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January 2018

Online at <https://mpra.ub.uni-muenchen.de/86634/>

MPRA Paper No. 86634, posted 12 May 2018 06:49 UTC

Measuring Financial Stability in Ghana: A New Index-Based Approach

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Abstract

We compute aggregate financial stability index (AFSI) for Ghana to gauge the performance of the financial system since the adoption of inflation targeting in 2017. The index is derived from four sub-indices, namely financial development index (FDI), financial soundness index (FSI), financial vulnerability index (FVI), and the world economic climate index (WECI). The trend in AFSI identifies three distinct developments in Ghana's financial system. These are (1) the period of financial strain following the global financial crisis (June 2007 – September 2010); (2) period of sustained improvement in financial stability (December 2010 – June 2015); and (3) a return to financial stress (September 2015 – December 2016). We observe that the risks to financial stability still persist as sub-indices especially FVI, FDI and FSI (in 2016) remain well below their respective levels in since 2012. Analysis of the sub-indices thus suggests that the risk factors to financial stability primarily emanates from the weakening domestic factors which could be linked to the uncertainties that surrounded the election in 2016. Our metric therefore provides a more powerful gauge of financial stability in Ghana and very relevant for monetary policymaking decision.

Keywords: Financial Stability, Soundness, Vulnerability, Ghana

JEL Codes: E0, E42, E51, E52, E58

I. Introduction

The successful development of economies across the globe is largely underpinned by the effective and stable performance of financial or credit institutions, mainly banks. Studies have found financial instability to have negative impact on economic performance (see, Creel, Hubert and Labondance, 2014). Consistently, various governments have long sought to regulate financial institutions, particularly commercial banks to ensure that they are safe, sound, and able to honour their obligations (Jacome and Nier, 2012). But the devastating effects of the recent global financial and economic crises have further intensified the attention on financial stability.

One cardinal lesson learnt, rather painfully, during the crisis was that traditional micro-prudential regulation was insufficient to guarantee the health and safety of the financial system as a whole. Micro-prudential policy, which aimed at ensuring that individual financial institutions were safe and sound, was inadequate to prevent risks of systemic importance – the sum of the parts was not necessarily equal to the whole. When the crisis struck, financial sector regulators were largely unprepared to tackle it head-on because they lacked the necessary tools to appreciate the enormity of the systemic crisis, much less the capacity to deal with its aftermath. However, massive monetary and fiscal stimulus implemented mostly by advanced countries, the epicentre of the crisis, prevented what could have probably been the worst depression in human history. This recognition led to a reconfiguration of the existing financial sector supervisory and regulatory architecture to accommodate a more systemic (macro-prudential) approach to financial regulation and give renewed impetus to financial stability issues.

With financial stability issues now firmly in focus, a rigorous search began for new indicators to measure the state of financial stability as well as provide early warning signals of looming risks in the financial system to enable authorities take timely and appropriate action. Although the International Monetary Fund (IMF) developed and stimulated the usefulness of the Financial Soundness Indicators (FSIs), following the Asian Financial Crises, to gauge the health and safety of the financial sector, they tend to measure the idiosyncratic characteristics without considering the spill-over effects from other sectors. In hindsight, however, we know that the global financial crisis cascaded through the economy, first from housing to the banking sector and other financial markets, and then finally into the real economy.

Consequently, any attempt at monitoring the state of stability of the financial system must necessarily involve observing not only financial sector specific data but also macroeconomic and market-based data, qualitative and structural information. In addition, it is not enough to focus on deviations from benchmarks in individual sectors for an overall assessment of financial stability. This realization has triggered a growing interest in constructing a single aggregate index to gauge the state of financial stability based on data from the external sector, monetary sector, balance of payments, capital market, foreign exchange market and the traditional FSIs (see Albuлесcu, 2008; Cheang and Choy, 2009; Morris, 2010; Jordan and Smith, 2014; and Sere-Ejembi et al., 2014).

The purpose of this study is to construct an aggregate indicator of financial stability using Ghanaian data. Developing a composite quantitative measure of financial system stability that could signal these conditions is subliminally appealing. As indicated in Box 1 at Appendix A,

the Bank of Ghana Act 612 (2002) also clearly mandated the central bank to promote effective and efficient operation of banking and credit systems in the country. Therefore, the construction of this index would enable policy makers and financial system participants to envisage the sources and causes of financial stress to the system; better monitor the degree of financial stability of the system; and also effectively communicate the impact of such conditions. Therefore, this paper contributes to the ongoing debates by providing further perspective on developing and frontier economies and hence serves as a benchmark for further research. To the best of our knowledge, this is the first paper to compute an aggregate index for financial stability in Ghana and hence offers critical policy implications for Bank of Ghana's objective of ensuring stability in the financial system.

The rest of the paper is organized as follows: Section II outlines the methodology and discusses the variables selection and data issues. The empirical results are presented in Section III with the concluding remarks contained in Section IV.

II. Literature Review

Financial stability, unlike price stability, is however difficult to define or measure given the interdependence and the intricate interactions among different elements within the financial system and with the real economy. This is further complicated by the time and cross-border dimensions of such interaction. Basically, a financial system can be characterised as stable in the absence of excessive volatility, stress and crises (Gadanecz and Jayaram, 2008). Although this narrow definition is relatively simple to formulate, it fails to capture the positive contributions of a well-functioning financial system to overall economic performance. Therefore, a broad definition is required that is more inclusive of the macro-economic dimension of financial stability and interaction between financial and real sector. In view of this, the European Central Bank (ECB, 2007) broadly defined financial stability as a condition in which the financial system, which comprises, financial intermediaries, markets and infrastructure, is capable of resisting shocks and unravelling potential financial imbalances, thereby dampening the prospects of disruption in the financial intermediation process. Similarly, Schinasi (2004) defined financial stability as a state in which the financial system is able to enhance economic processes, manage risks and survive shocks with minimal disruption.

Since the broader definition of financial stability is more abstract, most analysts tend to focus on the risks and vulnerabilities of the financial system as these are less cumbersome to comprehend and quantify. But, there are also complexities arising from the narrow definition insofar as crisis is equally difficult to define. This is because different countries have experienced different types of crises (such as currency crisis, banking crisis, equity crisis, debt crisis, etc) over time and there are several ways of defining a crisis of each type (see Frankel and Rose, 1996; Patel and Sarkar, 1998).

