Journal of Sustainable Development in Africa (Volume 17, No.5, 2015)

ISSN: 1520-5509

Clarion University of Pennsylvania, Clarion, Pennsylvania

THE OHLSON VALUATION MODEL: EVIDENCE FROM NIGERIA'S POST-CONSOLIDATION BANKING INDUSTRY

Olusegun Felix Ayadi, Ph.D. (corresponding author)

Jesse H. Jones School of Business, Texas Southern University, Houston, Texas, USA

Ade Thompson Ojo, Ph.D.

School of Business, College of Development Studies, Covenant University. Ota, Ogun State, Nigeria

ABSTRACT

This paper explores the application of a valuation approach that focuses on book values and earnings as two key accounting determinants of stock prices as proposed by Ohlson (1995). This is important to determine the extent of sophistication of the Nigerian Stock Exchange (NSE) after the banking consolidation exercise that began in 2004. The consolidation exercise led to a sharp increase in activities on the stock exchange that is critical to banking sustainability. On the other hand, banking sector sustainability is critical to economic development. The research employs Pedroni panel cointegration method to test the existence of a long-run equilibrium relationship between the stock price and accounting data represented by book value and earnings of quoted banks in Nigeria. The results indicate that there is no long-run equilibrium relationship between stock prices and book value plus earnings of banks listed on the Nigerian Stock Exchange during the post-banking consolidation period. The implication of the results reported in this paper is for the Central Bank of Nigeria and the Nigerian Securities and Exchange Commission to pursue transparency in information reporting by firms listed on the Exchange. Another practical implication of the results is that the intense competition among Nigerian banks is a possible explanation for the results.

Keywords: Bank Consolidation, Ohlson Model, Information Dynamics, Valuation Model, Banking Sustainability, Nigeria

122

INTRODUCTION

A critical component of finance theory is the evaluation of assets with much precision (Gordon, 1959; Mayer, 1988; Damodaran, 1999; Bodie and Merton, 2002). An evaluation of the market value of a firm is significantly critical for investors, financial institutions, management as well as researchers. Cupertino and Lustosa (2004) and Kusakci (2009) argue that financial decisions are made in order to maximize economic value of assets and that the ability to place a number on asset value with precision is critical. Moreover, personal and business decisions involve a selection of alternatives that maximize value. According to Kamath (1980), a banking firm's value depends on several variables including beta, volume of trading, growth in earnings, payout ratio and capital adequacy. Miller and Modigliani (1961) on their part, suggest that expected dividends, growth rate in expected dividends as well as a proxy for risk are the determinants of security prices under assumptions of perfect capital market and rational behavior.

Al-Hares *et al.* (2011) argue that the purpose of a valuation model is to assess the relevance of accounting information for different users of financial statements. According to the authors, financial statements are the most significant sources of information for decision making by investors. Dahmash and Qabajeh (2012) also note that the objective of value relevance research is to deduce the measure of firm value from financial statements data and to evaluate the relation between such data to the determination of value. In an earlier research, Kothari (2001) argues that value relevance literature focuses on the strength of accounting data in explaining the differences in stock prices in financial markets. Several researchers, such as Ball and Brown (1968) and Fama and French (1992) report results that validate the relevance of accounting information in valuation. More specifically, researchers have referred to research in this area as market-based accounting research (MBAR) citing the works of Ou and Penman (1989), Ohlson (1995, 2001), Felthan and Ohlson (1995) and others.

The financial economics literature is replete with different methods for measuring the value of a firm. The thesis of the Ohlson model is a measure of performance which provides a link between accounting numbers and market value. In their notable work, Ball and Brown (1968) report results which indicate that stock prices react to accounting earnings announcements. Valdes and Vazquez (2010) argue that accounting data represent relevant information for investors in making decisions. Ou and Penman (1989) also emphasize the importance of accounting data in firm valuation. Easton *et al.* (1992) and Easton (1999) report results suggesting that over the long-term, earnings account for over sixty percent of the variation in stock returns. Finally, Dechow (1994) concludes that accruals are more closely related to stock prices than cash flows.

The Ohlson model states the true value of equity as a function of its book value and excess equity returns that a firm is capable of generating in the future. Kusakci (2009) notes that the Ohlson model is based on the clean surplus relation (CSR) as well as the discounted dividends model (DDM). The clean surplus relation establishes a relationship between the book value of a firm's current year and the previous year's equity. More specifically, the CSR defines the current year book value of equity as a function of the previous year's book value of equity, the current earnings as well as dividends for the current period. The Ohlson's residual income model has gained some level of acceptability in empirical studies to the extent that Frankel and Lee (1998), Hand and Landsman (1999) and Dechow *et al.* (1999) conclude that the model explains 70 percent to 80 percent of variation in prices across stocks. On their part, Lundholm and O'Keefe (2001) present results that show the equivalency of the discounted cashflow model and the residual income model. They conclude that accounting information is

relevant in valuation. It should also be noted that an interesting property of the residual income valuation model is that it is not affected by accounting choices (Ota, 2002; Lundholm, 1995 and Palepu *et al.*, 1996). Therefore, accounting methods, rules, policies do not affect the application of the residual income valuation model.

