

An Extension of Capital Based Macroeconomic Model and 100 Percent Reserve System, the Free Banking System and BFH System: A Comparison among Latvia, Lithuania, Kazakhstan, and Kyrgyzstan

Joseph Antwi Baafi¹, Eric Effah Sarkodie^{1*} and William Kwasi Boachie¹

¹*Department of Accounting Studies Education, College of Technology Education, University of Education, Winneba, Ghana.*

Authors' contributions

This work was carried out in collaboration among all authors. Author JAB designed the study, performed the statistical analysis and wrote the first draft of the manuscript. Authors EES and WKB managed the analyses of the study. Authors EES and WKB also managed the literature searches and developed the framework diagram. All authors read and approved the final manuscript.

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ABSTRACT

This study extends the capital-based macroeconomic theory to include international capital flow thus extending it to an open economy and analyze it in the context of the BFH system, Free banking system and 100 per cent reserve ratio. In all these, it was noticed that interest rate would barely change even though the possibility of interest rate changes was not ruled out completely. A test of these systems was conducted on Latvia, Lithuanian, Kazakhstan and Kyrgyzstan and was

*Corresponding author: E-mail: effahsarkodie@yahoo.com;

successful. However, it must be noted that these are just proposition as these systems are not in place at the moment. In furtherance to this, past and present monetary system used by the countries exhibited similarities to these systems, even though difference could largely be seen.

Keywords: International capital flow; free banking system, black-fama-hall (BFH) system; 100 percent reserve.

1. INTRODUCTION

Banks and financial institutions have been one of the major sectors that have fuelled economic growth in many countries around the world. In the United States, the contribution of the financial sector amounted to about 1.2 trillion dollars in 2010. This represents about 8 per cent of GDP. In the United Kingdom, the financial sector contribution was about 10 per cent of GDP in 2009 [1]. In recent times financial institutions contribute to economic growth around the globe has averaged about 12 to 19 per cent of the world's GDP [2]. The banking sector which is the main component of the financial institution [3] has offered employment to many people around the world. In the UK, about 1.2 million individuals are employed in the banking sector in 2017 [4]. Other benefits of the banking sector largely include income generation at the micro-level, revenue mobilization at the macro level, foreign exchange earnings, contribution to social and economic infrastructure through co-operating social responsibility, granting of credit facilities to expand business etc [3].

In Ghana, the banking sector's contribution to growth and development cannot be overemphasized. The banking sector has grown on the average of about 13.1 per cent to 15.1 per cent between April 2017 and April 2018 [5] and its contribution to GDP has increased from 4.4 per cent 2011 to 7.3 per cent in 2015 [6]. In Latvia, Lithuania, Kazakhstan and Kyrgyzstan, the banking sector has grown over the years and its contribution GDP has averaged about 10.1 per cent [7,8].

Despite these massive contribution and advantages derived from this sector, it has also been one of the sectors which not properly managed could cause a major economic downturn. Banks are faced with problems that can result in this downturn. One of the problems is the self-destructive nature of the artificial booms caused by credit expansion. This is known by De Soto [9] as 'forced savings'. This occurs when there is an increase in the quantity of money in circulation that is not voluntarily

backed by saving which is injected into the economy at a point in time. The increase in the quantity of money is supported by the bank's ability to create credit. In this case, at any point in time, the value of credit created by the bank is much higher than the actual physical currency in circulation. If the majority of customers rush to the bank for their monies, there would not be enough currency to serve these customers; thus the bank would have liquidity challenge. De Soto [9] stated that any attempt to increase forced saving without corresponding backing of voluntary saving is condemned to failure and will invariably propel economic crises. For the crises to be halted, the entire process should be accompanied by a simultaneous, independent and spontaneous increase in the voluntary saving of an amount at least equal to the newly-created banks' credit.

Another problem of banks is the squandering of capital, idle capacity and malinvestment of productive of resources [9]. Credit creation by banks coupled with privilege government grant banks, allowing them to use a fractional reserve of demand deposits enables these banks to launch and attempt to complete series of investment projects which nonetheless could not have come into fruition (example, Biege Capital in Ghana). These investments often throw the banks into liquidity problems and thus a relatively larger group of customers who walk into the banks would pose problems for these bankers because these investments are not easily convertible into liquid assets. Such widespread investment of societies' scare resources would create serious economic crises. At other times these expanded credits are spent in ways that cannot be accounted for by directors of these banks.

The third problem faced by banks and which is self-created is a violation of legal principles. Hayek [10] stated that whenever a universal legal principle is violated, either through systematic state coercion or governmental privileges or advantages conferred on certain groups or individual, the spontaneous process of social interaction is inevitably and seriously obstructed.