Several techniques are employed to assess financial stability and each has its advantages, disadvantages and limitations. However, in recent years, policymaker and academic researchers have concentrated on various statistical indicators that epitomised and described vulnerability of financial system to appraise financial stability. Among the commonly used quantitative methods for financial stability assessment are early warning systems, macro-stress testing, and financial stability indices. It is however essential to note that the approaches to the development

of these measures has changed over time as the locus of concerns moved from micro-prudential to macro-prudential dimension of financial stability.

The early warning systems are constructed from potential leading indicators to predict the probability of a financial crisis. A number of studies have applied the early warning indicators methods initially developed in the literature for currency and balance of payment crises to banking crises. These include, among others, Calvo, Leiderman and Reinhart (1993), Eichengreen, Rose and Wyplosz (1996), Turner and Goldstein (1996), Frankel and Rose (1996), Demirguc-Kunt and Detragiache (1997) Kaminski and Reinhart (1999), Borio and Lowe (2002), Bussiere and Fratzscher (2008), Borio and Drehman (2009), and, Alessi and Detken (2009). They use a discrete representation of the dependent variable and the signalling approach to evaluate indicators by minimizing either their noise-to-signal ratio or some type of loss function. It is however argued that the early warning systems should be used a starting point or a complementary instrument. This should be followed by a more thorough financial stability analyses in order to identify all the vulnerabilities the financial system is exposed to and also attain information relating economy's risk absorption capacity (see, Jakubik and Slacik, 2013).

In contrast, stress testing, which can estimate financial system resistance to adverse macroeconomic scenarios, proffers more accurate analysis. As documented in a number of research works (including, Cihak, 2007; Schmeider, Pühr and Hasan, 2011; Buncic and Melcky, 2012; Jakubik and Sutton, 2012) stress tests can identify the source of risks and vulnerabilities of the investigated banking sector or the overall financial sector.

Another strand of research, including those from the central banks, has developed aggregate financial indicators intended to encompass a broader definition of financial stability. This represents another quantitative method for measuring the stability of the financial system. The set of Financial Soundness Indicators developed by the IMF (IMF 2006) are examples of such indicators. These are used by Hawkins and Klau (2000), Nelson and Perli (2005) and Gray, Merton and Bodie (2007) to monitor market pressure, external and banking system vulnerabilities. Similarly, country-specific financial stability indexes have also been constructed. These include Koong, Law and Ibrahim (2017) for Malaysia; Arzamasov and Penikas (2014) for Israel; Sere-Ejembi et al (2014) for Nigeria; Jakubik and Slacik (2013) for nine selected countries in emerging Europe¹; Albuлесcu (2013) and Islami et al (2013) for euro area; Sales, Areosa and Areosa (2012) for Brazil; Brave and Butters (2011) for the United States; Albuлесcu (2010) for Romania; Morales and Estrada (2010) for Colombia; and, Illing and Lui (2003) for Canada. Loloh (2015) however constructed an aggregated financial soundness indicator for Ghana, while Kocisova (2014) constructed an aggregated banking system stability index for ten selected countries that joined the European Union in 2004², focusing primarily on the financial soundness indicators.³

¹ These include Czech Republic, Hungary, Poland, Slovak Republic, Bulgaria, Croatia, Romania, Russia and Ukraine.

² These include Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovak Republic and Slovenia.

³ However, studies (including Nelson et al 2005; ECB (2005); and Van den End, 2006) argue for inclusion of market information in addition to balance sheet-based information, because of the interactions between bank and non-bank financial intermediation.

Particularly, Illing et al (2003) provide a good description of how one might attempt to build a composite financial stability index. They emphasise the choice of relevant variables which must reflect the structure of the country's financial system. They further intimated that selection should often be based on the literature on the early warning system and usually covering the banking system, the foreign exchange market and the equity market. Then, the single aggregate measure is calculated as a weighted average of the selected variables (see also, Van den End 2006).

The growing interest of central banks in monitoring and analysing risks and threats to the financial stability has culminated in the publication of financial stability reports (FSRs). Studies including Gadanecz et al. (2008), Oosterloo, De Haan and Jong-A-Pin (2007) and Cihak (2006) provide comprehensive surveys of the available FSRs and the underlying indicators. Particularly, Oosterloo, et al (2007) outlines three main incentives for publication of FSRs. They argued that FSR publications (1) increase the transparency of authorities responsible for financial stability; (2) contribute to financial stability and (3) strengthen cooperation between the various stakeholders involved in maintaining financial stability. In generally, most analyses of financial stability as reflected in the financial stability reports (FSRs) focus on various market segments. Essentially, the focus depends on the specific conditions in the economy and areas of observed and perceived vulnerabilities (Gadanecz et al. 2008). Indeed, while many emerging market economies broadly concentration on capital inflows, balance of payment situation and exchange rate movements, industrial economies however focus on their banks' exposure to emerging markets. Also, banking ratios are widely analysed in most reports, though there are variations. However, the use of composite indicators is not very common in published FSRs. But, there are several common areas when it comes to specific variables used in the FSRs.

In addition, financial stability Map has been developed to assess the risks and conditions that affect financial stability. The Map is intended to complement and build upon existing practices as well as on the IMF's broader surveillance and financial stability initiatives (see April 2007 Global FSR). According to Dattels, McCaughrin, Miyajima and Puig (2010), the Map intends to capture a diverse range of potential sources of instability, contagion among different segments of financial markets and non-linear interactions among the underlying factors. There are four risks and two conditions included in the Map. The four risks include macroeconomic risks, emerging market risks, credit risks, market risks, while the two conditions include monetary and financial conditions, and Risk appetite (for details see Dattels et al, 2010).

The enormity of interest of financial stability issues is exemplified by the regular report of the Global Competitiveness Index (GCI), prepared by the World Economic Forum. The GCI, which ranks economies using 12 pillars, also has parameter that assesses the soundness of banks using opinion polls where respondents evaluated the stability of the banking sector in their country.