The banking consolidation exercise which began in Nigeria in 2004 resulted in several drastic changes in the banking sector as well as an increase in stock market activity (Abdullahi, 2007; Somoye, 2008; Barros and Caporale, 2012; Ojo and Ayadi, 2014). The consolidation exercise magnified the role of the banking sector in Nigeria's economic development. According to the Global Alliance for Banking on Values (2012), sustainable banking's focus on customer lending and deposit taking is directly relevant to public policymakers as well as regulators and consequently, to the general economy. The increased activity in the stock market attracted many more investors into the market with potential implications on competition and value of information. Valdes and Vazquez (2010) argue that to understand the functioning of financial markets in emerging markets, it is critical to explore the extent to which financial statements provide the most available data on publicly-traded firms. The objective of this paper is to follow a valuation approach that focuses on book values and earnings as two key accounting information determinants of stock prices as proposed by Ohlson. This is necessary, given that Bryan and Tiras (2007) submit that the unspecified nature of other information in the Ohlson model precludes any direct empirical validation of the model. This study contributes to existing financial economics literature by providing additional evidence on the existence of other information in equity valuation in an African securities market. This is achieved by applying the Ohlson model to a post consolidation evaluation of Nigerian banking firms by assessing the existence or otherwise of a cointegrating relationship among book values, earnings and stock prices. Kusakci (2009) argues that the Ohlson model represents an applicable way to measure a firm's performance while building a descriptive relation between book value and market value which helps in the estimation of expected residual income based on current data.

BANKING SECTOR CONSOLIDATION IN NIGERIA

The banking sector as a part of the financial system plays a significant role in stimulating the economy through its core financial intermediation function (Ojo, 2010). As Adeyemi (2007) observes, the banking sector facilitates capital formation; lubricates economic production engine and consequently contributes to economic development. Egwurube (2012) argues that the banking sector needs attention to improve and enhance the sector's ability to perform key developmental functions within the economy. The role of the financial sector in sustainable economic development is emphasized in Pisano et al. (2012) who argue that its link to the 'real' economy is through capital allocation. Finance is defined as the lifeblood of the economy and thus affects sustainability and social responsibility of corporations. The Global Alliance for Banking on Values (2012) identifies the principles of sustainable banking to include:

- (i) greater exposure to customers in both deposits and loans and direct understanding of clients' economic activities and risks,
- (ii) transparent and inclusive governance, and,
- (iii) grounded in communities, serving the real economy and enabling new business models to meet needs.

The preceding argument is supported by Peetz and Genreith (2011) who report a close and mutual relationship between the financial sector and the real economy.

The Nigerian banking landscape took root in about 1892 when the African Banking Corporation was established. Donwa and Odia (2011), note that the Nigerian banking industry has witnessed several remarkable changes due to problems arising from various sources. For many years the Nigerian federal government dominated the banking sector as an active participant. However, in 1986, the government embarked on an IMF-induced structural adjustment program (Alford, 2010). The immediate requirement at the time was an economic environment that was conducive to free market operations.

Balogun (2007) observes that since 1986 when a structural adjustment program (SAP) began, one can identify four phases of banking sector reform. The first phase was from 1986 through 1993 when financial reform culminated in deregulation of interest rates, exchange rates and a winding down of government ownership of banks. The second phase in 1993 through 1998 marked the reintroduction of regulation to address distress in the banking sector. The third phase which began with the introduction of civilian government in 1999 promoted financial liberalization as well as universal banking. The final stage started in 2004 to deal with structural as well as operational weaknesses in the financial system. The aforementioned final stage seems to have set the stage for many Nigerian banks to become international banks as a result of consolidation.

According to Ezeoha (2007), the three arguments employed in order to explain banking consolidation are expansionist, economies of scale and corporate governance theses. The expansionist thesis is based on the bank's ability to expand operations into a larger geographic area. The economies of scale argument, on the other hand is premised on reduced operational costs which include cost of funds. Finally, the corporate governance argument is based on the belief that there is a direct relationship between bank size and its capacity to adopt better management practices. Furlong (1994), notes that the early pursuit of banking consolidation is premised on possible cost efficiency in terms of eliminating excess capacity in marketing, data management and branch network overlap. However, Hughes et al. (1999), conclude that banking consolidation allows scale economies to accrue but fail to account for risk. Craig and Hardee (2004), argue that as consolidation intensifies, "relationship" lending becomes extinct which could spell doom for small and medium-size businesses.

Somoye (2008), identifies the rationale for regulator-induced consolidation in terms of a resultant cost efficiency from excess capacity elimination. The author also expects a better risk control mechanism through the creation of a critical mass and economies of scale in marketing, product initiatives, and technology exploitation. More specifically, Donwa and Odia (2011), argue that the changes in the Nigerian banking sector were meant to advance a sounder industry through an operationally globalized, technologically innovative, and prudential supervision necessary to propel Nigerian banks into the international banking landscape.

Soludo (2004), notes that the Nigerian banking sector has gone through a rough patch over the years. By the end of June 2004, of the 89 deposit money banks operating in Nigeria, ten of them account for 50 percent of the industry's total assets/liabilities which is an indicator of a highly concentrated sector. Unfortunately, most of the banks could only brag of a capitalization below \$10 million (Kama, 2006; Agbonkpolor, 2010; Sanusi, 2012). According to Soludo, the largest Nigerian bank with a capital base of \$240 million could not compare with the smallest bank in Malaysia whose capital base was \$526 million. The author also reported the expensive taste of the Nigerian bank managers who keep expensive head offices with huge investment in software and hardware with branches in a few commercial centers. The resultant high level of average cost incurred by these banks puts undue pressure on the spread between deposit and lending rates. Consequently, banks

resort to sharp practices to survive. Soludo cites the case of a typical situation in which a group of 'investors' use their connections to obtain a banking license. They use the same connections to obtain a couple of billion naira (NGN) deposits from a few government agencies and then use the funds to trade in government treasury bills, foreign exchange and finance importers through letters of credit. At the end of the accounting year, the bank declares billions of NGN in profit. They then lay claim to a level of 'sophistication' that translates into shunning small depositors and thus increase the amount of currency outside the banking system.

