

Rethinking Valuation Methodology for Sustainable Mortgage Financing: A Nigerian Perspective

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Abstract

The mortgage industry is just evolving in Nigeria, Africa's most populous nation, unlike in the developed economies of the world where the mortgage sector is a major contributor to economic development. An emerging economy of 170 million people, Nigeria is presently estimated to have mere 20,000 mortgages which account abysmally for less than one percent of the country's GDP. The sector's under-development is viewed with grave concern considering the criticality of housing to humanity and the potentialities of a robust mortgage financial system in driving inclusive economic growth. Property value underpins much of the banking system as housing and lands account for the vast majority of collateral in the financial system. A sound mortgage system also helps in mobilizing both domestic and offshore funds into the pivotal housing development, developing new financial products, and linking the capital market to real estate. Despite the spate of reforms in the Nigerian mortgage sector in recent times, issues bordering on valuation opacity have continued to raise unresolved methodological question in current appraisal practice, among many other challenges plaguing the sector, but research studies are rather sparse on the crucial issue. Available studies have tried to examine the problem from the perspectives of the traditional metrics of 'cost', 'direct comparison', and 'income capitalization', with contributions yielding mixed findings. The present study seeks to revisit the issue by using alternative methodology. In this paper, a combined exploratory research method and empirical case study analysis showed how deficiency in full and transparent application of pivotal valuation metrics of cash flow, risk, and growth may be contributory to mortgage valuation credibility problem. The empirical evidence suggests that robust mortgage values may be more effectively and transparently captured by the Discounted Cash Flow (DCF) model, and the implications of this for sustainable mortgage finance business in Nigeria are highlighted in the paper. The imperatives for higher-level disclosure in mortgage valuation and innovative paradigm shift towards discovering "intrinsic" rather than the conventional "market" values for mortgage deal-making are also briefly discussed.

Keywords: DCF, Intrinsic value, Housing markets, Model validation, Mortgage finance, Sustainability

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“What could be more natural to ask of a capital asset than that it produces a reliable and steady income.”

Thomas Piketty (2014, p. 114)

Introduction

Real estate mortgage lending, also referred to as a mortgage, is used by prospective home owners (mortgagors) to raise finance from lenders (mortgagees) to purchase a real estate; or by existing home owners to raise funds for any purpose while putting a lien on the property being mortgaged. The mortgage sector is a key part of credit democratization as exemplified in the United States where it has helped to push the country's homeownership to a record 69 percent, up from 64 percent a decade earlier (Bernanke, 2015). Real estate mortgage lending is usually 'secured' on mortgagor's valuable property, which is regarded as the investor's wealth at time t (Capinski & Zastawniak, 2011). Typically, valuations are performed as of a time t by professional valuers who hold recognised and relevant professional qualifications and have recent experience in the location and category of the real estate being valued. Whereas these valuations are at core of mortgages and sustainable socio-economic development, many of these professionals live in developing countries where the theory and practice of valuation have not evolved naturally (Sangosanya, 2008; Udo, 2015). The true valuation of this 'collateral security' becomes critically important to the whole mortgage lending process because in most jurisdictions, a mortgagee may foreclose the mortgaged property if certain conditions occur – principally, non-payment of the mortgage loan. Additionally, lenders' variations in loan-to-value ratios caused by market or regulatory changes make valuation a major and frequent activity many mortgage markets across the globe. In this context, valuation science postulates that a rational investor would not pay for an asset than it is worth. The market prices in an efficient market are generally determined by the current state of affairs, wealth-creation potentialities, and growth prospects (Parasuraman, 2014). While it is possible to estimate value for most assets such as real estate from their financial fundamentals, it is commonplace to observe that market prices often deviate from this value; hence it is regarded as a patent absurdity to justify an asset price simply because there are other investors willing to pay that price or higher price in the future (Damodaran, 2011). Yet, markets have demonstrated capacity to correct themselves. It is therefore contended that, in the primary market context, the value of mortgaged property should reflect the cash flows the property is expected to generating, allowing, of course for the level of uncertainty about, and the expected growth in, these cash flows, after all, there is nothing that guarantees long-term stability of the property value in any market (Piketty, 2014, p. 198; Damodaran, 2011). These two crucial factors in mortgage valuation, namely, level of uncertainty and level of expected growth in cash flows, are difficult to reflect outside the parameters provided by the Discounted Cash Flow (DCF) model; still, a robust valuation methodology is needed to drive a virile and sustainable mortgage industry.

