolvement in interactive mechanism between economic growth and inflation. On such a basis, slide forward one quarter at a time, and set the threshold of transmission strength and transmission probability as 0.6 and 0.5 respectively.

Then the final dynamic Bayesian factor graph are composed of 81 Bayesian factor graphs. Moreover, when the criterion is interpreted as the disappearing or emerging edges with the two key variables, the stable period for a Bayesian factor graph is nearly three to five years. It should be stressed that bi-directional influence does exist for any two factors but only the direction with greater transmission probability is left in the Bayesian factor graph. Although capital markets have developed rapidly since 1990s, economic operation and growth mode have not changed fundamentally at that time.

Therefore, until the middle of 1990s, the effect of traditional economy on capital markets dominated the interaction between economic operation and capital markets. However, since the late 1990s, the U.S. began to come into transformation from the period of industrialization to economic financialisation. Capital markets represented by finance and real estate take the place of traditional economy dominated by manufacturing step by step. What's more, the interactive relationship between capital markets and economic operation is becoming closer and closer. Taking the difference in scale and transmission speed of different capital markets into account, typical indicators from different capital markets gradually begin to enter into the transmission mechanism

Table 1. Detailed information about variables.

Type		Indicator	Description
Key variables	Economic growth	GDP	GDP with constant price is chosen to eliminate the influence of price so as to measure the changes in real output for a certain period
	Inflation	CPI	CPI with constant price is chosen to represent inflation. However, we have to estimate the quarter-on-quarter data ourselves based on month-on-month data. For example, let's denote the month-on-month CPI for April, May and June is p1, p2 and p3. Then the change between June and March can be treated as the change between second and first quarter, that is (1+p1)(1+p2)(1+p3)-1, and so on
Traditional macroeconomic variables	Money supply	M2	With the constant emergence of financial innovation, financial development has imposed great influence on the monetary statistics and the division of monetary level, on the basis of which M2 is selected to reflect money supply
	Interest	Federal fund rate (Interest)	The federal fund rate is the most sensitive indicator of the tightness in money market, especially when the intermediate target of monetary policy changes from money supply to real interest rate since the 1990s
	Exchange rate	generalized actual dollar index (Dollar index)	The generalized actual dollar index with price adjustment is chosen as the indicator of exchange rate, which can reflect the performances of dollar in international exchange market synthetically
Capital market variables	Scale	Market capitalization (Stock)	With respect to stock markets of the U.S., the market capitalization from NASDAQ, NYSE and AMEX roughly constitutes the total value, and the data is from *WFE World Federation of Exchanges*
		Debt securities outstanding (Bond)	As for the bond markets of the U.S., debt securities outstanding summarizes the international and domestic markets and the data is taken from BIS *Bank for International Settlements*
	Fluctuation	Yield	The yields on S&P500 (Stockyield) and one-year treasury bond (Bondyield) are selected to reflect the fluctuation in price of stock and bond markets
		House price index (Hpi)	This indicator is released by the official authority OFHEO, which has direct and timely performances for the volatility in real estate market

(a) The market value of financial assets is utilized to account for the financial development. It should be noted that the statistics including only stock and bond markets are incomplete. The reason for us to ignore the financial derivatives market is the high leverage ratio, which can distort its tendency and even affect the relationship between financial development and macroeconomic variables. (b) The principal data source of this paper is Wind database without special explanation.

mechanism of economic growth and inflation. Moreover, with the deepening of economic financialisation, indicators related to capital markets are playing an increasingly important role in the moderating and mediating effects and transmission mechanism tends to be more and more complicated.

In addition, we get rid of the periods with special effects on the overall economy from Asian financial crisis, subprime mortgage crisis and European debt crisis for a better identification of the evolvement of the interactive mechanism between economic growth and inflation. Due to the limitation of space, transmission mechanism graphs with representativeness are chosen for the followed analysis. Table 2 illustrates detailed information about transmission mechanism between economic growth and inflation with

transmission strength and probability, which can be divided into four stages:

Stage 1: There is only direct linkage between GDP and CPI, and they form another independent system compared with variables from capital markets, which reflects the relatively backward markets, which reflects the relatively backward development of capital markets before the middle
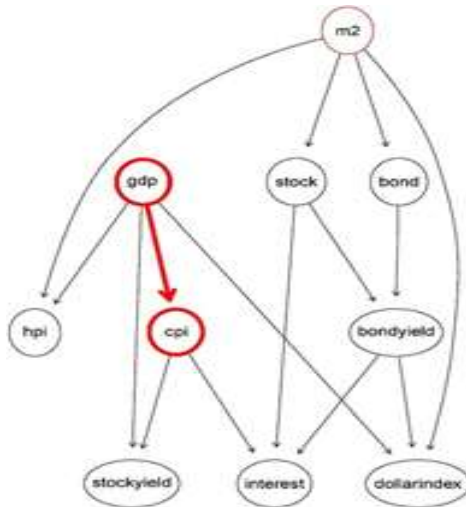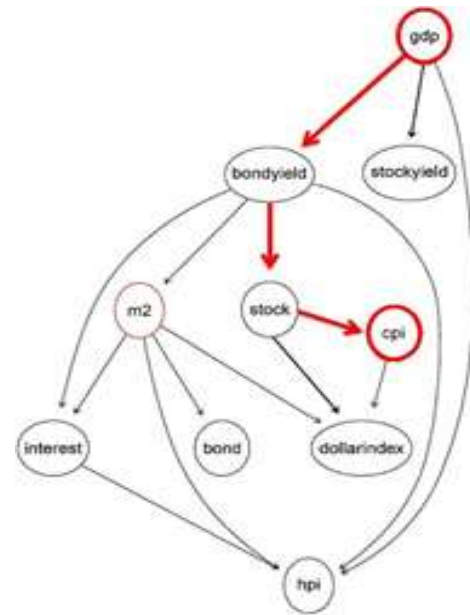
Figure 2. Transmission path graph (1993-1996).