In March 2004, the Central Bank of Nigeria (CBN) assessed the health of 89 banks in the system and found 62 of them to be satisfactory, 25 were classified unsound/marginal with 2 banks not reporting. The problem banks accounted for about 19 percent of total banking assets and 17 percent of deposit liabilities (Soludo, 2004). The non-performing assets within the banking system were at an alarming rate of about 20 percent. A catalogue of problems documented by Soludo (2004), include:

- (1) Weak corporate governance resulting in a high management turnover, poor reporting, non-compliance with regulatory requirements, and unethical behaviour.
- (2) Late and/or non-publication of financial reports.
- (3) Gross insider abuse resulting in non-performing insider loans.
- (4) Insolvency which eroded shareholder funds.
- (5) Weak capital base.
- (6) Overdependence on public sector deposits and a neglect of small depositors.

The Central Bank of Nigeria (CBN), announced an ambitious 13-point banking sector reform agenda in July 2004 (Cook, 2011). Bank capital requirement was increased from 2 billion naira to 25 billion naira (\$190 million). A phased withdrawal of public sector deposits from banks was introduced among other things. The CBN restructured information gathering and gathering mechanism in order to achieve a greater compliance and transparency. According to Cook (2011), the CBN introduced a Code of Conduct of Corporate Governance for banks. Alford (2010), notes that the intent of the new policy was to consolidate the existing banks into fewer, larger and financially viable banks. In view of the consolidation exercise which began in 2004 and the subsequent reform efforts, Alford (2010) concludes that the Nigerian banking industry has a potential to create opportunities for banks and investors in the Nigerian market. Cook (2011) concludes that the reform efforts have resulted in an increased banking sector development, and greater competition with less intervention from the government. Moreover, the author notes that Nigerian banks are more efficient after the reform which is consistent with increased asset quality held by the banks. Both Somoye (2008) and Egwurube (2012) also conclude that a post-consolidation banking sector in Nigeria is becoming more competitive with market forces enthroned. Somoye (2008) notes that market capitalisation on the Nigerian Stock Exchange grew by about 161 percent between 2004 and 2006 as a result of the consolidation exercise. More importantly, Appendix 1 shows the growth in the banking sector capitalisation shortly after the consolidation exercise. Between 2004 and 2006, banking sector capitalisation grew by about 223 percent.

The bank consolidation exercise resulted in a significant reduction in the number of banking institutions from 89 in December 2004 to 25 in 2005. In order to meet the new capital requirements, many banks became public institutions by listing on the Nigerian Stock Exchange (NSE). Donwa and Odia (2011) note that bank reforms recreated the Nigerian capital market in such a manner that both primary and secondary markets witnessed increased activities evidenced by aggregate market capitalization, new issues of bank securities as well as increased foreign direct investment. The banking sector became a dominant sector on the NSE. Sanusi (2012) concludes that Nigerian banks now are key players in the global financial markets with many of them rated in the top 20 banks in Africa and are in the top 1000 banks in the world. Finally, Ojo and Ayadi (2014) conclude that as a result of banking reform in Nigeria, investors have become more informed and pay attention to indicators of firm performance in their investing decision-making.

THE MODEL

The traditional valuation model which dates back to Williams (1938) defines the value of stock as the present value of the stream of dividends expected from the stock over its life. However, there seems to be a problem with a practical application of the aforementioned model. Ohlson (1995, 2001) and Feltham and Ohlson (1995) provide a valuation framework which relies on book value and discounted future abnormal earnings. Ohlson (1995), Feltham and Ohlson (1995) and Lee (1999) note that as long as earning forecasts, book values and dividends follow clean surplus accounting, security prices can be modeled as:

$$P_{t} = bv_{t} + \sum_{i=1}^{\infty} R_{f}^{-i} E_{t}(x_{t+i}^{a})$$
(1)

Where, P_t is the stock price at time t, bv_t is the book value per share at time t, R_f is one plus the risk-free rate of interest, E_t is the expectation operator at time t and x^a_{t+i} represents abnormal earnings per share

$$bv_t = bv_{t-1} + x_t - d_t \tag{2}$$

Where d_t represents dividend per share at time t and x_t denotes earnings per share at time t.

Equation (1) states that stock price is the sum of book value and discounted future abnormal earnings. According to Spilioti and Karathanassis (2011), the aforementioned model developed by Ohlson (1995) and Feltham and Ohlson (1995) builds a solid foundation between the market value of a firm and the accounting data relating to operating as well as financial activities within the framework of clean surplus accounting. In terms of the practical implementation of the model, Ohlson (1995) assumes a linear information dynamics (LID) for estimating abnormal earnings which is modeled as:

$$x_{t+1}^{a} = \omega x_t^{a} + v_t + \varepsilon_{It+I} \tag{3}$$

Where v_t denotes non-accounting information (or "other information") and ε_t is the stochastic error term. If one combines Equations (1) through (3), the price of a security becomes:

$$P_t + bv_t + a_1 x^{a_t} + a_2 v_t \tag{4}$$

With
$$a_1 = [\omega/(R_f - \omega)] \ge 0$$
 and $a_2 = [R_f/(R_f - \omega)(R_f - \gamma)] > 0$. Note that $v_{t+1} = \gamma v_t + \epsilon_{2t+1}$

According to Lundholm (1995), the determination of the value of a firm is based on presupposition that the information about future residual earnings is obtained both from the past series of abnormal earnings and also "other information" beyond accounting reports. The "other information" refers to non-accountable information. Lundholm argues that "other information" takes account of relevant events for the evaluation of a firm that will have an impact on the financial statements.