The mortgage industry is still nascent in Africa's most populous nation and largest economy, unlike what is obtainable in the rich countries where the mortgage sector is a major contributor to economic

development. Nigeria, an emerging economy of 170 million people, is presently estimated to have mere 20,000 mortgages which account abysmally for less than one percent of the country's Gross Domestic Product (GDP). The sector's under-development is viewed with grave concern considering the critical role that housing plays in the society and the potentialities of a sound mortgage financial system in driving inclusive economic growth (Scriven, 2008). Real estate mortgage accounts for the vast majority of collateral in the financial system and also helps in mobilizing both domestic and offshore funds into the pivotal housing development, developing new financial products, and linking the capital market to real estate (Chandra, 2008; Oteh, 2011). Owing to its wide economic ramifications (infrastructure, employment, household wealth, health, among others), a robust valuation-driven mortgage finance system is also seen as a means of improving living conditions of the people sustainably (Gopalam & Venkataraman, 2015). Despite the spate of reforms in the Nigerian mortgage sector in recent times, issues bordering on valuation opacity and discrepancies, margins of errors, have continued to raise largely unresolved methodological question in valuation practice, especially among banks and primary mortgage institutions (Aluko, 2000 & 2007; Adekoge & Aluko, 2007; Akerele & Thomas, 2014). The regulatory authorities are concerned about rampant cases of widely divergent mortgage values for the same property carried out by different estate valuation firms (Odudu, 2015). Majority of practitioners are reckoned to report variances outside the permissible range of ± 15 percent (Card *et al*, 1986; Adekoge & Aluko, 2007). While the issue has attracted some research interest, previous studies appear to have focused mainly on the problem from the perspectives of the traditional metrics of 'cost', 'direct comparison', and 'income capitalization', with many of the contributions yielding mixed findings, but certain questions in the valuation debate are of immediate interest in the Nigerian context. What is level of adoption of investor-focused valuation approaches such as the DCF model in a developing country like Nigeria? To what extent has research and regulatory standards and technical guidance notes addressed the problem of lack of uniformity in valuation methods particularly for mortgage business? Do practitioners have adequate knowledge and training on valuation principles and methodology to help them conduct reliable and consistent valuation? In the particular context of mortgage finance, to what extent will a new approach such as the DCF framework help to resolve the problem? These issues are germane not only to sustainable good corporate governance, but also to sustainable socio-development of emerging market economies like Nigeria.

In this paper, an attempt is made to revisit the foregoing issues the outcome of which yields a compelling case for alternative valuation methodology founded upon the DCF model. The central argument of this paper is that, while the need for continuous multidisciplinary research and innovation is acknowledged, the DCF model provides valuers with a veritable methodological platform to speak a common professional language when it comes to mortgage valuation.

Need for the study

A number of issues bordering on the emerging concerns on the importance and reliability of property valuations generally and mortgage valuations in particular have necessitated this study. Specifically, four perspectives of this contribution are noteworthy. First, the anticipated new guidelines from National Pension Commission in Nigeria is expected to be a major boost for the mortgage industry as over 6 million contributors will be able to use their pension contribution as equity for residential mortgages (Anohu-Amazu, 2015). Relatedly, the guidelines for mortgage refinancing in Nigeria stipulates 125% mortgage assets/collateral worth (BGL Research, 2013), hence the credibility of asset value that the mortgage lenders carry in their books becomes a crucial factor in the drive for sustainable housing finance. Second, the importance of sound property valuations for effective functioning of real estate mortgage market cannot be overemphasized, especially in the light of 2007-2009 global financial crisis