It is however clearly evident from the above deliberations that the assessment of the condition of and the quantification of financial stability index is largely focused on European and North American countries. Less attention is given to financial stability issues in Africa as fewer

researches have focused on the region (for instance Sere-Ejembi et al, 2014; Loloh, 2015). Besides, the survey of the literature suggests no aggregated financial stability index has been developed for Ghana despite the increasing pace of financial and trade globalisation. The only notable research is Loloh (2015) which developed aggregated financial soundness index for Ghana, focusing mainly on the financial soundness indicators. Consequently, the paper constructs an aggregate financial stability index for Ghana using carefully selected macroeconomic variables (both external and internal) and bank-balance sheet data (including financial soundness indicators). This paper thus contributes to debate on financial stability as pertains to frontier African economy.

III. Methodology, Variables used and data

A. Methodology and Data Issues

The study adapts the methodology⁴ of Cheang and Choy (2009) to construct a quarterly aggregate financial stability indicator (AFSI) for Ghana using the traditional FSIs as well as peculiar indicators from the external sector, monetary and financial sector, balance of payments, foreign exchange and the capital markets. In this regard, we first compute four sub-indices, namely, Financial Development Index (FDI), Financial Soundness Index (FSI), Financial Vulnerability Index (FVI), and the World Economic Climate Index (WECDI). These are then consolidated into an aggregate index (AFSI). All the variables in this study are normalized using z-score to ensure that the overall index is not dominated by any individual variable. The Z-Score, which has zero mean and one standard deviation (i.e. $Z \sim n [0,1]$) is given by:

$$Z_t = \frac{(X_t - \mu_X)}{\sigma_X}, \quad (1)$$

where Z_t represents the normalized value of the variable of interest; X_t denotes the value of the variable of interest at time t ; μ_X and σ_X represent the arithmetic mean and standard deviation of X respectively.

The normalization is followed by the construction of weights for the selected variables. In the empirical literature, weights for the index are often computed using either uniform weighting or principal component method. However, the index based on uniform averaging is likely to be influenced or swayed by the most dominant variable. Therefore, we further compute the weights for the selected variables (as well as the sub-indices) using principal component (PC) method, in line with the approach of Arzamasov and Penikas (2014). The PC method uses the following constraint on the variables' weight

$$\vec{z}_j^k \vec{z}_j = 1 \quad (1)$$

Where \vec{z}_j is vector of the initial factors' weights in the j -th principal component (generally speaking, of different sign). To ensure that weight generated from the PC methods are all positive, this paper takes an arithmetic mean of all the principal factors generated from the PC methods as follows

⁴ In the literature, this approach is generally referred to as statistical normalisation. Another commonly used methodology is the so-called empirical normalisation which converts all indicators to identical range of [0,1].

$$z_{ij} = \frac{\sum_{i=1}^k c_{ij}}{k} \quad (2)$$

where k is total number of principal factors, i is a factor index number and j is the selected variable or sub-index. This is then normalised to one as follows:

$$\widetilde{z}_{ij} = \frac{z_{ij}}{\sum_{j=1}^n z_{ij}} \quad (3)$$

where n represents the total number of variables or sub-indices involved in the PC method. Therefore, we computed a consolidated index for each of the four sub-indices using equation (4):

$$I_{tj} = \sum_{j=1}^n \rho_j * Z_{tj}, \quad (4)$$

Where $\rho_j = \frac{1/n + \widetilde{z}_{ij}}{2}$ represent the mean of the weights computed from uniform and PC weighting methods.

We introduced additional transformation to ensure that the selected indicators have the same directional impact on the aggregate index⁵. In this paper, therefore, an increase in a given sub-index points to an improvement in financial stability, while a fall indicates deterioration in financial stability.

The last step involves the aggregation of the four sub-indices in equation (4) into the single aggregate financial stability indicator (AFSI)⁶, as follows:

$$AFSI_t = \phi_{FDI} \sum_{j=1}^n I_{tj,FDI} + \phi_{FSI} \sum_{j=1}^n I_{tj,FSI} + \phi_{FVI} \sum_{j=1}^n I_{tj,FVI} + \phi_{WECI} \sum_{j=1}^n I_{tj,WECI}, \quad (5)$$

where $AFSI_t$ represents the consolidated AFSI and ϕ_i denotes weights, derived as an arithmetic mean of the uniform and PC weighting methods.

The AFSI has the same characteristics as its sub-indices, namely, it has a mean of zero and standard deviation of one. Positive readings of AFSI indicate a healthy financial sector, while a negative AFSI connotes deterioration in the health of the financial system.

B. Selection of Variables

The variables included in the AFSI are carefully selected based on the condition that developments in those variables have potential implications for financial stability. In this paper,

⁵ The transformation is done by multiplying such indicator variables by minus one (-1).

⁶ The weights are as follows: FDI, 5%; FSI, 50%; FVI, 30%, and WECEI, 15%. These weights are based on expert judgements and weights commonly used in the literature (see Cheang et al, 2009).

twenty two (22)⁷ variables are included in the computation of AFSI and Table 1 presents all the variables under each sub-index.

Table 1: Key Variables under each Sub-index

Sub-indices	Indicators	Impact
Financial Development Index	Total Credit/GDP	+
	Market Capitalization/GDP	+
	Herfindah-Hirschmann Index (HHI)	-
	Interest Spread	-
Financial Soundness Index	Ratio of NPLs to Total Loans	-
	Capital adequacy ratio	+
	Ratio of NPL net of Provisions to capital	-
	Ratio of Liquid Assets to total assets	+
	Customer Deposits to Total (noninterbank) Loans	+
	Cost to Income Ratio	-
	Return on Assets (ROA)	+
	Interest margin-to-gross income ratio	+
	Noninterest expenses to gross income	-
	Financial Vulnerability Index	Inflation rate (CPI, Y-o-Y)
Ratio of Net Foreign Assets to Net Domestic Assets		+
Composite Index of Economic Activity (CIEA)		+
General Budget Balance (% GDP)		+
Current account balance (% GDP)		+
Ratio of foreign currency assets to foreign currency liabilities		+
Ratio of external assets to total assets		-
World Economic Climate Index	Economic growth in G-20	+
	Inflation in G-20	-

C. Data Issues

Data for the construction of the AFSI was obtained from two main sources. The domestic dataset was sourced from the Bank of Ghana, while the external dataset was obtained from US Federal Reserves' Database (FRED DATA). We used quarterly data spanning 2007:q1 to 2016:q4. The starting period for the study was largely informed by the absence of comprehensive and reliable quarterly data on FSIs for the period preceding 2007.