Based on the foregoing, it is apparent that practical valuation of a firm goes beyond the traditional accounting variables because such an exercise would need to consider "other information" as presented by Ohlson (1995). Hand (2001) argues that any researcher who sets the value of "other information" to zero is making a "heroic" assertion that publicly available accounting reports are sufficient to explain share prices. Ohlson (2001) defines "other information" as a "mysterious" variable without establishing its analytical content. Kothari (2001) notes that the current performance of a firm as reported in its financial statements is a necessary but not sufficient source of information for the evaluation of its market value. Myers (1999) identified some candidates for "other information" as new patents, approval of laws for a new medicament in pharmaceutical firms, and long-term contracts. Kamath (1980) tries to value some large commercial banks and defined "other information" as commercial banks' risk exposure from lending to less developed countries. Kyle and Sachs (1984) note that the statistical significance of the risk factor employed by Kamath only in 1974, the year Franklin National failed is an indication that investors' perception is influenced by visible events affecting the welfare of banks. Lee and Ng (2006) investigate the relationship between corruption and corporate value using data from 44 countries from 1994 through 2003. Their results indicate that corruption impacts corporate value by lowering expected future cash flows.

The attempt in this paper is similar to those of Kamath (1980), and Lee and Ng (2006) in seeking another candidate for "other information" in the Ohlson (1995) and Feltham-Ohlson (1995) model. However, the approach in this paper is to examine if the value of all equities listed on the Nigerian Stock Exchange have a long-run equilibrium relationship with occurrence of fraud in the banking sector between 1990 and 2013. The results will also shed some light on the impact of the banking sector on the financial markets.

METHODOLOGY

Data:

The panel data employed in this study include financial and accounting variables for 17 publicly traded commercial banks in Nigeria. The sample selection is premised on full data availability for each firm from 2006 through 2013. The financial and accounting data are annual average stock prices, book values and earnings per share. The original data series were collected

from the Nigerian Stock Exchange and transformed into rates of change in order to ease comparison.

Unit Root Tests:

A cointegration test is usually preceded by a test for unit roots in time series studies. However, testing for unit roots in panel data is a more recent undertaking and the tests have more power than the usual tests associated with time series data (Taguchi et al., 2009). The tests employed in this paper are Levin, Lin and Chu (2002), and Fisher-based tests of 1932. The Levin, Lin and Chu (LLC) test as discussed in the EViews 6 User's Guide employs the following equation:

$$\Delta y_{it} = \alpha \ y_{it-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{it-j} + X_{it}^{'} \delta_i + \varepsilon_{it}$$
 (5)

Where, i=1,2,...., N cross-section or series that are observed for periods t=1,2,..., T and X_{it} are the exogenous variables in the panel which include fixed or individual effects. Under the null hypothesis, $\alpha=0$ with an alternative hypothesis assuming $\alpha<0$. The generalized form of the LLC model has a way to capture the presence of heterogeneity that is present in a panel setting. The LLC test assumes that all series are stationary under the null hypothesis. The testing procedure is based on the average of the individual unit root test statistics. Through this procedure, each section of the panel is estimated separately with different parameter specifications, residual variance and lag lengths (Asteriou and Hall, 2006). The Maddala and Wu (MW, 1999) tests use a Fisher-type test that combines the significance level for rejecting the null obtained when estimating individual unit root tests. The MW model can be applied to an unbalanced panel. The tests combine p-values from individual root (ADF and PP) tests.

Pedroni Panel Cointegration Test:

Pedroni (1999, and 2004) proposes several cointegration tests of panel data that are extensions of the Engle-Granger residual-based framework. The cointegration framework employed in this study accounts for individual as well as time effects by adjusting for potential heterogeneity and serial correlation existing in the data panel De Vita and Kyaw, 2008). The approach involves an examination of the residuals from a spurious regression performed on nonstationary variables. If the nonstationary variables are cointegrated, then the spurious regression residuals would be stationary. Formally, the null hypothesis that is tested is that Y and X are not cointegrated while the alternative hypothesis is that the series in the panel are cointegrated. The tests proposed by Pedroni allow for heterogeneous intercepts as well as trend coefficients across cross-sections. The panel regression is of the form:

$$Y_{i,t} = a_i + \partial_{i,t} + \sum_{m=1}^{M} \beta_{mi} X_{mi,t} + u_{i,t}$$
 (6)

Where t = 1, 2, ..., T (time); i = 1, 2,, N (number of cross sections) and m = 1, 2, ..., M (number of independent variables). Y and X are the nonstationary variables. The parameters a_i and ∂_i are individual and trend effects respectively. Two major groups of statistics are generated by Pedroni: Between-dimension-based statistics and Within-dimension-based statistics. The eight within-dimension-based tests are based on pooling autoregressive coefficients across different members of the panel for the unit root tests on the estimated residuals. The tests impose a common value for the autoregressive root under the alternative hypothesis. On the other hand, between-dimension-based tests represent the group mean approach as in the within-dimension. These tests are based on pooling along the "between" dimension by averaging autoregressive coefficients for each member of the panel for the unit root tests on the estimated residuals. The tests do not impose a common value for the autoregressive root under an alternative hypothesis (Orsal, 2008; De Vita & Kyaw, 2008).