which many authors have traced to an artificially inflated market (Grunwuld, 2009; Udo, 2014; Simkovic, 2013). Financial crisis is worse where investors, lenders, and clients cannot trust the numbers. By way of illustration in the context of the present study, the financial press alluded to a \$24 billion suit by at least 3000 investors against a property portfolio that reportedly failed due to “inflated appraisals” (International Economy, 2010). Consequently, in order to preserve the integrity of financial statements and to minimize the likelihood of confusion in the financial industry, there is a growing tendency towards standardization of valuation practice such that, for example, regulatory authorities now expect valuation reports for real estate/mortgage companies to meet the minimum procedures set by the International Valuation Standards Council [IVSC] (2015), and Securities and Exchange Commission SEC (2009). Current regulations require in the Nigerian REITs market that a valuation report of firms’ real estate portfolio should be filed with SEC every two years by a valuer registered with SEC (SEC, Rule 262, 2009). Third, complying with the requisite international valuation skills and requirements has been identified as a major challenge facing practitioners in developing economies like Nigeria (Udo, 2015). There is almost a total lack of research on the application of the DCF method to mortgage valuations. Inadequate capability has made some practitioners to disregard deterministic asset tenure and assume perpetuity of fixed income streams, against explicit terms of underlying property titles, mortgage tenures, and anticipated economic prospects, thereby casting doubts upon the reliability of valuations. Thus, further conceptual research and investigation into the utility of the DCF model as attempted in this paper in the context of mortgages, may help in remolding valuation higher-education and capacity-building to mitigate these challenges. Fourth, the DCF valuation approach is basically research-driven; for instance, strong research and statistical capabilities are needed to deal with realistic estimations of discount rate and growth rate of cash flows in DCF applications; thus, this paper may provide insights on areas needed to strengthen investor-education, practice reforms and capacity-building initiatives by a cross-section of stakeholders in the valuation profession (Nubi, 2009), such as International Valuation Standards Committee (IVSC), Financial Responsibility Council (FRC), Estate Surveyors and Valuation Board of Nigeria (ESVARBON), the Nigerian Institution of Estate Surveyors and Valuers (NIESV), Nigeria Mortgage Refinancing Company (NMRC), and other relevant stakeholders, to assist valuation practitioners.

Literature Review

Factors responsible for false valuation

Damodaran (2011) suggests three broad reasons are responsible for false valuations, namely, (i) appraiser’s bias, (ii) uncertainty in the valuation environment, and (iii) the complexity that modern technology and easy access to information have brought into valuation practice. One would classify all these factors as basic ‘human’ forces that nearly all professionals in practice across jurisdictions contend against. It is observed that the respected author does not appear to consider inadequate technical understanding of requisite valuation methodology in itself as a major source of false valuation. However, in another breadth, the author advises valuers to steer away from basing valuation on ‘big’, uncontrollable factors that tend to increase the element of bias, but to make their valuations as detailed as possible, which the DCF model provides. Thus, if we recognize valuation methodology as the main issue and seriously addressed, perhaps the recurring problem of margin of error or ‘misjudgment’ in valuation practice can be significantly reduced, hence the motivation for this paper to provoke a rethinking of the mainstream thought. It is this paper’s contention that an improved clarity on valuation methodology that DCF offers including evidence-based lucidity on controllable property-specific factors such as realizable earnings and growth rate can help mortgage valuers to deal more effectively with valuation credibility problem.

The basic valuation techniques

The three basic valuation approaches are DCF (Discounted Cash Flow, or Investment/income Capitalisation Method), DMC (Direct Market Comparison) and DRC (Depreciated Replacement Cost) methods (UPDC REIT, 2014; Damodaran, 2011; Ifediora, 2009). The adoption of these methods for a particular property depends on the type and market condition of the property. To some investors, the DMC is the most reliable and used where there is a form of recent sales price; but in the author's view, given the experience of investors who followed the market rather than the true worth of their assets such investors should be better described as market-driven, not value-driven. The idea that market price or 'Open Market Value' is right has been badly dented (Udo, 2014). Cost method or Depreciated Replacement Cost (DRC) method is typically used for assets that have no comparable properties, sales or rental transaction evidence, but where current construction cost rates are available (Ifediora, 2009). Investment/income-capitalisation method is usually adopted in determining the market value of an income producing property in the form of rentals. This method should be adopted and DCF-modified for robust valuation of residential real estate mortgage properties because these properties are normally income-generating and there are evidence of current rentals passing on such properties nation-wide (Olusegun, 2008; Ifediora, 2009). Two or all of the above methods could be used for a particular property at a particular time by way of cross-checking figures. The general practice is that the valuer uses his discretion to adopt the most appropriate method suitable to that type of property being valued, but in the case of mortgages, the argument of this paper is that the use of DCF should be compelling, not discretionary, in view of the wide spillover overs of discretionary valuation practice on the global economy as evident in the subprime mortgage crises of 2007-2009.