The operations of banks are based on certain laws and principles which when not followed would result in serious problems. Some of these principles include bookkeeping and cashier services, fractional reserves, true financial intermediation (taking deposits and granting loans, holders of bonds), deposits of securities etc. Banks take deposits and grant loans, the results is a different interest rate (profit) between taking deposits and granting loans. If banks decide to stretch these activities without due respect to laws and principles, the results of crises, poverty and hardship instead of wealth creation and prosperity.

These and many other problems faced by banks have resulted in economic crises and recession around the world. A most recent global economic recession occurred in 2008 and it was caused by deregulation in the financial industry [11]. Aside from this, there has been several economic downturns and social hardship and cost caused by the banking sector. In Ghana, for example, a clean-up of the banking sector in 2018 cost the government about 13 billion Ghana Cedis [12]. In Nigeria, the cost of clean-up in the banking sector was about 105 billion Naira [13]. In United States the cost of clean was about 160 billion dollars [14]. These crises posed by the banking sector partly results from the easy transfer of international capital across the world. That was why any economic crises in the US could affect the entire world. The banking sector indeed offers many advantages but its problems are also very huge with needs proper management.

The main purpose of the study is to apply theoretical principles in solving these problems faced by the banking sector. The objectives the researchers sought to achieve were to extend the capital-based macroeconomic theory and apply it to the real-world situation using four countries. Specifically, the objectives are

- i. proposed a theoretical principle based on capital based macroeconomic theory extended with international capital flows, 100 per cent reserve requirement, the free banking system and BFH (Fischer Black, Eugene Fama and Robert Hall) system to help correct the problems of the banking sector.
- ii. Apply these theoretical extensions to the real-world situation using four economies namely Latvia, Lithuania, Kazakhstan and Kyrgyzstan.

The hypothesis of the study is stated below:

- H₀:** There are no relevance of capital based macroeconomic theory and its extension in solving banking crises
- H₁:** There are the relevance of capital based macroeconomic theory and its extension in solving banking crises

It must be noted that these hypotheses would not be tested using mathematical procedures. Raw data would be applied to the theoretical extension and face value judgment based on the data would be analysed. Mathematical analyses of the theory would be a subject for future development.

The novelty of this study is the combination of extension of capital-based macroeconomics theory and 100 per cent reserves ratio, BFH system and Free banking system and an application to real-world data. Other papers that have done some extensions [15] have not explored the frontiers to what the authors sought to do. This study starts with briefly explaining 100 per cent reserves ratio, BFH system and Free banking system. It goes on to extend the capital-based macroeconomic theory to include international capital flow and test the extension in all four countries under consideration. It again then analyze the 100 per cent reserve ratio, free banking system and BFH system as well as the monetary system in all four countries.

2. LITERATURE REVIEW

This section reviews the literature for the study by defining 100 per cent reserve banking, BFH system and free banking system. The next section also deals with an extension of capital based macroeconomic theory to include international capital flow.

2.1 BFH System, 100 Percent Reserve Banking free Banking System

One hundred (100) per cent reserve banking is a practice in which the full amounts of each depositor's funds are available in reserve (as cash or other highly liquid assets) when each depositor had the legal right to withdraw them. As late as the twentieth-century court decision in Europe has upheld the demand for a 100 per cent reserve requirement, the embodiment of the essential element of custody and safekeeping in the monetary irregular deposit [9]. In other words,

banks will act as a more or less safe keeping house where agents deposit their monies and withdrawal them as a when needed.

There are historical factors and circumstances which gave rise to the bank-deposit contract with a fractional reserve. These contracts originated from privilege governments granted bankers, allowing them to use in their interest the money of their deposits most often in the form of loans given to the very granter of the privilege, i.e., the government or state. If the government had fulfilled their essential purpose and had adequately defined and defended the property rights of depositors such an anomalous institution would never have emerged. Other criticism against 100 per cent reserve banking includes the need for financial intermediation.

Nevertheless, aside from these criticisms, proponents of 100 per cent banking reserves argue that lack of government-manipulated currency (monetary policy) and the presence of a sound currency (as opposed to an 'elastic' one) are advantages of a 100 per cent reserve system. Another advantage of 100 per cent reserve system includes perfect certainty. As De Soto [9] writes *'if pessimism and the lack of confidence spread, all banks may become insolvent, ending in the disastrous failure of the banking system and the monetary system based on fractional-reserve banking. This instability intrinsic to the fractional-reserve banking system is what makes the existence of a central bank as lender of last resort inevitable, just as the correct functioning of a system of complete banking freedom requires a return of traditional legal principle and thus a 100 per cent reserve requirement'*. The 100 per cent reserve requirement will solve the problem of violation of the principle of fractional reserve.

BFH was named to credit Fischer Black, Eugene Fama and Robert Hall, but Greenfield and Yeager modified their ideas and have developed the system. The idea of the BFH system is to define the unit of account physically, in terms of many commodities and not in terms of any medium of exchange which value depends on the regulation of its quantity or its redeemability [16]. The reasoning applies to that of a gold standard but in a more effective sense because the money unit will not be convertible to not a single commodity but with a physically specific bundle of commodities. Because of the almost non-monetary character of the demand and supply of the commodities defining the unit and because of the separation from the medium of

exchange, no monetary pressures can exert themselves on the value unit.