The starting point to a panel cointegration test is to estimate the cointegration regression represented by Equation (6) through ordinary least squares. Under the null hypothesis of no cointegration, the residuals $u_{i,t}$ should be integrated at order one [I(1)] and proceed by estimating the following regression for each cross-section:

$$u_{i,t} = \rho_i u_{i,t-1} + \epsilon_{i,t} \tag{7}$$

Or

$$u_{i,t} = \rho_i u_{i,t-1} + \sum_{j=1}^{k_i} \pi_{i,j} \Delta u_{i,t-j} + \omega_{i,t}$$
 (8)

The null hypothesis implies that ρ_i =1. The alternative hypothesis is two-fold. With the within-dimension panel tests the alternative hypothesis assumes homogeneity in which case, (ρ_i = ρ) < 1 for all i. In the second alternative (between-dimension) heterogeneity is assumed and ρ_i < 1 for all i. In both cases identified above, Pedroni generates eleven panel cointegration test statistics based on residuals from either Equation (7) or Equation (8). Moreover, a Newey and West (1987) estimator and the Bartlett kernel are employed to obtain a long-run variance estimate. Both the long-run variance and the contemporaneous variance estimates and other Newey-West kernel estimates are employed to generate the different test statistics. The null hypothesis of no cointegration, is rejected if the absolute value of the calculated test statistic exceeds the critical value at a chosen level of significance (Orsal, 2008). In a simulation test, Orsal (2008) reports results that indicate that the panel-ADF and panel-PP statistics have the best size and power properties among the panel cointegration test statistics evaluated.

EMPIRICAL RESULTS

Table 1 shows the descriptive characteristics of the panel data employed in this paper. The mean value of rate of change in earnings per share is registered at – 161 percent, change in book value is 43.03 percent, while the change in stock price is 33.84 percent. These numbers reflect the problematic environment in which banks operated subsequently to the consolidation exercise. The standard deviation for variables as reported in Table 1 is reflection of a wide swing in the variables. The earnings per share variable is negatively skewed while the book value and stock price are positively skewed. This is anecdotal evidence that the variables are not normally distributed. The minimum and maximum values as well as other statistical properties of the sample time series are also reported in Table 1. Regarding statistical distribution, the Jarque-Bera test shows that the three time series are not normally distributed. The results reported in Table 1 are consistent with the observation of Ojo and Ayadi (2013) that banks in Nigeria reported huge losses that were interpreted as negative indicators in the stock market.

Table 1: Descriptive Statistics of Panel Data (2006 – 2013)

| STATISTIC | Rate of Change in | Rate of Change in | Rate of Change in Stock |
|---------------------------|------------------------|-------------------|-------------------------|
| | Earnings Per Share (%) | Book Value (%) | Price (%) |
| Mean | -161.55 | 43.03 | 33.84 |
| Median | -4.37 | 7.29 | 0.68 |
| Maximum | 2232.43 | 629.93 | 722.90 |
| Minimum | -4390.91 | -283.00 | -93.49 |
| Std. Dev. | 909.32 | 154.66 | 130.02 |
| Skewness | -2.71 | 1.29 | 2.56 |
| Kurtosis | 14.48 | 6.18 | 11.66 |
| Jarque-Bera (probability) | 591.36 (0.00) | 61.44 (0.00) | 371.01 (0.00) |

Table 2 contains the results of both LLC and Maddala and Wu (1999) Fisher-type tests that are applied to both the level and first difference of the panel series. The results indicate that the series are stationary in first difference. The implication of these results is that the series need to be differenced once before a regression analysis is applied in order to avoid getting spurious results. Given that the series are integrated of order one, there is likelihood that they are co-integrated. This means the existence of a long-run equilibrium relationship among the time series.

Table 2: Panel Unit Root Test Results

| Variable | LLC | Fisher ADF | Fisher PP |
|--|---------|------------|-----------|
| Stock Price (Level) | 33.68* | 29.74* | 50.73* |
| Stock Price (1 st Difference) | -14.34 | 128.79 | 128.95 |
| Book Value (Level) | -11.12* | 31.24* | 54.79* |
| Book Value (1 st Difference) | -8.82 | 135.94 | 136.45 |
| EPS (Level) | -18.97* | 57.83* | 104.54* |
| EPS (1 st Difference) | -18.68 | 168.16 | 168.12 |

LLC stands for Levin, Lin & Chu statistic. Fisher ADF is the Fisher statistic with ADF option and Fisher PP is Fisher statistic with Phillips-Peron option. The null hypothesis is that unit root exists. *indicates one percent significance level.

The Pedroni panel method is applied to test the null hypothesis of no co-integration. The results of the tests are reported in Table 3. All the within-dimension test (Panel v, Panel rho, Panel PP and Panel ADF) results are indicative of a non-rejection of the null hypothesis of no cointegration. Note that these four test results are based on pooling the data along the within-dimension with an alternative hypothesis impose a common coefficient on the cross-sections. The group mean cointegration statistics are Group rho, Group PP and Group ADF and they are referred to as the between-dimension test statistics. The alternative hypothesis for this group of tests allows for heterogeneous coefficients. While the null hypothesis is not rejected by the Group rho statistic, it is rejected by both the Group PP and Group ADF statistics. In summary, the results reported in Table 3 show that the within-dimension tests could not reject the null hypothesis while the between-dimension tests rejected the null at the conventional level of significance. The between-dimension results point to a slight long-run equilibrium relationship between stock price on the one hand and book value plus earnings on the other hand.