IV. Empirical Results

A. Computed Aggregate Financial Stability Index (AFSI)

Figure 1 shows our computed AFSI for Ghana based on Equation (8) using quarterly data spanning the period March 2007 to December 2016, while Figure 2 illustrates the contribution from the sub-components. In this paper, positive AFSI reflects improved financial stability, while negative AFSI connotes deteriorating financial stability. The trend in AFSI evidently identifies three distinct developments in Ghana's banking sector as external and domestic

⁷ For instance, Albulescu (2008) used 18 variables; Morris (2011), 19 variables; Cheang and Choy (2009), 19 variables; and Sere-ejembi et al. (2014), 18 variables.

developments took their toll. These are (1) the period of financial strain following the global financial crisis (June 2007 – September 2010); (2) period of sustained improvement in financial stability (December 2010 – June 2015); and (3) a return to financial stress (September 2015 – December 2016).

Figure 1: Aggregate Financial Stability Index (AFSI)

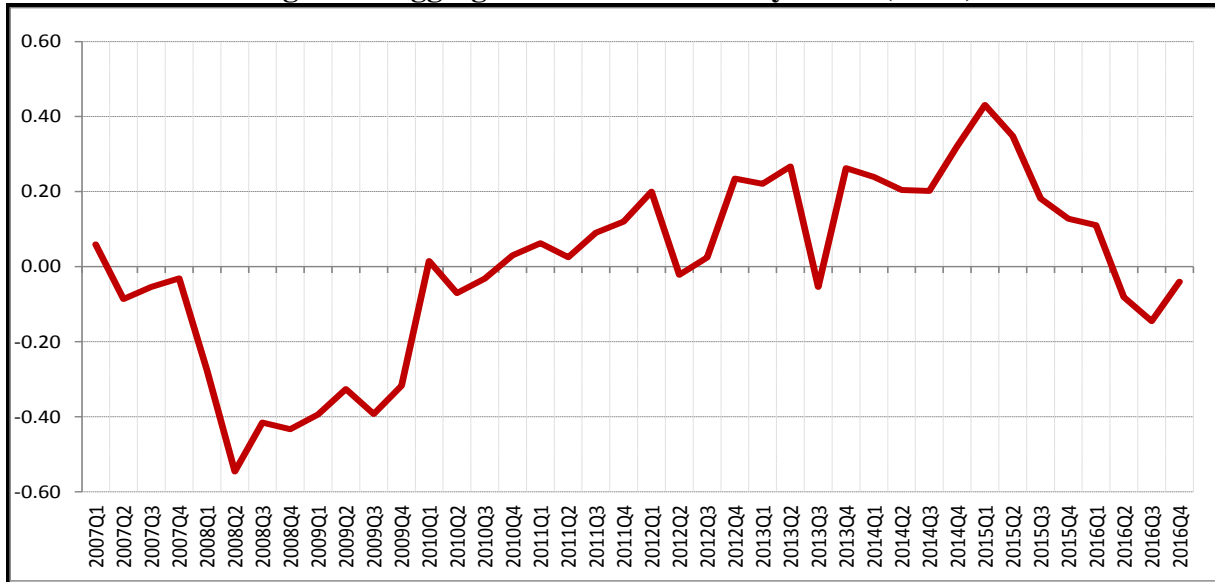
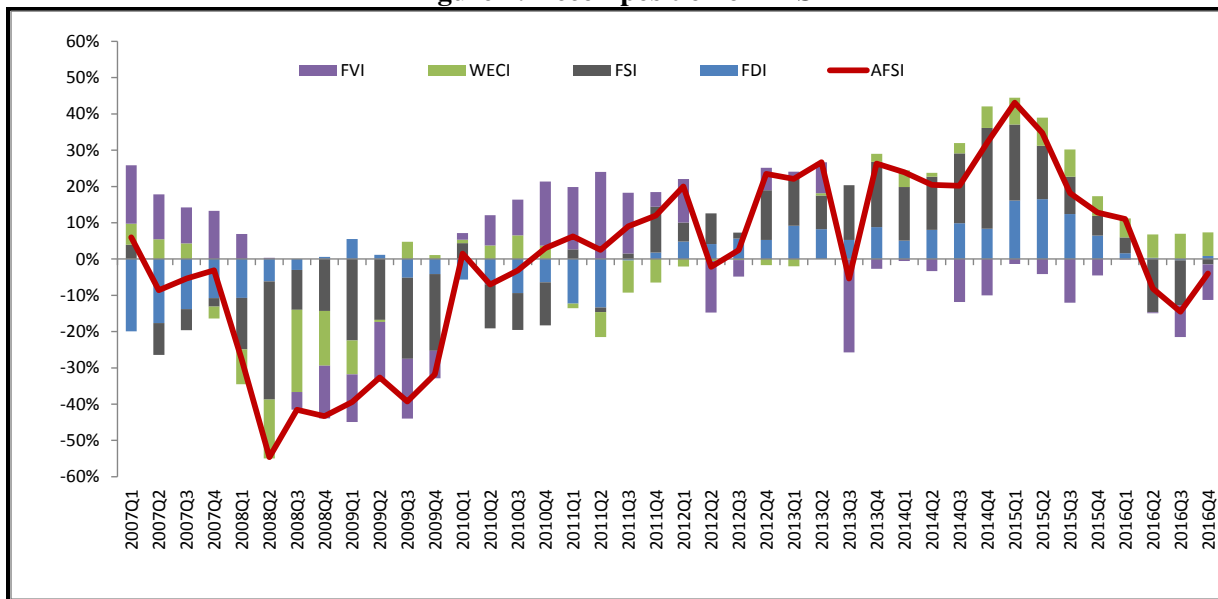


Figure 2: Decomposition of AFSI



The period between June 2007 and September 2010 was mainly characterized by considerable strain in banking sector stability, underpinned by deterioration in all four sub-indices of FDI, FSI, FVI and WEIC. In particular, as shown in figure 3A, the WEIC declined sharply within this period as the world economy went through the worst recession since the Great Depression in the 1930s. The impact of the crisis cascaded through Ghana’s economy evidenced by declines in FVI (see Figure 3B). This originated mainly from deteriorating terms of trade as demand for the country’s main export commodities fell dramatically. Rising unemployment in

advanced countries also meant lower remittances flow. This coupled with tighter external financing conditions generally brought the local currency under intense pressure during the last quarter of 2008 through to the first half of 2009. These unfavourable developments in the external sector adversely affected the real sector of the economy, resulting in growth decelerating from 8.4% in 2008 to 4% in 2009 (see Figure 3D).