Figure 4. Transmission path graph (2003-2006).
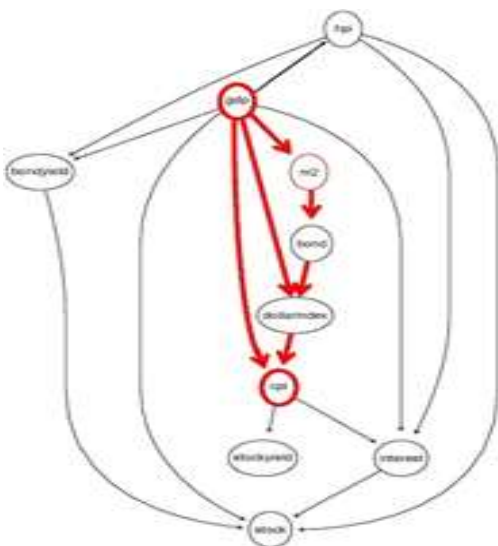

Figure 3. Transmission path graph (1999-2002).

of 1990s. It can be seen from Figure 2 that macroeconomic indicators such as GDP, CPI and M2 are in a dominant position in the transmission path, especially GDP and M2, which are located in the original position. At the same time, indicators related to capital markets are situated in the middle or end of the transmission path. In a word, traditional economy plays a leading role at this stage, and the effect of traditional economy on capital markets dominated the interaction between economic operation and capital markets.

Meanwhile, there is significant transmission relationship between M2 and capital markets, which demonstrates the monetary shunting effect of capital markets. From the second to the fourth stage, in the order of bond, stock

and real estate markets, indicators related to capital markets gradually enter into the transmission mechanism of economic growth and inflation. The transmission system between GDP and CPI has experienced the evolvement from the period with both direct and indirect linkage to the period with only indirect linkage based on indicators related to capital markets.

Stage 2: The earlier mentioned two independent systems set out to turn up signs of fusion. The indicator Bond measuring the scale of bond market begins to enter into the GDP-CPI system. Apart from direct linkage, indirect transmission path comes into existence based on indicator from capital markets. According to Figure 3, as an important operation platform, bond market has become the hinge of financial markets and traditional economy. Money supply can impose influence on the scale of bond market through asset substitution effect, wealth effect and expected effect, which in turn acts as the bridge of transmission mechanism from GDP to CPI.

Stage 3: The direct linkage between GDP and CPI starts to disappear, and indicators related to capital markets that have an effect on GDP-CPI system extend to Bondyield and Stock. As shown in Figure 4, as the most classical portfolio, stock and bond markets share the role of tie of interaction between GDP and CPI, which bear the functions of transmission and adjustment combined with the linkage mechanism of stock and bond markets.

Stage 4: The two systems come into further integration. As the representative indicators of stock, bond and real estate markets, Bondyield, Stock and Hpi all enter into the GDP-CPI system. As is indicated in Figure 5, GDP is
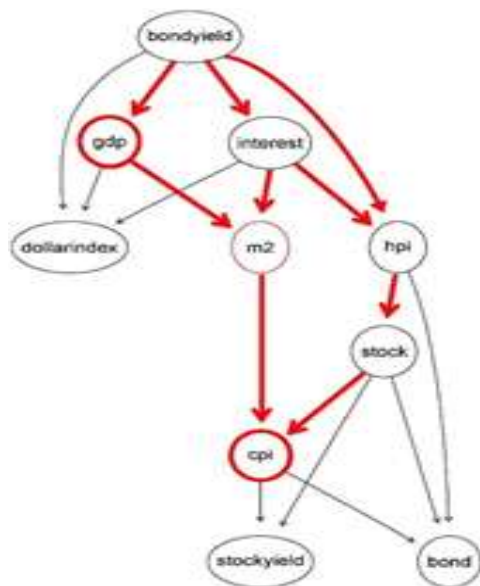
Figure 5. Transmission path graph (2011-2014).

no longer situated in the dominant position to simply have impact on other indicators. However, Bondyield sets about having an effect on GDP and plays an important part in the overall transmission mechanism. What's more, indirect interactive mechanism between GDP and CPI becomes more and more complicated, and different transmission chains interwoven into a network. As the most important parts of capital markets, financial markets and real estate markets presents mutual penetration and fusion, which have moderating and mediating effects on transmission mechanism between GDP and CPI. In addition, the reason for the order of bond, stock and real estate market to enter into the transmission mechanism can be summarized as follows:

Firstly, as one of the earliest countries to develop bond markets, its development in the U.S. can date back to the 18th century. In the 1990s, bond market is the main part of financial markets, the scale of which is more or less twice as much as that of stock market. On one aspect, the bond market can regulate the money supply. On the other hand, the real relationship between supply and demand of the market can be reflected to great extent by interest rates formed in bond markets. Owing to its close connection to money and capital markets, indicator from bond market goes into the GDP-CPI system in the first place.

Secondly, after the bond market, stock market comes into existence in the transmission mechanism between GDP and CPI. Since the late 1990 s, the scale of stock market expands rapidly, which is gradually more mature and perfect and plays a more and more important role in the economic operation no matter in terms of stock issuance and circulation, or in the aspect of market capacity and development degree. The flow of funds

between stock and bond markets will be different due to different stages of economic operation. In addition, the understanding and focus on liquidity, security and profitability from economic subjects will change with the economic situation and market background, which may correspondingly give rise to the change in investment portfolio and fluctuations of asset price. As a consequence, the GDP-CPI system will be affected through substitution effect, Tobin q effect and finance accelerator effect, and so on.

Finally, the entrance of indicator from real estate market is an inevitable trend for a certain degree of economic financialisation. As is known to all, the development of real estate market depends on large numbers of various kinds of financial institutions. With the development of financial liberalization and globalization, real estate as both investment and investment instruments is increasingly involved in the market transaction. Capitalized pricing is becoming more and more popular in the development of real estate market. As a real asset possessing the function of both investment and consumption, its price can be affected by not only cost, supply and demand, but also monetary policies to some degree.

Furthermore, the fluctuations from real estate price will have effect on inflation through wealth effect, balance-sheet effect, expected effect, liquidity effect and money illusion, and so on.