Table 3: Pedroni Test Results for Panel Cointegration

| Test | Statistic | Probability | Reject Null of No Cointegration? |
|---------------------|-----------|-------------|----------------------------------|
| Panel v-statistic | -0.9906 | 0.839 | NO |
| Panel rho statistic | 0.8616 | 0.806 | NO |
| Panel PP-Statistic | -1.0638 | 0.144 | NO |
| Panel ADF-statistic | -1.0635 | 0.144 | NO |
| Group rho-statistic | 2.4115 | 0.992 | NO |
| Group PP-Statistic | -6.5001 | 0.000 | YES |
| Group ADF-Statistic | -3.713 | 0.000 | YES |

Note: * indicates the rejection of the null hypothesis at the 1 percent level.

CONCLUDING REMARKS

The banking consolidation exercise in Nigeria provided a sort of impetus for the growth of activities on the Nigerian Stock Exchange (NSE) because many banks became listed public corporations. The literature on valuation, include results of several studies that accounting earnings account for over 60 percent of variations in stock returns (Easton *et al.* 1992; Easton, 1999). A logical way to understand the functioning of the NSE is to explore the likelihood that financial statements provide the most available information to market participants. The focus of the Ohlson (1995) model is that value of a firm is made up of the net investment value made in it and the present value of periodic earnings (Valdes and Vazquez, 2010). The two components are collectively referred to as the "clean surplus" concept of equity valuation.

The paper attempts to examine the applicability of the Ohlson model to the valuation of banks' stocks on the Nigerian Stock Exchange. The estimation of market value of a firm's stock is of importance to its many stakeholders. Kusakci (2009) underscores the importance of the ability to evaluate financial assets with precision which is considered critical to finance theory. More importantly, decision making in finance is based on a selection among alternatives in order to maximize economic value. Therefore, the Ohlson model provides a direction for estimating the performance by building a bridge between market value and book value plus earnings.

The approach adopted in this paper is to explore a long-run equilibrium relationship between stock price, book value and earnings of banking firms listed on the Nigerian Stock Exchange from the period 2006 through 2013. The period is significant because many banks listed on the NSE as a result of banking consolidation exercise. The Pedroni panel cointegration test results are mixed. However, Orsal's (2008) simulation results reveal that the Panel PP and Panel ADF possess the best size and power properties among the Pedroni recipe of tests. Therefore, since the Panel PP and Panel ADF test results could not reject the null hypothesis of no cointegration, one is lead to conclude that accounting information (book value and earnings) do not co-vary with market values of banks listed on the NSE for the period sampled.

The results reported in this paper suggest that there is no long-run equilibrium relationship between market prices of bank stocks on the one hand and accounting data represented by book values and earnings. Spilioti and Karathanassis (2011) report findings that are not supportive of the Ohlson model for the British telecommunications industry. They interpret their results as evidence of a high degree of competition in the British telecommunications sector. According to the authors, competition forces abnormal earnings to zero, thus, removing the influence of excess returns on stock prices. By implication, the results reported in this paper could also point to the high degree of competition in the banking industry in Nigeria as Cook (2011) concludes that post-consolidation period in the Nigerian banking sector witnessed increased development, greater competition and less government intervention.

Moreover, Dechow *et al.* (1999) argue that by incorporating information in analysts' forecast of earnings into the information dynamics increases forecast accuracy. The results reported by Liu *et al.* (2004) also point to the existence of a poor information environment in Nigeria which makes analysts' forecast to become less correlated with earnings and book value. The results reported in this study are certainly consistent with the results reported by Ojo and Ayadi (2014) which indicates a long-term equilibrium relationship between stock market capitalisation and bank fraud. The unanswered question now is how to incorporate bank fraud into the valuation of bank stocks. Given that the nature of the information environment is critical to valuation, the relevant authorities in Nigeria should pursue transparency in information reporting by firms listed on

the NSE. Transparency is a concept that is consistent with sustainable development.

Pisano et al. (2012) reports an interview with Alexander Welzl who argues that valuation approaches covering quantitative metrics based on monetizing values are not useful in the context of sustainable development. This position calls for a fundamental change to corporate accounting and reporting standards that are capable of capturing the valuation of intangibles. The implication is that investment professionals, analysts and financial service firms as well as corporate managers should explore the possibility of relying on value metrics and integrated information in decision-making.

REFERENCES

Abdullahi, I.B. (2007). Banking sector reforms and bank consolidation in Nigeria: Challenges and prospects. *Babcock Journal of Management and Social Sciences*, 6(1), 116-125.

Adeyemi, K.S. (2007). Banking sector consolidation in Nigeria: Issues and challenges. *Union Digest, Union Bank Publication*, 3-8.

Agbonkpolor, T. (2010). Risk management and regulatory failures in banking: Reflections on the current banking crisis in Nigeria. *Journal of Banking Regulation*, 11, 146-155.

Al-Hares, O.M., AbuGhazaleh, N.M. and Haddad, A.E. (2011). The effect of 'other information' on equity valuation: Kuwait evidence. *The Journal of Applied Business Research*, 27(6), 57-70.

Alford, D. (2010). Nigerian banking reform: Recent actions and future prospects. *Journal of International Banking Law and Regulation*, 25(7), 337-345.

Asteriou, D. & Hall, S.G. (2006). Applied econometrics: A modern approach. Hampshire, UK: Palgrave Macmillan.

Ball, R., and Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research*, 6(1), 159-178.