Similarly, the FSI declined as the deterioration in the real economy affected the balance sheets of nonfinancial corporations and households, making it difficult for them to repay loans contracted from the banking sector, resulting in substantial impairment of banks' asset quality (see Figure 3C). For instance, non-performing loans (NPLs) as a percent of gross loans rose from 6.9% in December 2007 to 16.9% in December 2009 and further to 17.6% in December 2010. This resulted in the establishment of special loan recovery trust in 2010 to help clean up the loan books of banks. In addition, the FDI also trended downward on the back of tighter credit conditions, rising concentration within the banking sector and a bearish stock market fundamentals (See Figure 3D), emanating from wary foreign investors who begun to liquidate their shares.

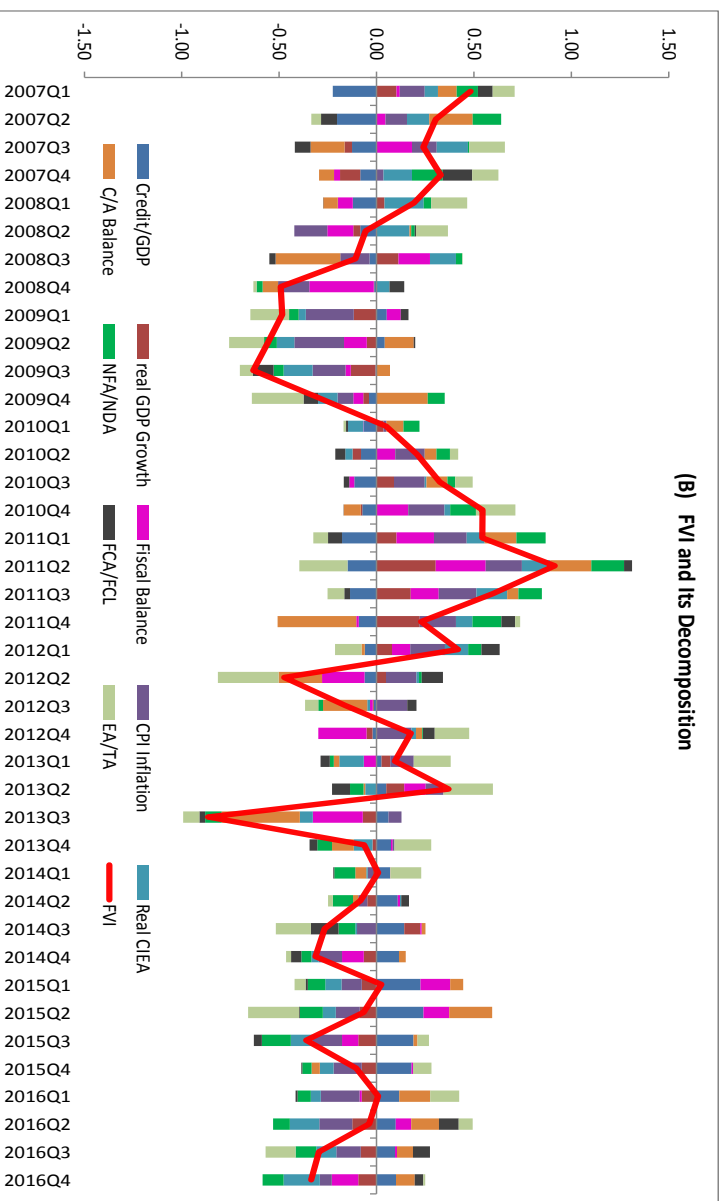
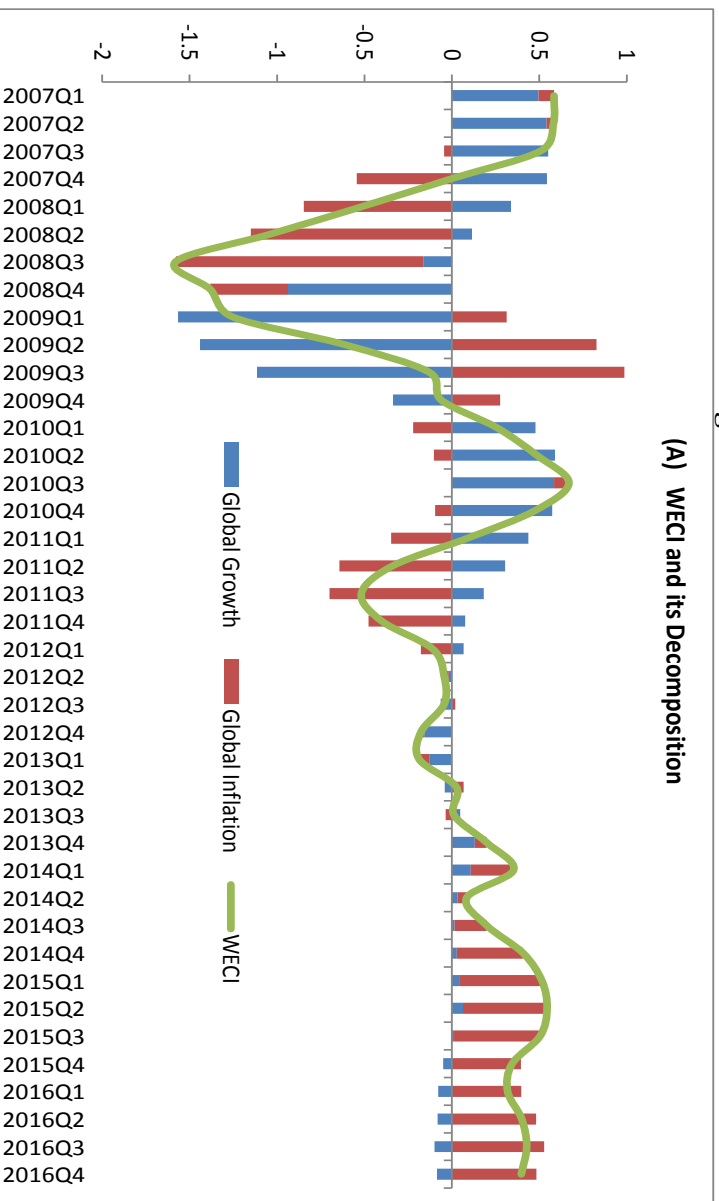
However, the WECEI began to improve by the third quarter of 2009 (see Figure 3A) as the global economy started to emerge from the ensuing crisis on the back of significant fiscal and monetary stimulus packages administered mainly by advanced countries. Improvement in global demand positively impacted the country's terms of trade and funding conditions as commodity prices recovered from their slump and investors looked for higher yields in emerging and developing countries. Meanwhile, the real sector of the domestic economy began to improve as the country started producing oil on commercial quantities in the last quarter of 2010 with growth leaping, on year-on-year basis, to 15% in 2011 from 4% recorded in 2009 and 7.9% in 2010 (see Figure 3D). As a result of these developments, the FVI rose above the zero threshold, contributing positively to the improvement in financial stability.