The BFH system would virtually get rid of money existing in an explicit quantity. The government will therefore not issue legal-tender status to any particular means of payment, but would only simply put in force contracts which the parties had clear-cut what would comprise achievement. By these prices would be quoted in a defined unit of value. The commodities defining the unit would not have to be storable. With no money quantitatively existing, people make payments by transferring other properties.

Financial intermediaries have been a mix of present-day banks and mutual funds would develop. Payments would be made by checks to transfer suitable value unit of share ownership. These financial intermediaries will seek to attract customers by compiling records of high earnings, safety and efficiency in administering the payment of cheques. What would serve as the hand-to-hand currency of fund share of fluctuating value could take the physical form of coins and circulating paper.

The advantage of the BFH system is that it will not provide a stable unit for pricing, invoicing, accounting, economic calculation, borrowing and lending and writing contracts reaching into the future [16]. Second, the government will come under financial discipline. Again, competition in the free-market economy would ensure innovation in finance and payment system and would ensure the discipline of banks and investment funds.

Free banking is a theory of banking in which markets forces control the provision of banking services, where there is no central bank to protect commercial banks from runs and where money production is unregulated by the government. Under free banking, government-supported central banks and currency boards do not exist, banking specific government regulations are either non-existent or not as strict and general commercial laws against fraud, insolvency and bankruptcy apply to banks as they apply to other commercial entities [17]. Unregulated banking services may include the provision of full reserve banking services. In short, under free banking, banks are free, even to engage in fractional reserve banking, but they must redeem their notes or demand deposits on demand, promptly and without cavil, or otherwise be forced to close their doors and liquidate their assets.

There are several strict and important limits on inflating credit expansion under free banking. This may include the build-up of trust and dread bank run (when the clients of a bank, lose confidence in their bank and begin to fear that the bank does not have to ability to redeem their money on demand and depositors begin to rush to their bank to cash in their receipts). Banks cartel could be formed legally under a free banking system but economic incentives will ensure that such cartel will not occur. Rothbard [17] therefore concludes that '*contrary to propaganda and myth, free banking would lead to hard money and allow very little bank credit expansion and fractional reserve banking. The hard rigour of redemption by the one bank upon another will keep anyone bank's expansion severely limited.*'

2.2 An Extension of Capital Based Macroeconomic Model to Include International Capital Flow

The study turns attention to extending the capital-based macroeconomic model to include international capital flow. Capital-Based macroeconomics is an outgrowth of the Austrian theory of the business cycle- a theory set out in 1913 by Ludwig Von Mises and developed by Friedrich A. Hayek and other in the 1930s. Three elementary graphical devices serve as building blocks for capital-based macroeconomics. These are – the market for loanable funds, the Production Possibilities Frontier and the Intertemporal Structure of Production. The theory shows just how the supply and demand for loanable funds, the production possibility frontier and the intertemporal structure of production relate to another.

When the theory is extended to include international capital flow, how will the interest rate be affected? We assume that international capital flows come in the form of financial aid. As governments' start spending, the capital flows, for instance on the payment of workers' salaries, individuals tend to be the final recipient of these flows thereby increasing their income. If intertemporal preference changes are absent, both the supply and demand for loanable funds shifts rightward. Savers will be supplying increasing amounts of loanable funds out if their increasing incomes, the business community will be demanding increasing amounts of loanable funds. With ongoing shifts in the demand and supply for loanable funds, the equilibrium interest rate remains constant. We started by saying that,

governments spend international capital flows in a specific pattern to trigger off these trends. But government expenditure depends on other factors of which two will be considered – monetary system and budget deficit or financing. If a government is operating a flexible exchange rate, its expenditure will not be constrained by currency readjustment. In this case, the government can allocate international capital flows into sectors of the economy that needs re-capitalization. A flexible exchange rate not only accomplishes necessary adjustments of resources allocation in a relatively efficient way but also helps avoid unnecessary adjustment [18]. But if a government is operating a fixed exchange rate, part of the international capital flows will have to be channel into adjustment. But the adjustment is easier than if the country had to adjust to foreign depression under fixable exchange rates.