Conclusions

The relationship between economic growth and inflation is dynamic and conditional, which is bound up with social and economic environment, macro policies and exogenous shocks, and so on. Moreover, with the globalization of financial markets and emergence of financial innovations, the capitalization degree can no longer be ignored any more. In consideration of the evolvement from the period of industrialization to economic financialisation of the U.S., through the Bayesian network learning of rolling time window, we concentrate on the dynamic interaction mechanism between economic growth and inflation with full consideration of the gradual development of capital markets. Thus, the following conclusions can be reached:

1. From the period of industrialization to economic financialisation, the relationship between capital markets and economic operation is becoming closer and closer. Indicators related to capital markets gradually enter into the interactive mechanism between economic growth and inflation, which constitutes the dynamic evolvement in the background of economic financialisation.
2. The dynamic transmission mechanism between economic growth and inflation can be divided into four stages. In the first stage, the effect of traditional economy on capital markets dominated the interaction between

economic operation and capital markets, and there is only direct linkage between GDP and CPI. From the second to the fourth stage, in the order of bond, stock and real estate markets, indicators related to capital markets go into the transmission mechanism step by step. The transmission system between GDP and CPI has experienced the evolvement from the period with both direct and indirect linkage to the period with only indirect linkage based on indicators related to capital markets.

Based on the above conclusions, policy suggestions are put forward for the process of economic financialisation as follows:

1. Optimize the structure of traditional economy and capital markets, and it is of great importance to keep balanced development between them from the view of both gross scale and internal structure.
2. The rapid development of capital markets has changed the traditional transmission mechanism among important macroeconomic indicators. In the future policy-making, we should pay more attention to the stable development of financial markets as well as the transmission effect of capital markets.
3. Financial asset price had better be gradually incorporated into the reference index for adjusting and making monetary policies.
4. Establish both global and dynamic monitoring and warning system of capital markets. Through taking full consideration of capital flow, the fluctuation in price of financial assets and the whole process of risk from formation, transmission to final outbreak under the perspective of interactive development of different capital markets, the operation of different capital markets and the whole economy should be real-timely monitored to identify abnormal fluctuations of the markets without delay.

Conflict of Interests

The authors have not declared any conflict of interests.

Acknowledgement

REFERENCES

Akinlo AE, Egbetunde T (2010). Financial development and economic growth: The experience of 10 Sub-Saharan African countries revisited. Rev. Financ. Bank. 2(1):17-28.
Almalki AM, Batayneh KI (2015). The relationship between inflation and financial development in Saudi Arabia. J. Dev. Areas 49:321-332.
Ang JB, McKibbin WJ (2007). Financial liberalization, financial sector development and growth: Evidence from Malaysia? J. Dev. Econ. 84(1):215-233.
Ang JB (2008). A survey of recent developments in the literature of finance and growth. J. Econ. Surv. 22(3): 536-576.
Bittencourt M (2011). Inflation and financial development: evidence from Brazil. Econ. Model. 28, 91-99.
Boyd JM, Levine R, Smith BD (1996). Inflation and Financial Sector Performance. Federal Reserve Bank of Minneapolis, Working Paper, No. 573D.
Boyd JM, Levine R, Smith BD (2001). The Impact of Inflation on Financial Sector Performance. J. Monet. Econ. 47:221-248.
Calvo GA (1983). Staggered Prices in a Utility Maximizing Framework. J. Monet. Eco. 12:383-398.
Clower RW (1967). A Reconsideration of the Microfoundations of Monetary Theory. Western Econ. J. 6(1):1-9.
Cole RA, Moshirian F, Wu Q (2008). Bank stock returns and economic growth. J. Bank. Financ. 32(6):995-1007.
Enisan AA, Olufisayo AO (2009). Stock market development and economic growth: Evidence from seven sub-Sahara African countries. J. Econ. Bus. 61(2):162-171.
Estrada G, Park D, Kamayandi A (2010). Financial Development and Economic Growth in Asia. ADB, Working Paper, No. 233.
Friedman M (1977). Nobel Lecture: Inflation and Unemployment. J. Polit. 85:451-472.
Gail J, Gertler M (1999). Inflation Dynamics: A Structural Econometric Analysis. J. Monet. Econ. 44:195-222.
Giedeman D, Compton R (2009). A note on finance, inflation, and economic growth. Econ. Bull. 29(2):749-759.
Heckerman D, Geiger D, Chickering DM (1995). Learning Bayesian networks: The combination of knowledge and statistical data. Machine Learn. 20(3):197-243.
Huang HC, Lin SC, Kim DH (2010). Inflation and the finance–growth nexus. Econ. Model. 27(1): 229-236.
Itaya JI, Mino K (2003). Inflation, Transaction Costs and Indeterminacy in Monetary Economies with Endogenous Growth. Economica, 70(3):451-470.
Jahfer A, Inoue T (2014). Financial development and economic growth: The role of stock market in Japan. Int. Rev. Bus. Res. Papers 10(2):46-61.
Kar M, Nazlioglu S, Agir H (2011). Financial development and economic growth nexus in the MENA countries: Bootstrap panel Granger causality analysis. Econ. Model. 28(1-2):685-693.
Keho Y (2009). Inflation and financial development: cointegration and causality analysis for the UEMOA countries. Int. Res. J. Financ. Econ. 27:117-123.
Kim DH, Lin SC (2010). Dynamic relationship between inflation and financial development. Macroecon. Dyn. Home 14(3):343-364.
Kolapo FT, Adaramola AO (2012). The impact of the Nigerian capital market on economic growth (1990-2010). Int. J. Dev. Soc. 1(1):11-19.
Kremer S, Bick A, Nautz D (2013). Inflation and growth: New evidence from a dynamic panel threshold analysis. Empir. Econ. 44(2):861-878.
Lee C, Wong SY (2005). Inflationary thresholds effects in the relationship between financial development and economic growth: Evidence from Taiwan and Japan. J. Econ. Dev. 30:49-68.
Levine R (2005). Finance and growth: theory and evidence. Handbook Econ. Growth 1(5):865-934.
Lucas RE (1972). Expectations and the neutrality of Money. Econ. Theory 4:103-124.
Manki NG, Reis R (2003). What Measure of Inflation Should a Central Bank Target? J. Eur. Econ. Assoc. 1(5):1058-1086.
Montes GC, Tiberto BP (2012). Macroeconomic environment, country risk and stock market performance: Evidence for Brazil. Econ. Model. 29(3):1666-1678.
Naceur SB, Ghazouani S (2005). Does Inflation Impact on Financial Performance in the MENA Region? J. Middle East Econ. Financ.

3:219-229.

Odhiambo NM (2008). Financial development in Kenya: A dynamic test of the finance-led growth hypotheses. Econ. Issues 13(2):21-36.

Ozturk N, Karagoz K (2012). Relationship between inflation and financial development: evidence from Turkey. Int. J. Alanya Fac. Bus. 4(2):81-87.