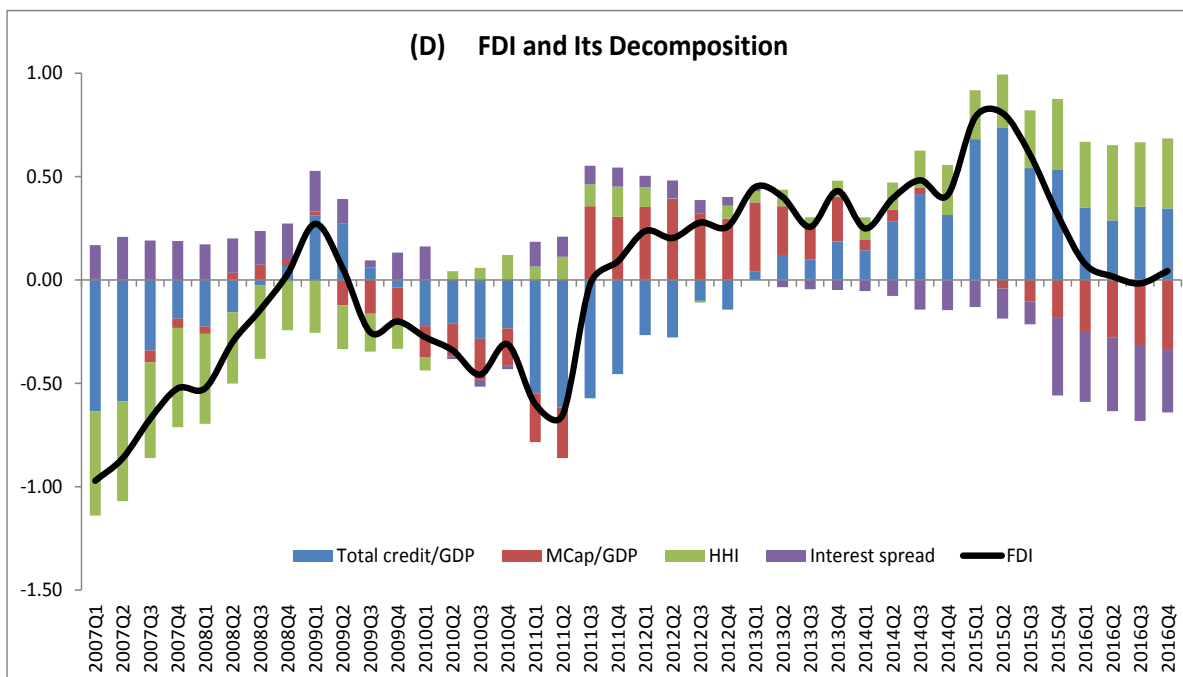
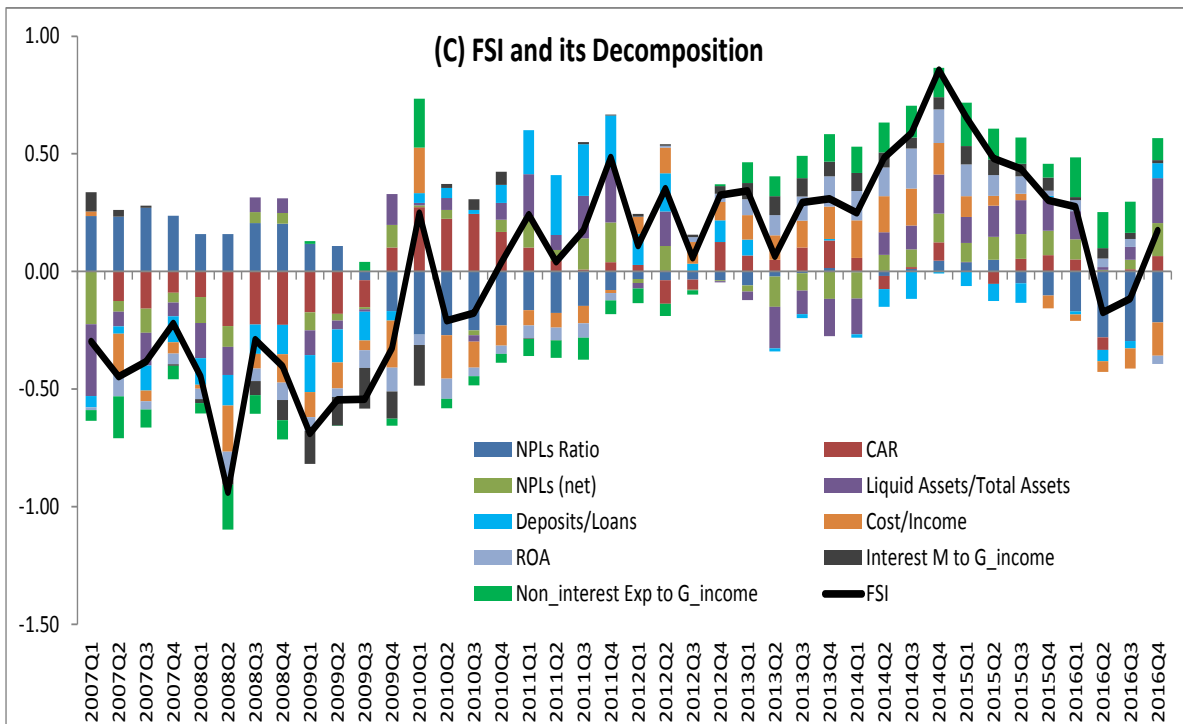
The listing of Tullow Oil on the Ghana Stock Exchange in 2011 was a significant boost to the development of the financial sector, as it resulted in the doubling of market capitalization and hence reflected in an improvement in the FDI. The monetary authorities also initiated the process of recapitalizing the banking sector in 2007 with the banks required to raise their minimum capital from GH¢7 million to GH¢60 million by the end of 2012⁸. The recapitalization by the banks resulted in improvement in the industry's capital adequacy ratio and liquidity conditions, culminating in marked improvement in the soundness of the banking sector (FSI). These developments led to the general improvement in financial stability between 2010 and 2014 albeit lingering threat from macroeconomic vulnerability⁹, as captured by the negative readings of the FVI for most part of the period. However, the significant downward spikes in AFSI observed in the second quarter of 2012 as well as the third quarter of 2013 were largely driven by sharp deterioration in FVI which surpassed the relative improvements in the other sub-indices. This was mainly on account of worsening current account and fiscal deficits, decline in foreign asset holdings as well as rising interest rate spreads.