We assumed previously that, the international capital flow comes in the form of financial aid. But, let's extend to technological or even physical and human capital. In this sense, we are considering both financial capital and physical and human capital. From the theory, technological advance has a direct effect on the Production Possibility Frontier (PPF) and the market for loanable funds. When there is international capital flow in the form of technological innovation in one or few markets, it allows, through resource reallocation, for shifts in the PPF. The demand for loanable funds shifts to the right, as business firms take advantage of technological inflows. The resulting higher incomes cause the supply of loanable funds to shifts to the right and that the interest rate though initially increases becomes indeterminate thereafter. Again, we are back to the point of the unchanging interest rate. It is important to point out that international capital flows in the form of technological advancement affects all stages of the product directly and proportionally so that no reallocation of resources among the different stages is called for. This is because understanding capital combination entails an understanding of the concept of complementarity and substitutability. On the production side, there is deepening of capital structure which led to increased consumption. This is represented by an increase in the area of the triangle.

The Fig. 1 shows how international capital flow in any form can aid in economic advancement not considering the type of exchange rate regime. The international capital flow would shift an

economies' production possibility curve to the right. this is because for the PPF curve to shift to the right, there are certain factors such as the discovery of natural resources, improvement in technology, increasing skilled labour, increase in capital goods etc. International capital flows which forms part of capital cause growth according to the basic idea in economics [19]. This is indicated in part E on the diagram. That is the basic theoretical understanding. But the capital inflow has a pass-through mechanism through which such growth could be realized. As explained previously, capital inflows could affect the various stages of production especially if it is creative destruction. Increased inflows would affect both the consumption and production side causing the triangle to expand. In the consumption side, agents would be able to use/spend inflows or capital goods to expand production. Using or spending these inflows entails consumption by production agents. Again, as these agents spend, the expenditure is meant to aid in the production of other goods: both

consumable and unconsumable goods. Consumable goods would deepen the consumption side causing it to expand while unconsumable goods will deepen both consumption and production side.

This expansion is shown in diagram D. The diagram above shows a proportionate increase in both the consumption and production sides of the economy. However, such an increase may not be proportionate as expected but depends on the deepening international capital inflows offers for both sides of the economy.

In terms of interest rate adjustment, diagram F indicate that interest rate may not change. This may be because inflows are likely increasing the supply of loanable funds. This supply would intend to create its demand, causing the interest rate to be stable over time. But this consideration is only possible if inflows come in the form of foreign exchange earnings.

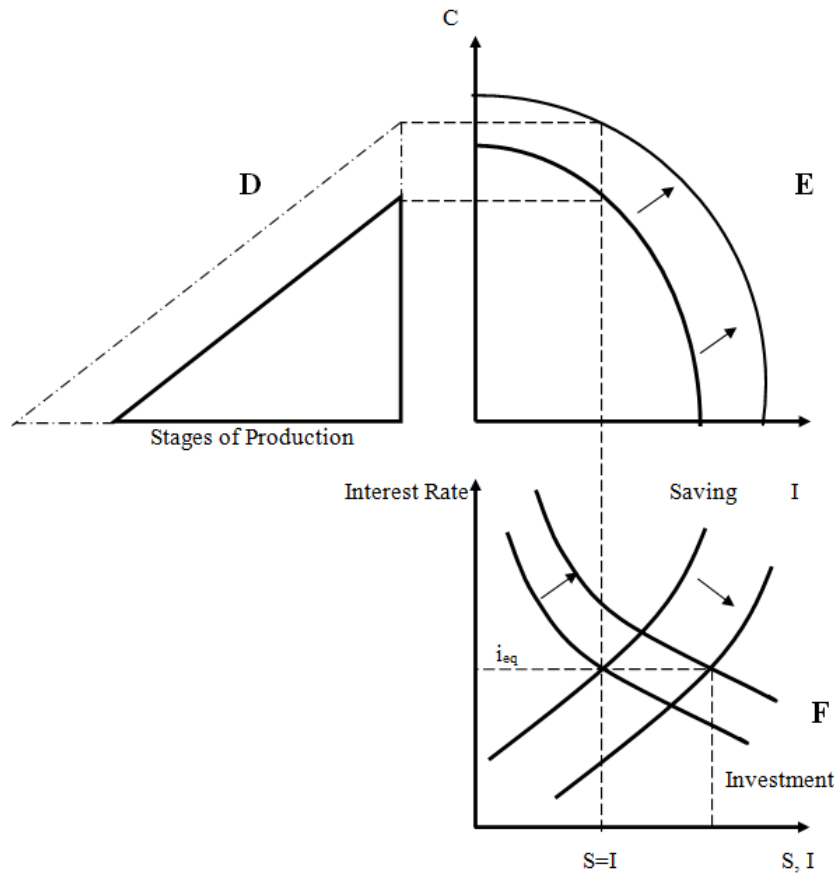


Fig. 1. Capital based macroeconomic framework extended with international capital flow

Source: Authors' Construct (2018)

All these activities would result in increased creativity, capital accumulation, economic growth and standard of living. International capital flows in different forms such as financial aid and physical and human capital and technological innovation ensures that all 'gaps' are filled. Lewin [20] states that between any two points of time, during which unexpected changes will necessarily have occurred, resources substitution will have been made in an attempt to adjust to the changes. Complementarity is a condition of plan equilibrium (stability), substitutability is a condition of plan disequilibrium (changes). Again, the scope for resources reallocation allows the implementation of technology that is usable only in one or a few stages to have an immediate or nearly immediate impact on current consumption. In this case, the demand for loanable funds rises as producers seek to take advantage of new international capital flow (technology) that directly affects the early stage of production. The interest rate rises but the increased interest rate causes resources not directly involved in implementing the capital flow to be reallocated towards the late and final stages of production, which allows consumers to increase. As income increase and consumption increase, the supply of loanable funds is driven back to the initial level.