Balogun, E. D. (2007). Banking sector reforms and Nigerian economy: Performance, pitfalls and future policy options. *Munrich Personal RePEe Archive*, Paper No. 3804, 7th November.

Barros, C.P. and Caporale, G.M. (2012). Banking consolidation in Nigeria, 2000-2010. Brunel University, London, Economics and Finance Working Paper Series, Working Paper No. 12-06.

Bodie, Z. & Merton, R.C. (2002). Finance. Porto Alegre: Bookman Editora.

Bryan, D.M. & Tiras, S.L. (2007). The influence of forecast dispersion on the incremental explanatory power of earnings, book value and analyst forecasts on market prices. *Accounting Review*, 82(3), 651-677.

Cook, L. (2011). Were the Nigerian banking reforms of 2005 a success and for the poor? Working paper no 16890, NBER, March.

Craig, S.G. & Hardee, P. (2004). The impact of bank consolidation on small business credit availability. Working paper, University of Missouri.

Cupertino, C.M. & Lustosa, P.R.B. (2004). The Ohlson model of evaluation of companies: Tutorial for use. *Brazilian Business Review*, 1(1), 1-16.

Dahmash, F.N. & Qabajeh, M. (2012). Value relevance of Ohlson model with Jordanian data. *Interdisciplinary Journal of Contemporary Research in Business*, 3(11), 551-560.

Damodaran, A. (1999). Value enhancement: Back to basics. Contemporary Finance Digest, 2(1), 5-51.

Dechow, P.M. (1994). Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting and Economics*, 18(1), 3-42.

Dechow, P.M., Hutton, A.P., & Sloan, R.G. (1999). An empirical assessment of the residual income valuation model. *Journal of Accounting and Economics*, 26(1-3), 1-34.

De Vita, G. & Kyaw, K.S. (2008). Determinants of FDI and portfolio flows to developing countries: A panel cointegration analysis. *European Journal of Economics, Finance and Administrative Sciences*, 13, 161-168.

Donwa, P. & Odia, J. (2011). Effects of the consolidation of the banking industry on the Nigerian capital market. *Journal of Economics*, 2(1), 57-65.

Easton, P. D., Harris, T. & Ohlson, J.A. (1992). Aggregated accounting earnings can explain most of security returns. *Journal of Accounting and Economics*, 15(2-3), 119-142.

Easton, P. (1999). Security returns and the value relevance of accounting data. Accounting Horizons, 13(4), 399-412.

Egwurube, O.A. (2012). The reforms of the banking sector and issue of economic development in Nigeria: A lesson for the Sub-Saharan countries. *International Journal of Business and Management Tomorrow*, 2(3), 1-12.

Ezeoha, A.E. (2007). Structural effects of banking industry consolidation in Nigeria. *Journal of Banking Regulation*, 8(2), 159-176.

Ezeoha, A.E. (2011). Banking consolidation, credit crisis and asset quality in a fragile banking system: Some evidence from Nigerian data. *Journal of Financial Regulation and Compliance*, 19(1), 18-32.

Fama, E., & French, K. (1992). The cross-section of expected stock returns. *Journal of Finance*, 47(2), 427-465.

Feltham G. & Ohlson J. (1995). Valuation and clean surplus accounting for operating and financial activities. *Contemporary Accounting Research*, 11, 689-731.

Frankel, R. & Lee, C.M.C. (1998). Accounting valuation, market expectation, and cross-sectional stock returns. *Journal of Accounting and Economics*, 25(3), 283–319.

Furlong, F. (1994). New view of bank consolidation. FRBSF Economic Letter, 98-23, San Francisco: Federal Reserve Bank of San Francisco.

Global Alliance for Banking on Values (2012). Strong, straightforward and sustainable banking. GABV, Triodos Bank, The Netherlands. March 2012.

Gordon, M.J. (1959). Dividends, earnings and stock prices. Review of Economics and Statistics, 41(1), 99-105.

Hand, J.R. (2001). Discussion of earnings, book values, and dividends in equity valuation: An empirical perspective. *Contemporary Accounting Research*, 18(1), 121-130.

Hand, J. R. M. and W. R. Landsman (1999). Testing the Ohlson model: V or not v, that is the question. Working Paper, University of North Carolina at Chapel Hill, Chapel Hill, NC.

Hughes, J.P., Lang, W., Mester, L.J. & Moon, C.G. (1999). The dollars and sense of consolidation. *Journal of Banking and Finance*, 23(2), 291-324.

Kama U. (2006). Recent reforms in Nigerian banking industry: Issues and challenges. CBN Bullion, 30(3), 65-74.

Kamath, P. R. (1980). Determinants of premiums and discounts in commercial bank common stocks. *Review of Business and Economic Research*, 16(fall), 54-68.

Kothari, S.P. (2001). Capital markets research in accounting. Journal of Accounting and Economics, 31(1), 105-231.

Kusakci, A.O. (2009). Market value evaluation with Ohlson model: An empirical analysis of ATX indexed companies in Vienna stock exchange. Retrieved July 4, 2012 from http://ssrn.com/abstract=1491496

Kyle, S.C. & Sachs, J.D. (1984). Developing country debt and the market value of large commercial banks. working paper No. 1470, National Bureau of Economic Research, Cambridge, MA.

Lee, C.M.C. (1999). Accounting-based valuation: Impact on business practices and research. *Accounting Horizons*, 13(4), 413-425.

Lee, C. & Ng, D. (2006). Corruption and international valuation: Does virtue pay? MPRA paper no. 590, Munich Personal RePec Archive. Retrieved February 25, 2012 from http://mpra.ub.uni-muenchen.de/590/

Levin, A., Lin, C. F., & Chu, C.S. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics*, 108, 1-24.