Palley TI (1996). Old wine for new bottles: putting old growth theory back in the new. Australian Econ. Papers 35(67):250-262.

Panopoulou E (2009). Financial variables and euro area growth: A non-parametric causality analysis. Econ. Model. 26(6):1414-1419.

Pearl J (2000). Causality: Models, reasoning and inference. Cambridge University Press.

Pradhan RP (2011). Finance development, growth and inflation: The trilateral analysis in India. J. Econ. Soc. Res. 13(2):45-59.

Raheem ID, Oyinlola MA (2015). Financial development, inflation and growth in selected West African countries. Int. J. Sustain. Econ. 7(2):91-99.

Rousseau PL, Wachtel P (2002). Inflation thresholds and the finance-growth nexus. J. Int. Money Financ. 21:777-793.

Rousseau PI, Yilmazkuday H (2009). Inflation, Finance, and Growth: A Trilateral Analysis. Econ. Syst. 33(4):310-324.

Samuelson PA, Solow RM (1960). Analytical Aspects of Anti-Inflation Policy. Am. Econ. Rev. 50(2):177-194.

Sidrauski M (1967). Rational Choice and Patterns of Growth in a Monetary Economy. Am. Econ. Rev. 57(2):534-544.

Tiwary MK, Thampy A (2015). Financial development and economic growth: Evidence from States in India. J. Financ. Account. Manage. 6(1):41-86.

Tobin J (1965). Money and Economic Growth. Econometrica 33:671-684.

Wang ZT, Wang LL, Tan SH (2008). Emergent and spontaneous computation of factor relationships from a large factor set. J. Econ. Dyn. Control 32(12): 3939-3959.

Wang LL, Wang ZT, Zhao S (2015). Stock Market Trend Prediction Using Dynamic Bayesian Factor Graph. Expert Syst. Appl. 42(15-16):6267-6275.

Zhu HX, He BL (2015). On price transmission mechanism of different stages in China - An empirical analysis based on industrial data in China. Econ. Theory Bus. Manage. 5:40-50.

Full Length Research Paper

Exploring rejection, acceptability and use of bond coins in Zimbabwe during the Multicurrency era

Norman Marime

Department of Banking and Finance, Munhumutapa School of Commerce, Great Zimbabwe University, P O Box 1235, Masvingo, Zimbabwe.

The study explored the reasons of rejection, acceptability and usage of the bond coins by Zimbabweans as well as the challenges they faced in their usage. To achieve the overall aims of the study, an explanatory sequential design (ESD) of mixed-methods was used to explore the people and institutions' views on the rejection and acceptability of bond coins in Zimbabwe. A sample of 100 vendors, 60 commuter operators, 20 economists, 10 reserve bank of Zimbabwe officials, 10 banks, 100 supermarkets and 100 informal traders were used. Quantitative data was gathered using a questionnaire whilst qualitative data was generated using telephone interviews with public institutions, banks and professionals. Survey data was captured in SPSS and presented in the form of tables and graphs while descriptive statistics were computed and used in the interpretation of the findings. The findings showed that bond coins were initially rejected when they were introduced in December 2014, because people felt that the RBZ was clandestinely introducing the local currency through the back door. With the deterioration of the South African rand (ZAR) against the US Dollar (USD) in 2015, the results showed that the acceptability of the bond coin spiked. Evidence showed that charges levied by banks to the public for transacting in rand coins and the fall of ZAR were the major drivers to the acceptability of the bond coins. Thus, the research indicated that the demonetization of the rand coins in Zimbabwe was a result of public perception on the bond coins. The findings showed that there is a possibility that the public may begin to shun the bond coins once the rand rebounds against the USD. The study recommended an increased awareness campaign by the apex bank to allay fears inherent in Zimbabweans on the use of bond coins and to come up with a raft of measures to protect the ordinary traders and citizens. The research further recommends that the RBZ further play its oversight role to the maximum.

Key words: Bond coin, dollarization, problems, challenges.

INTRODUCTION

In April 2009, Zimbabwe had to abandon its own currency and simultaneously adopted a collection of currencies including the South African rand, Botswana pula and the US dollar. This was after a prolonged period of hyper-

inflation which peaked at an astounding monthly rate of 79.6 billion percent in mid-November 2008.At that point, as was expected, people simply refused to use the Zimbabwe dollar (Hanke, 2008: 9), and the hyperinflation came to an abrupt halt. The Federal Bank notes were then used in large value transactions, while the rand coinage from neighboring South Africa was used for smaller transactions. The transacting Zimbabweans were then faced with the problem of coins in conducting trade (Daily News, 2014). The demand for small change was visible and items like sweets, ball point pens, vouchers and gums were used as coin-substitutes.

In light of the above, due to the fact that importing coins from USA to Zimbabwe was expensive, the Reserve Bank of Zimbabwe (RBZ) began to release Zimbabwean bond coins on December 18, 2014 after realizing the negative implications of 100% dollarization of the economy. The mistake Zimbabwe did was to disown the Zimbabwean dollar and adopting the United States dollar without making provision in terms of change for lowly priced goods and services (Mangudya, 2015). Thus in a way bond coins were introduced as a measure to reinforce the multicurrency system by making change available in United States currency and to facilitate correct pricing of goods and services through the bond coin system (Moyo and Mbira, 2016). These were the first Zimbabwean coins since 2003. The coins were denominated at 1, 5, 10, and 25 cents and were pegged to the corresponding values in United States currency (Moyo and Mbira, 2016). A 50 Cent Bond Coin was finally released in March 2015 (Herald, 2015).

According to the RBZ, coins were being issued to remedy lack of small change resulting from the absence of a solid seignorage contract with the USA and other countries whose currencies were being used in the multi-currency regime that arose in 2009 (RBZ, 2014). Other dollarized nations such as Panama, with the balboa, Ecuador and East Timor with the centavo introduced their own coins which were used alongside the US dollar (Jacome, 2004). The centavos and balboas were equivalent to the US cents. In East Timor, the notes and coins were accepted by the public without full knowledge of whether the currency was genuine or not (BPA, 2010).

The introduction of the Bond coins was widely greeted with skepticism as it was believed to be a gradual introduction of Zimbabwe's own unreliable currency (Mail and Guardian, 2015,Telescope, 2014). Soon after the release of the coins on the market, street vendors, commuter bus operators (kombis), and fuel service stations rejected the coins, insisting that their customers use US dollars to settle for goods and services. Circulation of the coins seemed to have been confined to major retail shops such as OK Zimbabwe and TM Pick and Pay Supermarkets.