⁸ At the time, this was equivalent of raising the minimum capital from US\$7 million to US\$60 million

⁹ The threat to financial stability within this period was the vulnerability in the macroeconomy captured by the FVI

Figure 3: Sub-indices of the AFSI





Beginning September 2015, risks to financial stability heightened as sovereign debt and currency crises mainly in Europe as well as the prolonged domestic energy crisis resulted in heighten macroeconomic vulnerability (see Figure 3A-D). These developments culminated in a slowdown in economic activities, as GDP growth moderated to 3.5% in 2016 from 3.9% and 6.7% for 2015 and 2014 respectively. This further engendered sharp deterioration in FSI, FDI and FVI especially during the first three quarters of 2016, underpinned largely by rising NPLs (on account of energy sector debt), subdued inflows, rising interest rate spread, slowdown in

credit as well as bearish stock market fundamentals. Efforts at resolving the energy sector crisis led to significant buildup of debt, which threatened to disrupt the stability of the banking sector¹⁰. Though the AFSI remained within unfavorable territory in 2016 due to subdued global and domestic growth, its upward trajectory during the last quarter of 2016 suggests improving state of financial stability.

B. Risks to Financial Stability

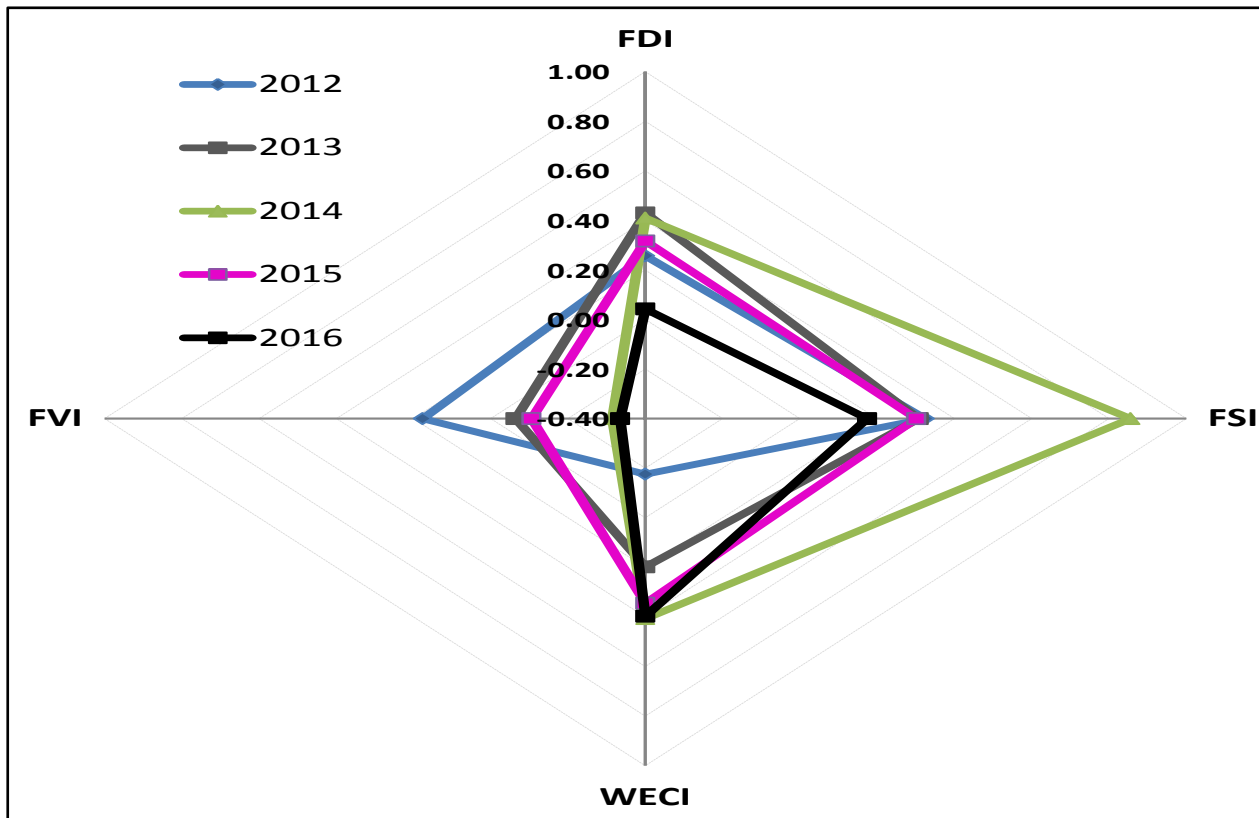
It is generally apparent that the recent global financial crisis in 2007-2008 had considerable toll on AFSI, reflecting on all the sub-indices, although the magnitude of impact varied. Further analysis of sub-indices in Figure 3A-D shows a recent dip in the financial development index (FDI) which reflects mainly the poor performance on the stock market and the widening interest rate spread of the banking sector. The banking sector's soundness as measured by the financial soundness indicators (FSI) has witnessed some marginal improvement in recent times as efforts to resolve Ghana's energy sector legacy debts begin to kick in and reflect in the loan books of banks. The trajectory of financial vulnerability index (FVI) also suggests that the banking sector has remained highly susceptible to the developments in the broader macroeconomy since the beginning of 2013 as the country's energy crisis heightened and weighed heavily on the economy. The trend in world economic climate index (WECI) also exemplified a global economy that seemed to have recovered much of its lost steam following the currency and sovereign debt crises which characterized much of 2014 and 2015.