In this case, international capital flows under fixed exchange rate tends to inflate the domestic money supply, prices, and production and employment. These changes are not the result of the goods-and-services export surplus but rather a part of the means of bringing the surplus about. Under fluctuating exchange rates international capital flows causes exchange appreciation and an increased export directly. With the money supply remaining under domestic control, this international capital flow will raise prices in the country as individual income increase as explained early on and production and employment increases. What does this mean for government deficit financing? The government will be in the position to increase for example income tax and seeks various ways of widening the tax 'net' to capture the increasing number of people been employed. This will enable the government to raise enough revenue to finance its deficit or better still write it off.

The capital-based macro-economic theory also considers the change in intertemporal preferences. It simply hypothesizes an autonomous economy-wide change in intertemporal preferences: people become

thriftier, more future-oriented in their consumption plans. For instance, increasing doubt about the viability of social security cause people to save more for their retirements. More pointedly, the theory suggests that change in intertemporal preference cause the interest rate to change moving upward or downward. That is the change in credit –market conditions result in a decrease in the rate of interest and an increase in the number of funds borrows by the business community. But international capital flow fills the gap between demand and supply of loanable funds bringing interest rate back to its initial point. This is because the public has some set of time preference that determines its willingness to supply loanable funds in the form of saving, including the holding of bank liabilities, as well as its willingness to demand loanable funds from the banking system and/or government.

In general, the quantity supplied of loanable funds (saving) will vary directly with the interest rate. The quantity demand for loanable funds (investment) will vary inversely with the interest rate. Capital flow in the form of financial aid increases the supply of money and the monetary system's role as a supplier of money and the public's role as a demander are an important subset of the broader market for loanable funds. At any point in time, inflows of international capital tend to make up excess demand for loanable funds and will bring the interest rate down. Outflows also tend to reduce the excess supply of money. This will maintain monetary equilibrium. If monetary equilibrium is maintained, it makes it that much easier for the loanable funds market to smoothly translate time preference into intertemporal exchanges [21]. In this sense, a country operating a fixed exchange rate system tends to depend heavily on monetary policy and is greatly vulnerable to external shocks. This is because, in the situation where there is no international capital flow, the difference in the demand and supply for money cannot be eliminated and the interest rate will tend to widen. However, a country operating a flexible exchange rate may not have these problems but will have to face the problem of reduction in financial transfer due to higher exchange rate volatility and this will also cause a problem for interest rate stability.

2.3 A Test of the Extended Model

Table 1 shows the capital flows of all four countries in approximately millions of dollars and interest rate values in percentages.

Table 1. Capital flows of all four countries in millions of dollars and interest rate values in percentages

Country	1990-2000	2001-2003	2004	2005	2006	2007	2008	2011-2017
Latvia								
<i>International capital flow</i>								
Inflow	226	n.a	713	n.a	1664	2247	1426	961
Outflow	-4	n.a	128	n.a	173	335	231	313
Interest rate	4.9	5.1	4.84	4.4	4.42	5.5	6.21	4.15*
Lithuania								
<i>International capital flow</i>								
Inflow	222	n.a	1032	n.a	1840	2017	1815	914
Outflow	4	n.a	343	n.a	290	608	356	464
Interest rate	9.2	9.5	3.5	3.1	3.51	4.75	4.95	n.a
Kyrgyzstan								
<i>International capital flow</i>								
Inflows	39	n.a	n.a	43	182	208	233	508
Outflow	3	n.a	n.a	n.a	n.a	n.a	n.a	33
Interest rate	28.5	21.0	n.a	18.5	23.0	17.0	19.9	13.3
Kazakhstan								
<i>International capital flow</i>								
Inflows	851	n.a	n.a	1971	6278	1112	1454	9180
Outflow	2	n.a	n.a	-146	-385	3151	3821	1827
Interest rate	15.0	n.a	n.a	8.0	9.0	11.0	10.5	9.2

Sources: Bank of Latvia, Bank of Lithuania, National Bank of Kazakhstan, Bank of Kyrgyzstan *2011-2013