However, John Mangudya, the Governor of the Reserve Bank of Zimbabwe denied that the Zimbabwean dollar was being reintroduced, saying such

a move would be "economic suicide (Herald, 2015). The governor said it would take about 4 to 5 years for the local currency to be reintroduced. The government went onto launch the coins regardless of some of the concerns that had been raised.

Zimbabweans have been transacting with both ZAR and USD since 2009, but they have been setting prices in the latter. The dollar, not the rand, is the unit of account. This means that any transaction involving rand is inconvenient as it requires a foreign exchange conversion back into dollars prior to consummation. Over the last few years, Zimbabweans have solved this problem by the informal adoption of a "street" rate of ten rand-to-the-dollar. They use this rate as a rule of thumb even though the market exchange rate has deviated quite far from it. The advantage of a nice round number is that it reduces the calculation burden of a two currency system.

Of late, there was a sudden change in public perception on bond coins by Zimbabweans who begun to embrace bond coins in earnest. The experience which Zimbabwe have had on the bond notes seems to argument a widely believed economic theory thought that the acceptance of an currency in an country rests with the households' perceptions (users) than the policy makers. At the same time, no one wants South African currency anymore, with retailers and banks increasingly rejecting rand coins (Sunday Mail, 2015). The bond coin has become the most valuable currency and they made some positive impacts (Newsday, 2015).

The paper seeks to answer the following research questions:

a) Did the introduction of bond coins prove helpful to Zimbabweans?
b)   What are the reasons behind the rejection and acceptance of the bond coins in Zimbabwe?

LITERATURE REVIEW

Bond coin defined

According to the RBZ's FAQ on bond coins, the value of the bond coins is guaranteed by a $50million facility with the African Export-Import Bank (Afreximbank), hence the term bond coin (RBZ, 2015). The bond coins are denominated in 1, 5, 10, 25 and 50 cents and they can be converted anywhere in Zimbabwe into United States dollars at the nearest bank, shop or supermarket in Zimbabwe. This convertibility of the bond coins into US dollars and vice-versa on a one-to-one basis guaranteed by RBZ through a bond facility with an international bank has sustained the perpetual value of the coins in United States dollars. This is why banks accept them and issue customers United States dollars for the equivalent value of coins. This has been a comfort zone for the public (Newsday, 2015). The total value of the coins introduced was US $10 million backed by a $50 million dollar

denominated bond translated to 2% of the total bank deposits in the country.

Use of bond coins

Alleviate problem of small change

According to Mangudya (2015), the bond coins were introduced to assist in the restoration of proper pricing models, alleviate problems associated with change, issuance of change vouchers and change in the form of unwanted goods. Previously lack of change in the economy contributed to the overpricing of commodities and forced consumers to overspend as a result of the lack of change thereof (Mangudya, 2015).

To aid divisibility of the currency

Moyo and Mbira (2016) went further to suggest that in a low inflation country, it is a requirement that the unit of exchange and unit of account be divisible as much as possible. A good example is in the economy of Japan, which is a very low-inflation economy and the Japanese yen is a very divisible unit of currency. This allows businesses to set optimum prices for goods and services right to the smallest possible margin (Chigome, 2015). This aspect benefits both consumers and business people as customers get exactly what they want and pay exactly what it is worth, rather than a rounded off figure (Chagonda, 2010).

To remove price distortions

The lack of coins in the economy had contributed to the overpricing of goods and services and forced consumers to overspend as a result of the lack of change (Mangundya, 2015). With the advent of the bond coins, both the consumer and the producer were suffering as the manufacturer was not facing the correct demand for the product. Moreover, the consumer was being short-changed by paying more than they should. A more accurate determination of price points to match demand for goods and services was made possible by the availability of small change meaning producers could reduce production to efficient cost levels, matched by true demand in the market.

Public perception on bond coins

The hyperinflation period of 2008 left unhealed wounds in Zimbabweans' psychology on how they think about money, its value and future (Makoto, 2012). Accordingly, Bonga et al. (2014) were of the firm belief that Zimbabweans simply do not trust their government and the RBZ. According to Nyoni (2015) and Moyo and Mbira

(2016), upon introduction of the bonds coins, they were rejected. The reasons for rejection were rooted in the New Classical School of Thought which emphasizes on the role and importance of the Central Bank's reputation and issues to do with time inconsistency, rational expectations, confidence and credibility. According to Perrier and Amano (2000), credibility is of paramount importance when it comes to public confidence in the Central bank's determination in meeting its goals. When the bond coins were introduced in December 2104, vendors, filling stations, informal traders and kombi operators rejected the coins because of the credibility of the RBZ's reputation of macro-economic mismanagement. Nyoni (2015) noted that recovery of the economy without confidence was an uphill task. Due to lack of confidence in the monetary policy, the public perceived the introduction of bond coins as the reintroduction of the Zimbabwe dollar and expected prices to rise due to an increase in liquidity brought about by the introduction of bonds. The introduction of the bond coins was perceived not to be compatible in the short run as the public saw it as a ploy to reintroduce the Zimbabwe Dollar in the long run (Nyoni, 2015). Thus, the bad reputation earned by the RBZ led to the rejection of the bond coins.

However, in April of 2015, the public started to bond with the bond coins (Herald, 2015). This was due to public perception over the value of the bond coin against the USD. The other reason why Zimbabweans embraced the previously unpopular currency could be as a result of the fall of the ZAR against the USD.

RESEARCH METHODOLOGY

In view of the nature of the problem under study, a sequential explanatory mixed method research design was considered the most appropriate to collect and investigate views on acceptability and rejection of bond coins in Zimbabwe. Consistent with the design, data were collected in two phases. First, the researchers collected and analyzed results of quantitative data (Quantitative phase) and then followed-up with a qualitative data collection from key interviews which were carried out with key institutions and policy makers. In the quantitative data collection, the study made use of random sampling in the selection of respondents who participated in this study. The use of random selection was adopted as it allowed that all members of the public were given an equal chance of being selected, thus in a way reducing bias selection of respondents. Self-administered questionnaires were a major tool of data collection. The questionnaire was administered to the informal traders, vendors, commuter bus operators and supermarket managers in Masvingo, Harare, Gweru, Mutare and Bulawayo over a period of one month, that is, in November 2015. Out of the 360 questionnaires administered, 335 were returned representing a response rate of 93%. The high response rate may be attributed to the interest that the research generated and its economic importance upon completion. The questionnaire was divided into two sections. Section A comprised of biographical data such as age, gender and highest qualification of the respondents, while Section B captured information on the rejection, acceptability and use of bond coins on a five point Likert scale where respondents indicated the degree of their agreement on various statements. The

Table 1. Usefulness of bond coins.