Liu, M., Xu, D. & Yao, T. (2004). Why does analysts' forecast dispersion predict stock returns: A corporate guidance perspective. Working paper, University of Arizona, Tucson, AZ.

Lundholm, R., (1995). A tutorial on the Ohlson and Feltham/Ohlson models. *Contemporary Accounting Research*, 11, 749-761.

Lundholm,R. & O'Keefe, T. (2001). Reconciling value estimates from the discounted cash flow model and the residual income model. *Contemporary Accounting Research*, 18(2), 311–335.

Maddala, G.S. & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and statistics*, 61, 631-652.

Mayer, C. (1988). New issues in corporate finance. European Economic Review, 32(5), 1167-88

Miller, M. H. & Modigliani, F. (1961). Dividend policy, growth and the valuation of shares. *Journal of Business*, 34(4), 411-433.

Myers, J. N. (1999). Implementing residual income valuation with linear information dynamics.. *The Accounting Review*, 74(1), 1–28.

Newey, W.K. & West, K.D. (1987). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica*, 55(3), 703–708.

Ohlson, J.A., (2001). Earnings, book values and dividends in equity valuation: An empirical perspective. *Contemporary Accounting Research*, 18, 107-120.

Ohlson, J.A., (1995). Earnings, book values and dividends in security valuation. *Contemporary Accounting Research*, 11, 661-687.

Ojo, A. T. (2010). The Nigerian maladapted financial system: Reforming task and development dilemma, The CIBN Press Ltd, Yaba, Lagos.

Ojo, A.T. & Ayadi, O.F. (2014). Financial malpractices and stock market development in Nigeria: An exploratory study. *Journal of Financial Crime*, 21(3), 336-354.

Orsal, D.D.K. (2008). Comparison of panel cointegration tests. Economic Bulletin, 3(6), 1-20.

Ota, K. (2002). A test of the Ohlson (1995) model: Empirical evidence from Japan. The International Journal of Accounting,

37(2), 157-182.

Ou, J. & Penman, S. (1989). Financial statement analysis and the prediction of stock returns. *Journal of Accounting and Economics*, 11(4), 295-329.

Palepu, K., Bernard, V. & Healy, P. (1996). Business analysis and valuation, Cincinnati, Ohio, USA: South-Western College Publishing.

Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics & Statistics*, 61, 653-670.

Pedroni, P. (2004). Panel cointegration; asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. *Econometrics Theory*, 20, 597-625.

Peetz, D. & Genreith, H. (2011). The financial sector and the real economy. Real-World Economics Review, Issue 57, 41-47.

Pisano, U., Martinuzzi, A. & Bruckner, B. (2012). The financial sector and sustainable development: Logics, principles and actors. European Sustainable Development Network Quarterly Report No. 27, Vienna, Austria.

Sanusi, L.S. (2012). Banking reform and its impact on the Nigerian economy. Paper presented at the Warwick Economic Summit, University of Warwick, Warwick, UK., February 17.

Soludo, C.C.(2004). Consolidating the Nigerian banking industry to meet the development challenges of the 21st century. Paper delivered to the special meeting of the Bankers' Committee, CBN Headquarters, Abuja, July 6.

Somoye, R.O.C. (2008). The performances of commercial banks in post consolidation period in Nigeria: An empirical review. *European Journal of Economics, Finance and Administrative Sciences*, 14, 62-73.

Spilioti, S.N. & Karathanassis, G.A. (2011). Comparison of the Ohlson and Feltham-Ohlson models for equity valuation: Evidence from the British telecommunications sector. *International Journal of Financial Services Management*, 5(4), 343-355.

Taguchi, H., Murofushi, H. & Tsuboue, H. (2009). Exchange rate regime and real exchange rate behavior. New Economic and Social Research Institute (ESRI) Working Paper Series No. 10, Tokyo, Japan.

Valdes, A.L. & Vazquez, R.D. (2010). Ohlson model by panel cointegration with Mexican data. *Contaduria y Administracion*, 232, 131-142.

Williams, J.B. (1938). The Theory of investment values. Harvard University Press, Cambridge, MA.

ABOUT THE AUTHORS:

Olusegun Felix Ayadi, Ph.D.: O. Felix Ayadi is JPMorgan Chase Professor of Financial Literacy in the Jesse H. Jones School of Business at Texas Southern University, Houston, Texas, USA. He served as Interim Associate Dean in the Jesse H. Jones School of Business from September 2010 through November 2011. He was editor of *Southwestern Business Administration Journal* (SBAJ). His research interests are in the areas of investments and international finance especially issues relating to emerging markets. He was a Fulbright Scholar at Covenant University in Nigeria when this research commenced.

Ade Thompson Ojo, Ph.D.: Ade T. Ojo is Distinguished Professor of Banking & Finance at Covenant University in Nigeria. He was formerly at the University of Lagos (1975-2004) where he was Head of Department of Finance, Dean of Business Administration and Director of Distance Learning Institute; and also at the OPEC in Vienna as Senior, International Money &

Finance Analyst (1978-1980). He has undertaken and published extensive research works in Nigeria and internationally in the main areas of domestic and international banking and finance. His more recent book publication is: **The Nigerian Maladapted Financial System** – *Reforming Tasks and Development Dilemma*, the Chartered Institute of Bankers of Nigeria (CIBN) Press Ltd, Yaba, Lagos, 2010