Let's consider how these four economies will fair in this explanation. We are testing an extension of the capital base macroeconomic theory to include international capital flow. We have noticed the behaviour of interest rate in the theoretical sense. Lets us, therefore, analyze it in the empirical sense. International capital flow in Latvia between 1990 – 2000 averaged 226 million dollars. Interest rate also averaged 4.9 per cent in the same period. For some unexplained reason, the interest rate increased to 5.1 per cent between 2001-2003. Figures for international capital flows are not known but we can notice that interest rate dropped to 4.84 per cent in 2004 almost equalling the figure between 1990-2000. We could also notice that in the same period International capital flow increased from 226 to 713 million dollars. We then can say that our theory is in line because the rise in interest rate has been reduced by the inflow of international capital bringing it back to almost the initial level. As international capital flow continues to increase to 2247 million dollars interest rate stay in the range of between 4.9 and 5.5 falling back to its mean value as a marginal increase in inflow occur. Expect for 2008 which is a major outlier largely because of the global financial crises.

The same can be said of Lithuania. Except for 1990-2000 and 2008 figures which are outliers, the international capital flow has increased from 1032 to 2017 million dollars. We can observe that interest rate decreased from 3.5 per cent to 3.1 per cent from 2004 to 2005 but came back to its initial value of about value of 3.51 per cent when international capital flow increased to 1840 million dollars.

The pattern is not very much different in Kyrgyzstan when interest rate fell back to 17 percent almost equalling its initial value of 18.5 per cent. Interest rate seems to have been in a range of 19.0 – 21.0 per cent as international capital flow increases even in 2008. This is keeping the interest rate from not fluctuating too high or too low from its mean value.

Even though a clear pattern cannot be readily seen in the case of Kazakhstan, because of very high capital outflow, the table still exhibits some truth in the theoretical analyses undertaken early. That is an interest rate almost returned to the former figure of 9.0 per cent in 2006 when international capital flow increased from 6278 to 14,543 million in 2008.

3. METHODOLOGY

This section provides principles in an application of the extension of theory and inclusion of 100 Percent Reserve Ratio, Free Banking System and BFH System. An analysis of the principle is later applied to four economies which all aspects of the theory is applied

3.1 Application of an Extension of the Theory and 100 Percent Reserve Ratio, Free Banking System and BFH System

From the explanation above it could, therefore, be stated that interest rate movements are very much affected by International capital flows. With the idea of a free banking system in mind, a lot could be said of interest rate movement again. Based on the explanation of these two concepts given previously, about credit expansion, it could be stated that interest rate would be stable for a long time within the economy or that interest rate changes may be very slow. This is because in terms of 100 per cent reserve ratio, banks will only be seen as a safekeeping house and by that; they can only charge a 'fee' for that duty. The amount of fee accumulated will be the only source through which banks can lend. The right of banks to create deposit will be taken away from them. In terms of a free banking system; banks cannot also expand credit because of 'build-up of trust and dread bank run'. For these reasons, credit expansion and contraction cannot fluctuate unnecessarily and interest rate, once fixed will be maintained for a long time. International capital flows and taxes received by the government, therefore, becomes a very important source of finance. The pattern of expenditure will determine whether the country will be on a contraction, stationary or expansion path. If the government decides to even out the expenditure between consumption and investment and net investment is zero, then the economy will be on the stationary point. The other two points give a direct contrast to each other.

Growth is depicted by outward shifts in the PPF. As stated earlier on, we can start our analysis by looking at the behaviour of interest rate movement. Again we bring back the assumption of International capital flow in the form of financial aid. The general case will be considered later. Government expenditure of international capital inflows tends to benefits income earners through higher incomes; under 100 per cent

reserve ratio, credit expansion may not be possible because increased saving cannot be loaned out. But under free banking system, a marginal increase of loanable funds out of increasing income can occur but this marginal increase will not be enough to cause the interest rate to change. Recall also that we have explained why International capital flows in the form of financial aid will cause an unchanging interest rate with government expenditure benefiting income earners. We can therefore strongly conclude that the interest rate will remain unchanged or slightly fluctuate (down and up) about the existing value. Under the BFH system, the unit of account is defined physically in terms of many commodities and the function of money as a medium of exchange is separated from the unit of account. What this means is that the individual gets increased income from the expenditure of international capital flow is not a single commodity but in different commodities. The business community also borrow is not a single commodity but in different commodities. There will, therefore, be no room for the scarcity of one commodity to drive its price up. The scarcity of one commodity is immediately compensated for by the relative unscarcity of the other commodity. Because the higher price will not be paid for borrowing, again interest rate will remain at the equilibrium point for a long time.