People's views on usefulness of bond coins	Frequency	Percent	Valid percent	Cumulative percent
Strongly agree	214	63.9	63.9	63.9
Agree	42	12.5	12.5	76.4
Indifferent	29	8.7	8.7	85.1
Disagree	36	10.7	10.7	95.8
Strongly disagree	14	4.2	4.2	100.0
Total	335	100.0	100.0	-

Statistical Package for Social Scientists (SPSS) was used in the analysis of the data were computed and employed in the interpretation of results. Data was thus presented in the form of frequency tables and graphs.

The second phase of the data collection process was to collective qualitative data through follow up interviews with economists based in Harare and Bulawayo and banks and RBZ officials based in Harare within the same period. This was necessary to compliment the results of the survey data collected by the use of self-administered questionnaire. The second phase was used as a follow – explanatory approach to offer a better evaluation of the perceptions of individuals on acceptability and rejections of bond coins. Institutions and key people (economists, banks, RBZ and supermarkets) who had better information on the policy framework on bonds coins were interviewed. The population for the study comprised of vendors, commuter bus operators, supermarket managers, Economists, RBZ officials and informal traders. The sample consisted of 100 informal traders, 100 vendors, 60 commuter bus operators, 100 supermarket managers, 20 economists, 10 banks and 10 RBZ officials.

RESULTS AND DISCUSSION

Usefulness of bond coins

The vendors, commuter bus operators, supermarket managers, economists, RBZ officials and informal traders were asked as to whether they think that the introduction of bond coins proved helpful to the public. Most people believed that the introduction of the bond coins did benefit Zimbabweans and this is represented by approximately 76% of the respondents who either strongly agreed or agreed (Table 1). Reasons given ranged from removal of price distortions and lowering of prices. Most goods were priced at less than a dollar.

Degree of usefulness of bonds coins by province

The results of the survey show that the degree of usefulness of bond coins varied with the province where the respondents were located. Bulawayo and Masvingo (17 and 13, respectively) had more numbers of respondents who disagreed that the bond coins were much useful. The results show that more respondents who strongly agreed that the bonds coins were useful

came from Harare (104). This shows that people from Harare benefited more on bond coins than people in other provinces. The results could be explained by the fact that bond coins were much concentrated in Harare when they were introduced. Few bond coins which circulated in other provinces such as Bulawayo were wiped away by speculators who would go in other smaller towns to buy bond coins at a rate of 5ZAR: 50 cents equivalent bond coin to benefit 20 cents from the depreciation of the rand against the USD. Most vendors mostly in rand linked cities such as Bulawayo lost as they accepted the remaining rands in the market at their vending sites but would not get a 5ZAR:50 cents exchange rate in shops when they would reorder their stocks. They were now forking more rands to buy a 1 US$/ bond valued product because of the depreciation of the rand. The lack of more bonds in circulation in these provinces made the disadvantaged poorer.

Reasons for the rejection and acceptability of bond coins

This subsection presents the research findings in form of a table showing frequencies of the extent of rejection and acceptability of bond coins as well as the use of the bond coins.

Reasons for rejecting bond coins

Tables 1 to 11 present responses as to the reasons why the bond coins were rejected when they were first issued.

Chief among the reasons why bond coins were rejected was public perception that the coins were linked to the return of the Zimbabwe dollar (Zim dollar) that ravaged Zimbabweans lives previously. This is evidenced by a cumulative frequency of 86% rate of respondents who either strongly agreed or agreed with the above reason. The reason was in sync with Bonga et al. (2014)'s findings that public perception. 87.2% felt (strongly agreed and agreed) that the other major reason for rejection was that service providers like filling stations were rejecting the coins. In addition 89.3% were of the

Table 2. The usefulness of Bond coins by province.

Count	Location	People's views on usefulness of bond coins					Total
		Strongly agree	**Agree**	**Indifferent**	**Disagree**	**Strongly disagree**	
	Harare	104	16	8	2	3	133
	Bulawayo	9	4	8	17	1	39
Location of respondent	Masvingo	25	4	6	13	5	53
	Mutare	35	4	2	3	1	45
	Gweru	41	14	5	1	4	65
Total		214	42	29	36	14	335

Table 3. Return of Zimdollar.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
	Strongly agree	218	65.1	65.1	65.1
	Agree	72	21.5	21.5	86.6
	indifferent	16	4.8	4.8	91.3
Valid	Disagree	15	4.5	4.5	95.8
	Strongly disagree	14	4.2	4.2	100.0
	Total	335	100.0	100.0	-

Table 4. Business is mostly informal.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
	Strongly agree	52	15.5	15.5	15.5
	Agree	13	3.9	3.9	19.4
	Indifferent	24	7.2	7.2	26.6
Valid	Disagree	79	23.6	23.6	50.1
	Strongly disagree	167	49.9	49.9	100.0
	Total	335	100.0	100.0	

view that coins had unquantifiable store of value which was liable to fluctuations based on potential black market evaluations and thus they were rejected. 82% were of the view that the coins were rejected on the basis of a lack of confidence in the monetary system.

Thus, a lack of trust, according to the New Classical school of thought is a major factor in determining the acceptability of any Central Bank policies. Such lack of trust led to the rejection of the bond coins. Those who thought the exchange rate of 1:1 would not hold for long constituted of 86.6% cumulatively. The results also showed that 81.2% were of the view that since paying the coin bearer

US dollars was not constitutionally mandated, the bond coins were rejected.

The results also noted that business being mostly informal, introduction assuming a closed economy, bond coins looking suspicious and bond coins increasing liquidity were weaker reasons for the rejection of the coins. This is evidenced by the 19.4, 55.2, 17.3 and 57.6% disagreeing rates, respectively. Unlike in other economies that dollarized, Zimbabweans had reasons for not accepting the coins while in those nations the populace accepted the centavos and balboas without having the knowledge whether they were legal tender or not.