The DCF provides value on the basis of present value of expected future cash flows of that asset, while DMC suggests asset value largely on the basis of the sale prices of comparable properties. In DMC, the mortgage value is based on active market prices, adjusted, if necessary, for differences in the nature, location or condition of the subject property. In Nigeria, a good number of mortgage valuations tend to focus on DMC (sales prices) without particular attention to the underlying fundamentals of parametric earnings and cash flow capacity of an investment property (William, (1938). Under DMC, it is generally assumed that it is easy to get 'market prices', but, as no two properties are exactly the same, the definition of 'comparable' becomes a subjective one, and a great deal of subjectivity thus arises when the valuer has to make the necessary adjustments for property peculiarities (site orientation, bedroom sizes, kitchen sizes and orientation, presence or absence of certain amenities, and so on). The DRC (or contactor's method) suggests value on the basis of 'cost' of replacing the asset, and the immediate theoretical error of the DRC approach is in looking at value solely from the 'supply side' economics, equating 'cost' with 'value', without considering the crucially important demand element; the true worth of an asset will not be the same as its cost, but a function of the expected benefits or cash flows derivable from that property (Damodaran, 2011). The central argument of this paper is that it is dangerous to sustainable economic aspirations to put mortgage valuation trust in DMC and DRC approaches. Admittedly, the determination of fair value for some properties for which there are no observable market prices (that trade infrequently and have little price transparency) may require the deployment of the DRC tool, but it is stressed that the DRC model as a mortgage value solution lacks the capacity to reflect the fundamentals of investment uncertainty, cash flow and tenure that are associated with collateral security.

Why DCF is crucial for dependable mortgage valuation

Discounted cash flow (DCF) model is a tool for determining the current value of a company using future cash flows adjusted for time value. The future cash flow set is made up of the cash flows within the determined forecast period and a continuing value that represents the cash flow stream after the forecast period. The essence of DCF approach for mortgage valuation is that it accounts for the time value of money, which aligns with value-creation and maximization objectives of investors and lenders (Brealey *et al*, 2014). Admittedly, perhaps, at initial recognition, the best evidence of the fair value of a mortgage property is the transaction price (i.e. the consideration paid or received for a new estate development project). In other common circumstances, the more appropriate valuation technique is the DCF model whose variables include only data from observable markets (UPDC REIT, 2014, p. 19). Of course, the DCF valuation results could be compared with other observable current market transactions in similar properties, but not as a primary basis for mortgage valuation. This means that, the only recognised and acceptable valuation technique for mortgage purpose is DCF. Under the DCF model (Damodaran, 2011), value of mortgage property is given as:

$$\text{Value of property} = \frac{E(CF_1)}{1+r} + \frac{E(CF_2)}{(1+r)^2} + \frac{E(CF_3)}{(1+r)^3} + \dots + \frac{E(CF_n)}{(1+r)^n} \quad \dots (1)$$

Where

$E(CF_t)$ is net cash flow (rental) in period t .

r is the discount rate reflecting the riskiness of estimated rental cash flow from the mortgage property.

n is the life (tenure) of the property.

In essence, we compute the present values of all payments and add them up to get the capital value of the subject property (Capiński & Zastawniak, 2011).

In effect, the DCF technique reflects the present value of streams of net cash flow that the mortgage investment property is expected to generate (William, 1938; Haugen, 2003). Fortunately, computers now perform most of the calculations that once dominated applied mathematics and can be leveraged to reshape the valuation profession (Stine & Foster, 2011; Susskind & Susskind, 2015); thus, achieving successful, credible and reliable valuation may simply depend on selecting and applying the correct method for answering a valuation problem.

Essence of discount rate in DCF model

As earlier noted, the DCF model provides asset value on the basis of present value of expected future cash flows of the asset (Damodaran, 2011). Thus, net rental cash flow, time period available to realize the cash flows, the growth rate of the cash flows and the discount rate are of critical interest, not only for the mortgagee, but also for the mortgagor, and these are the key parameters captured by the DCF model. The DRC and market comparison methods do not explicitly reflect these factors that are fundamentals to long-term investments like mortgages. Undoubtedly, there are issues regarding determination and application of the discount rate in particular, but the greater reliability of the DCF model (Damodaran, 2001) should be discountenanced because of these to such an extent that many practitioners to opt for 'quicker' results obtainable from DRC and market sales comparison approaches. The literature is fairly long and dense on the essence of discount rate in asset valuation (Richardson & Isaiah, 1946; Damodaran, 2001 & 2011; Brealey *et al*, 2014; Ifediora, 2009; Wikipedia, 2015).