We previously assumed that international capital flows come in the form of financial aid. Let's consider a more general case. That is international capital flows in the form and technological or physical and human capital and financial flows. Again interest rate changes will not occur under the free banking system and BFH system. This is because, even though technological advancement will cause the business community to increase their demand for loanable funds, international capital flow in the form of finance increases money supply because of increased income. Ongoing shifts in the demand and supply of loanable funds will not cause the interest rate to change. Under Free banking system, increases in the demand for loanable funds will not cause banks lending to increase because of the reason given earlier and also because the 'gap' for incentive in increasing borrowing has been consumed away by international capital flows. Under the BFH system, different commodities serve as a medium of exchange and therefore different commodity quantity will be borrowed at any moment in time. Under such as system, no bank could keep more of its note and deposit liabilities

in circulation and of its checkable equity accounts outstanding than the public was willing to hold. A temporarily over expanded bank would experience adverse clearing balances and the resulting transfer of both assets and liabilities to banks with which the public was more willing to do business [16].

3.2 Analysis of the 100 Percent Reserves, Free Banking System and BFH System as Well as the Monetary System in the Four Countries

We can then consider how each of the four countries will fair under these systems and their current monetary system.

3.2.1 Lithuania

For some reason not directly connected with trade-in goods and services, there is International capital flow because of relatively higher interest rate or better profit prospects, changes in taxation or other governmental policies in Lithuania. Perhaps the international community is seizing favourable opportunities to float new securities on the Lithuanian market. Starting with international transactions imbalance, the capital movement now means overall disequilibrium in an independently motivated transaction which will eventually come to equilibrium as explained earlier. Under 100 per cent reserve and free banking system, the disequilibrium between demand and supply may not even occur or even if it occurs, it will happen for a very short time. This is because banks tend to quickly absorb any such inflow as soon as possible. Lithuania has in place the currency board and operates a hard peg currency system. That is Lithuania establishes a fixed exchange rate between its litas (national currency) and the dollar. Under such a system, the 'absorption' depressing cash balances effect occurs because of the resulting decline in the money supply available. There is an automatic tendency for saving and investment to be equal at just this right level of the money supply. They are made equal not so much by changes in the level of interest rate, but the explanation hinges on Keynes's 'fundamental psychological law' [16]. The 100 per cent reserve and free banking system seem appealing because the internal adjustment to an external disturbance of any given size can proceed more impersonally and slowly. Under the current monetary system, if revenue and capital flow are not enough to maintain a particular peg, then different peg will

have to be set. Government revenue and capital flow, therefore, become important in maintaining the peg because of constrained in government borrowing under the 100 per cent reserve and free banking system. Under the BFH system, these capital flows again come in not in the form of a single commodity, but different commodities. This presents us with the possibility of corrective arbitrage. Much of the arbitrage would no doubt involve the operation of the banks at their clearinghouses in terms of interest rate equilibrium and pegging stabilization. What this means under the current Lithuanian monetary system is that there will no risk of currency crises and a subsequent sharp recession. Again, there will not be a strong dependence of monetary policy because the BFH ignores base money - nothing comparable to gold or to government fiat money as we know today.

3.2.2 Kyrgyzstan

Kyrgyzstan is operating a dirty floating monetary system [22]. That is a system of floating exchange rate in which the government or the central bank occasionally intervene to change the direction of the value of the country's currency. In most instances, the intervention aspect of a dirty float system is meant to act as a buffer against an external economic shock before its effect become truly disruptive to the domestic economy [22]. Under 100 per cent reserve and free banking system, government domestic borrowing will be very limited. The government will, therefore, have to use up its internally generated funds and capital inflow to manage this floating system. How deep or bad the floating is will determine how long the government can hold unto such maintenance. For example, the government can manage a 15 per cent shift in floating than say a 50 per cent shift. Because of government constraint of domestic borrowing, the international capital flow will be used for such purpose. If the government uses much of her capital flow in a short period, it cannot continue to manage anymore. For Kyrgyzstan to continue operating a dirty floating exchange rate system under 100 per cent reserve and/or free banking system, the government should, therefore, more or less 'act' like a 'private individual' whereby she seeks ways of increasing her domestic revenue and attracting more capital flow.

Under the BHF system, the problem becomes less severe. Government revenue generation and International capital flow do not come in terms of one single commodity. The part of the floating to be managed by the government is

managed in terms of a different commodity. Managing the float in this case just equals to managing the value of the commodity basket used. Kyrgyzstan under the BFH system will have a lesser problem with dealing with their dirty floating system.

3.2.3 Latvia and Kazakhstan

Latvia pegs her currency to the euro and Kazakhstan pegs her currency to the dollar. In effect, both countries are operating a pegged or fixed exchange rate. The main idea is to stabilize the value of their currency against the currency it is pegged to. This makes trade and investment between the two countries easier and more predictable. A similar analysis from the above could be given in this sense but with a slight difference. While the government manages a percentage amount of the currency in the previous case, where the government manages 100 per cent of the currency. What this means is that once the government pegs the currency to either the euro or the dollar, it becomes their sole responsibility to keep the pegged value. Government revenues and International capital flow, therefore, become extremely important. If revenue and capital flow are not enough to maintain a particular peg, then a different peg will have to be set. Pegs will frequently change if revenue and capital flow are not enough and it would have been better off if both countries have not pegged. Of the two countries, under 100 per cent reserve and free banking system, Kazakhstan would have been able to manage it pegs quite well than Latvia because of revenue and capital inflow from the oil sector.