We also assess looming risks to financial stability by developing a financial stability map that illustrates the relative positions of the risk factors (namely, WECI, FVI, FSI and FDI) to financial stability between 2013 and 2016. Analysis of the financial stability map (in Figure 4) clearly demonstrates that three of the four sub-indices of the AFSI (namely FDI, FSI, and FVI) deteriorated in December 2016 compared to performance in the preceding four years (2012-2015). In contrast, WECI has improved remarkably in December 2016, exceeding the levels in the corresponding periods in 2012, 2013 and 2015 but largely comparable to the level recorded in December 2014. In addition, trend in the FVI has remained unchanged in December 2016 compared to December 2014 positions, suggesting risks to financial stability from the macroeconomic environment have not changed much over last two years.

Our findings suggest that the global economy seemed to have recovered much of its lost steam following the currency and sovereign debt crises which characterized much of 2014 and 2015. In contrast, considerable domestic risk factors to financial stability remain prevalent. It is therefore critical that the recent improvements in the financial stability is sustained, going forward. In particular, there is the need to maintain the recent stability in the domestic currency, hasten the ongoing discussion to recapitalize the banks, as well as leveraging on the ongoing improvement in global economy to boost domestic economic activities in order to enhance the state of financial stability in Ghana. Nevertheless, this would warrant a concerted effort from the managers of the economy to strategically enact policies that would attract more non-debt relative inflows (such as foreign direct investment) to help strengthen the domestic economy.

¹⁰ Arrangement has been reached among stakeholders to settle the energy sector debts owed to the banks with introduction of the energy sector levy account (ESLA) which is special petroleum tax implemented at the beginning of 2016

Figure 4: Financial Stability Map for Ghana



Source: Author's own construct.

V. Concluding Remarks

This study constructs a quarterly aggregate financial stability indicator (AFSI) for Ghana since official adoption of inflation targeting monetary policy framework in 2017. We compute AFSI as a weighted average of the composite indicators of financial development, financial soundness, financial vulnerability, and the world economic climate. The corresponding weights assigned to the sub-indices of AFSI were derived as an arithmetic mean of weights based on both uniform and principal component methods.

Our empirical results generally show that the recent global financial crisis in 2007-2008 indeed had considerable toll on AFSI, reflecting on all the sub-indices, although the magnitude of impact varied. Analysis of sub-indices also shows a recent dip in the financial development index (FDI) which reflects mainly the poor performance on the stock market and the widening interest rate spread of the banking sector. The banking sector's soundness as measured by the financial soundness indicators (FSI) has witnessed some marginal improvement in recent times as efforts to resolve Ghana's energy sector legacy debts begin to kick in and reflect in the loan books of banks. The trajectory of financial vulnerability index (FVI) also suggests that the banking sector has remained highly susceptible to the developments in the broader macroeconomy since the beginning of 2013 as the country's energy crisis heightened and weighed heavily on the economy. The trend in world economic climate index (WEICI) however suggests that the global economy seemed to have recovered much of its lost steam following the currency and sovereign debt crises which characterized much of 2014 and 2015.

Overall, our AFSI depicts pretty well the developments in the banking sector over the study period and hence provides a more powerful and faster tool in gauging the stability of the banking sector in Ghana. Our index showed a lingering strain in the financial system as at end-December 2016, although its direction suggests some pickup. We observe that the risks to financial stability still persist as the recent trends in sub-indices especially FVI, FDI and FSI in 2016 remains below the respective levels in since 2012.

It is therefore critical that the recent improvements in the financial stability is sustained, going forward. In particular, there is the need to maintain the recent stability in the domestic currency while hastening the ongoing discussion to recapitalize the banks. This together with a deliberate policy effort aimed at leveraging on the ongoing improvement in global economy would help boost domestic economic activities and enhance the state of financial stability in Ghana. Particularly, the managers of the economy should strategically enact policies that would attract more non-debt relative inflows (such as foreign direct investment) to help strengthen the domestic economy, and hence, inure financial stability.

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Appendix A:

Box 1: Bank of Ghana Act, 2002 (Act 612)

Objects of the Central Bank

3. (1) the primary objective of Bank of Ghana is to maintain stability in the general level of prices
- (2) Without prejudice to subsection (1) the Bank shall support the general economic policy of Government and **promote economic growth and effective and efficient operation of banking and credit systems in the country**, independent of instructions from the Government or any other authority.

Function of the Central Bank

4. (1) **The Bank shall for the purposes of section 3 perform the following functions:**

- 1 Formulate and implement monetary policy aimed at achieving the price stability and creating an enabling environment for sustainable economic growth.
- 2 Promote by monetary measures, the stabilization of the value of the currency within and outside Ghana.
- 3 Institute measures which are likely to have a favourable effect on the Balance of Payments.
- 4 Regulate, supervise and direct the banking and credit system and ensure the smooth operation of the financial sector.
- 5 Promote, regulate and supervise payment and settlement systems.
- 6 Issue and redeem the currency notes and coins.
- 7 Ensure effective maintenance and management of Gross external reserves of banks.
- 8 License, regulate, promote and supervise non-bank financial institutions.
- 9 Act as banker and financial adviser to the Government.
- 10 Promote and maintain relations with international banking and financial institutions.