Table 5. Coins are not US$.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
Valid	Strongly agree	175	52.2	52.2	52.2
	Agree	97	29.0	29.0	81.2
	Indifferent	26	7.8	7.8	89.0
	Disagree	22	6.6	6.6	95.5
	Strongly disagree	15	4.5	4.5	100.0
	Total	335	100.0	100.0	-

Table 6. Bond coins increases inflation.

Parameter	Views	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	163	48.7	48.7	48.7
	Agree	30	9.0	9.0	57.6
	Indifferent	55	16.4	16.4	74.0
	Disagree	28	8.4	8.4	82.4
	strongly disagree	59	17.6	17.6	100.0
	Total	335	100.0	100.0	

Table 7. Lack of confidence in the financial system.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
Valid	Strongly agree	191	57.0	57.0	57.0
	Agree	96	28.7	28.7	85.7
	Indifferent	18	5.4	5.4	91.0
	Disagree	15	4.5	4.5	95.5
	Strongly disagree	15	4.5	4.5	100.0
	Total	335	100.0	100.0	-

Reasons for accepting the bond coins

Tables 13 to 18 present the responses in terms of the reasons as to why the bond coin was finally accepted by the transacting Zimbabweans.

The tables revealed that 90.7% of the respondents were in agreement that the acceptability of the bond coins was mainly due to the fall of the South African Rand against the US Dollar. The other major reason why the bonds coins were embraced was the absence of the exchange rate risk of the bond coin against the US Dollar and the existence of the exchange rate risk in using the rand. This is evidenced by the fact that 84.8% of the respondents were in agreement. The bond coins were set at par with the US dollar, hence the nonexistence of

exchange rate risk. Thirty one percent agreed that realization by the masses that the use of bond coins was not a ploy by the central bank to reintroduce the now defunct Zimbabwe dollar. Therefore, the three major reasons as to why the bond coins finally bounced back after initial rejection were the fall of the ZAR against the USD, absence of the exchange rate risk between the bond coin and the USD as well as the realization by the masses that the RBZ was not of the idea to reintroduce the Zimbabwe dollar which is represented by the a cumulative agreement percentage of 54.

Only 24.8% of the respondents agreed to the fact that removal of price distortions contributed to the acceptability of the bond coins. The table also revealed that 69% were in disagreement to the idea that robust

Table 8. Service providers not accepting bond coins.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
Valid	Strongly agree	202	60.3	60.3	60.3
	Agree	90	26.9	26.9	87.2
	Indifferent	19	5.7	5.7	92.8
	Disagree	14	4.2	4.2	97.0
	Strongly disagree	10	3.0	3.0	100.0
	Total	335	100.0	100.0	-

Table 9. Modality does not favour exogenous transactions.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
Valid		1	0.3	0.3	0.3
	Strongly agree	184	54.9	54.9	55.2
	Agree	30	9.0	9.0	64.2
	Indifferent	54	16.1	16.1	80.3
	Disagree	29	8.7	8.7	89.0
	Strongly disagree	37	11.0	11.0	100.0
	Total	335	100.0	100.0	-

Table 10. Coins are capable of speculation based on potential black market evaluations.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
Valid	Strongly agree	212	63.3	63.3	63.3
	Agree	87	26.0	26.0	89.3
	Indifferent	16	4.8	4.8	94.0
	Disagree	12	3.6	3.6	97.6
	Strongly disagree	8	2.4	2.4	100.0
	Total	335	100.0	100.0	-

campaigns by the RBZ led to the acceptability of the coins. Approximately fifty five percent of the respondents also disagreed to the fact that increased confidence in the financial sector contributed much to the bond coin bouncing back. The removal of price distortions, robust campaigns by the apex bank and increased confidence in the financial system were noted as weak reasons for the acceptability of the bond coins. These results were justified and explained by interviews with RBZ officials and economists who revealed that bond coins were accepted mainly because of the depreciation of the Rand against the US$. Individuals, vendors and supermarkets preferred to hold and transact in bond coins which were

at par with US$ than in rand terms mainly to curb against loss of value of the rand. Infact, bond coins became "real money" as they could store a value as compared to rands.

CONCLUSIONS AND RECOMMENDATIONS

This study examined the extent of the rejection, acceptability and use of bond coins in Zimbabwe in the multi-currency era. The results of the study showed that on the basis of the historical challenges that Zimbabwe has faced regarding its currency, there was very

Table 11. Coins look suspicious.

Parameter	Views	Frequency	Percent	Valid Percent	Cumulative percent
Valid	Strongly agree	44	13.1	13.1	13.1
	Agree	14	4.2	4.2	17.3
	Indifferent	24	7.2	7.2	24.5
	Disagree	85	25.4	25.4	49.9
	Strongly disagree	168	50.1	50.1	100.0
	Total	335	100.0	100.0	-

Table 12. Exchange rate of 1:1 temporary.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
Valid	Strongly agree	195	58.2	58.2	58.2
	Agree	95	28.4	28.4	86.6
	Indifferent	17	5.1	5.1	91.6
	Disagree	14	4.2	4.2	95.8
	Strongly disagree	14	4.2	4.2	100.0
	Total	335	100.0	100.0	-

Table 13. Accepting Bond Coins because of ZAR depreciating against USD.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
Valid	Strongly Agree	265	79.1	79.1	79.1
	Agree	39	11.6	11.6	90.7
	indifferent	16	4.8	4.8	95.5
	Disagree	12	3.6	3.6	99.1
	Strongly Disagree	3	.9	.9	100.0
	Total	335	100.0	100.0	-

littleprobability that the bond coins where going to get an automatic acceptance. Thus initially the bond coins were rejected. The study revealed that the generality of Zimbabwe developed a wait and see approach to the acceptance of the bond coins, while leading retailers like OK and PnP adjusted their prices in order to correct price anomalies. With the seemingly clear benefits of the removal of price distortions, the public did not accept the use the bond coins.

Thus, it was concluded that the acceptance and rejection of the bond coins solely rests on public perception as well as fluctuating exchange rates.

The researcher therefore came to a conclusion that the rejection of the bond coins were a result of the attitude of the public towards the coins as well as the bad reputation that the RBZ earned and that its acceptance was mainly due to the demise of the South African Rand.