Under the BHF system, the problem becomes less severe. Government revenue generation and International capital flow do not come in terms of one single commodity. The pegs to the euro or dollar are done in terms of different commodity value. Maintaining the pegs becomes easier because the increasing commodity value easily makes up for the decreasing one. Once the peg is fixed, the effort will now have to be channelled towards maintaining the value of the fixed basket. Both Latvia and Kazakhstan can, therefore, maintain their peg.

4. CONCLUSION

This study sought to extend the capital-based macroeconomics theory to include international capital flow, 100 per cent reserve, the free banking system and BFH system and tested the

theory using real-world data. From the extension, it was realized that interest rate change may rarely occur. Inflows and outflows will cause an interest rate to be stable. We saw that the extension was quite successfully in all four countries. Under the BFH system, issues of bank crises and bank run could not occur. This is because the main driving force of bank crises (money) would be virtually non-existent. The theory implies that a BFH regime would solve all bank crises been experienced around the world. In the Free Banking system, there could hardly be a general banking crisis. If there would be, only inefficient banks would be forced out of business. This is because every bank has its autonomy to create its money supply. Customers could, therefore, read the signs of bank collapse earlier and exit the banks as early as possible. Early signs of banks collapse would be a continual depreciation and the bank's currency and unstable interest rate on the market. In a 100 per cent reserve requirement regime, there is no problem with bank crises. For countries around the world to prevent banking crises which could lead economic downturns, consideration of these theories should be looked at closely. But it must be stated that these theories would be difficult to apply in a real-world situation. The current economic system could be altered slightly to incorporate aspects of the theory which seem robust to financial crises. There is however some work in the realm of mathematical analysis which needs to be carried out before the application. Future research could consider how mathematics or numerical method could be applied to make real economic predictions about the theories.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Haldane A, Vasileios M. What is the contribution of the financial sector? 2011. Available:<https://voxeu.org/article/what-contribution-financial-sector>
2. Ross S. What percentage of the global economy is comprised of the financial services sector? 2018. Available:<https://www.investopedia.com/ask/answers/030515/what-percentage-global-economy-comprised-financial-services-sector.asp>
3. Haldane A. The contribution of the financial sector – miracle or mirage? Speech by Mr

- Andrew Haldane, Executive Director, Financial Stability, of the Bank of England, at the Future of Finance conference, London; 2010.
4. Statista – The portal for statistics; 2018. Available:<https://www.statista.com/>
 5. Bank of Ghana, Annual Statistics; 2018. Available:<https://www.bog.gov.gh/>
 6. Bank of Ghana, Financial Sector Overview; 2015.
 7. Republic of Latvia, Latvia Financial Sector update; 2018.
 8. Bank of Kazakhstan, Financial Sector Overview; 2018.
 9. De Soto JH. Money, bank credit and economic cycles, Ludwig Von Mises, 518 West Magnolia Avenue, Auburn, Alabama. 2006;63832-4528.
 10. Hayek FA. The sensory order: An inquiry into the foundations of theoretical psychology, The University of Chicago Press, Chicago, Illinois; 1958.
 11. Amadeo K, Causes of 2008 Global Financial Crises; 2018. Available:<https://www.thebalance.com/what-caused-2008-global-financial-crisis-3306176>
 12. Bank of Ghana, Banking Sector Report; 2018.
 13. Ajumogobia and Okeke Nigeria Banking and Finance Sector; Legal and Regulatory Overview; 2015.
 14. Congdon T. Money in the great recession: Did a crash in money growth cause the global slump? Edward Elgar Publishing; 2017.
 15. Cochran JP. Capital-based macroeconomics: Recent developments and extensions of Austrian business cycle theory. Quarterly Journal of Austrian Economics. 2001;4(3):17-25.
 16. Yeager LB. The fluttering veil: Essays on Monetary Disequilibrium, George Selgin (Ed.) Indianapolis: Liberty Fund; 1997.
 17. Rothbard M. The Mystery of banking, Ludwig von Mises Institute; 2018.
 18. Yeager LB. International monetary relations: Theory, history, and policy, Second Edition, New York: Harper and Row; 1976.
 19. Parkin M. What have we learned about price stability?, Bank of Canada; 2000
 20. Lewin P. Capital in disequilibrium: The role of capital in a changing world, London and New York: Routledge; 1999.
 21. Horwitz S. Microfoundations and macroeconomics: An Austrian perspective, London and New York: Routledge; 2000.
 22. Sekmen F, Madmarov N. Effect of exchange rate policy on GDP and GDP components: The Kyrgyz Republic Case, Theoretical and Applied Economics. 2018; 0(614):137-166.

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