Since the acceptability of the bond coins were a result push factors, that is the depreciating rand and increased bank charges for using rand coins, it is easy for the rand coin to bounce back should the rand appreciates against the green back to a certain extent.

Based on the research findings and conclusions earlier, the following are recommended for the RBZ and other stakeholders involved:

(1) RBZ to carry out education and awareness campaigns on the bond coins and assure stakeholders that it may not be the return of the Zimbabwe Dollar.
(2) The Apex bank to ensure that there is no possibility

Table 14. Accepting bond coins because of robust awareness campaigns by the RBZ.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
	Strongly agree	73	21.8	21.8	21.8
	Agree	31	9.3	9.3	31.0
Valid	Indifferent	27	8.1	8.1	39.1
	Disagree	73	21.8	21.8	60.9
	strongly agree	131	39.1	39.1	100.0
	Total	335	100.0	100.0	-

Table 15. Accepting bond coins because of increased confidence in the Financial System.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
	Strongly agree	119	35.5	35.5	35.5
	Agree	32	9.6	9.6	45.1
Valid	Indifferent	57	17.0	17.0	62.1
	Disagree	76	22.7	22.7	84.8
	Strongly disagree	51	15.2	15.2	100.0
	Total	335	100.0	100.0	-

Table 16. Accepting Bond coins because of no exchange rate risk against the USD.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
	Strongly agree	205	61.2	61.2	61.2
	Agree	79	23.6	23.6	84.8
Valid	Indifferent	19	5.7	5.7	90.4
	Disagree	17	5.1	5.1	95.5
	Strongly disagree	15	4.5	4.5	100.0
	Total	335	100.0	100.0	-

for counterfeit coins and eradicate challenges regarding change and exchange rates.
(3) RBZ manages the social media well as it has the effects of sabotaging the positive results of the bond coins so far realized
(4) Retailers to seek competitive advantage through lowering prices by a few cents.
(5) Commuter omnibus operators and vendors accept the coins as legal tender.
(6) RBZ maintains bond coins at par with the US$.
(7) The Central Bank takes appropriate actions to prove transparency in which it conducts its business and that the public is satisfied.
(8) RBZ to come up with full deposit insurance system to ensure assets are ring-fenced should the unthinkable happens
(9) The economy to adopt a Money Flow Index Oscillator measuring fiscal inflows in and out of the money ecosystem.

Conflict of interests

The author has not declared any conflict of interests.

REFERENCES

Behnke A (2008). Ecuador in pictures. 21st Century Books ISBN 08 22585731. P 68Bonga WG, Chira F, Chemina J, Strient MV (2014). World De-Dollarization: Economic Implication of De-

Table 17. Accepting Bond coins because of realisation that RBZ does not plan to re-introduce Zim Dollar.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
	Strongly Agree	125	37.3	37.3	37.3
	Agree	56	16.7	16.7	54.0
	Indifferent	48	14.3	14.3	68.4
Valid	Disagree	76	22.7	22.7	91.0
	Strongly Disagree	30	9.0	9.0	100.0
	Total	335	100.0	100.0	-

Table 18. Accepting Bonds coins because of removal of price distortions.

Parameter	Views	Frequency	Percent	Valid percent	Cumulative percent
	Strongly agree	55	16.4	16.4	16.4
	Agree	28	8.4	8.4	24.8
	Indifferent	27	8.1	8.1	32.8
Valid	Disagree	83	24.8	24.8	57.6
	Strongly disagree	142	42.4	42.4	100.0
	Total	335	100.0	100.0	-

Dollarization in Zimbabwe (Introduction of Special Coins). Available at SSRN 2534972.

BPA (2010). Know your currency, Banking and Payments Authority of East Timor, East Timor.

Chagonda T (2010). Dollarization of the Zimbabwean economy: Cure or curse? The case of the teaching and banking sectors. In Coterie Conference on the Renaissance of African Economies. Dar EsSalam,Tanzania. pp. 20-21.

Chigome J (2015). A Reflection on Sustainability of Dollarisation in Zimbabwe. Int. J. Adv. Res. 3(7):306-318

Hanke SH (2008). Zimbabwe: Hyperinflationto Growth. Harare Zimbabwe. New Zanj Publishing House.

Herald The (2015). $9m bond coins now in circulation, Harare. Available at: http://www.herald.co.zw.

Newsday (2015). The Positive Impact of Bond Coins, Harare. Available at: http://www.newsday.co.zw

Nyoni T (2015). Reasons for the rejection of the Zimbabwean Currency, Publications.

Sunday Mail The (2015). Business: Tethering problems for bond coins, Ignorance breeding skepticism. Available at: http://www.sundaymail.co.zw

The Daily News (2014). RBZ unveils bond coins. Available at: http://www.dailynews.co.zw.

Mail and Guardian The (2014). Zimbabweans skeptical of new bond coins, Johannesburg , South Africa, Published 22 December 2014 Retrieved 12 December 2015

Makoto R (2012). Dollarization and the way forward in Zimbabwe. Journal of Strategic tudies: A Journal of the Southern Bureau of Strategic Studies Trust: Joint Research Programme of the Ministry of Finance. The Zimbabwe Economic Policy and Research Unit and the University of Zimbabwe 3(1):51-67.

Mangudya JP (2015). Zimbabwe Monetary Policy Statement, Reserve Bank of Zimbabwe. Available at: http://www.rbz.co.zw.

Moyo S, Mbira L (2016). The Impact of Bond Coins in Business Transactions at Nkayi Growth Point in Zimbabwe. Int. J. Bus. Manage. 4(1).

RBZ (2015). Frequently asked questions about Bond Coins, Reserve Bank of Zimbabwe, Harare

Jacome H (2004). The late 1990s Financial Crisis in Ecuador. Institutional Weaknesses, Fiscal Rigidities and Financial Dollarisation at Work, International Monetary Fund Working Paper 04/12

Perrier P, Amano R (2000). Credibility and Monetary policy; Research Department; Bank Of Canada Review; Canada.

Telescope The (2014). Zimbabwe launches new coins to solve change shortage. Published24 December 2014, Retrieved 12 December 2015.

African Journal of
Business Management

Related Journals Published by Academic Journals

- Journal of Geography and Regional Planning
- Journal of Economics and International Finance
- Journal of Hospitality Management and Tourism
- International Journal of Sociology and Anthropology
- Journal of Public Administration and Policy Research
- African Journal of Marketing Management