The discount rate which is used in financial calculations is usually chosen to be equal to the cost of capital, or market rate of return. The discount rates typically applied to different types of assets show wide-ranging differences based on the risk-levels or relative disadvantages (e.g. marketability, liquidity, etc.) that an investor is likely to encounter in the exercise of ownership rights over particular assets. The Capital Asset Pricing Model (CAPM) is a good way of determining appropriate discount rate (Dugeri & Olaleye, 2008). The CAPM considers three variables that make up the discount rate, namely, risk-free rate, the beta, and equity risk premium. The risk-free rate is the percentage of return generated by investing in risk free securities such as government bonds or treasury bills. The beta measures how the market price of the asset reacts to a change in the market. Subject to requisite statistical tests of significance, a beta higher than 1 means that a change in share price is exaggerated compared to the rest of shares in the same market, while a beta less than 1 means that the share is stable and not very responsive to changes in the market. A negative beta means that the asset is moving in the opposite direction from the rest of the market or benchmark portfolio of assets. Equity market risk premium is the return on investment that investors require above the risk free rate.

The techniques for mortgage valuation rely greatly on the accuracy of the figures of cash flow on which the valuation is based. Investors and other stakeholders will have the discomfort of unreliable appraisals particularly in the event of foreclosures where realizations fall below expectations. Hence, having higher discount rates in DCF approach is advisable as a way of discounting NPV to a more realistic level and thereby giving investors a shield of protection, so that the in-built cushion will take care of changes in projections.

While it is important to guide against over-reliance on the mathematics of mortgage valuation or what has been described as information over-load (black-box syndrome) (Damodaran, 2011), it is equally important to bear in mind that the essence of the DCF model is ensure greater reliability which is thought achievable when the investor sees the individual components that form the valuer's assumptions.

The DCF model is not without limitations

Given some of its limitations, it is easy to see why non-DCF models are preferred in certain jurisdictions like Nigeria. Three DCF weaknesses are noteworthy. First, it is open to being manipulated or abused, hence the need for strict specification and enforcement of professional (regulatory) guidelines. Second, being multi-factor-dependent, the DCF is research-driven (relatively more information-dependent); it therefore demands a lot of capacity on the part of the valuation practice if valuation credibility is to be sustained. For instance, strong research and statistical capabilities are needed to deal with realistic estimations of discount rate and growth rate of rental cash flows in DCF applications (Damodaran, 2011; Capinski & Zastawniak, 2011; the latter authors seem to suggest that fluctuations of variables beyond 30 years will have an averaging effect that lend credibility to the result of investment valuations). Third, DCF may be criticized or despised as being 'academic' because its fundamental output may not accord with market moods or sentiments. Perhaps a concerted investor education drive may assist in dealing with this erroneous perspective, given the experience from the 2007-2009 global financial crises that basically arose from inflated, so-called 'market-based' valuations (Simkovic, 2013).

Regardless of the criticisms of the DCF model, it should be stressed that the DCF approximates intrinsic value of assets such that any deviation from the DCF estimate should be seen as a sign that the asset is over-priced or under-priced (Damodaran, 2011). Sustainability of cash flows (underlying asset benefits)

and risk are two critical investment fundamentals that so far only the DCF approach has been able to capture (equation 1). Information on market sales trend and construction costs are undoubtedly useful valuation inputs but they do not carry the prudential weights to form the basis for sustainable wealth appraisal. In essence, the DCF model is unlikely to give us the 'market value' that so repeatedly, but erroneously emphasized in guidance notes; rather the DCF will give us the 'intrinsic value' of mortgage asset that lenders and their clients need to make better-informed decisions about over-priced or under-priced mortgage properties and also design more realistic loan-to-value ratios in mortgage deal-making. In essence, valuation of investment properties is a recognised professional practice that acknowledges the fact that the real estate is prone to such a wide range of risks and uncertainties, including title risks, mortgage repayment risks, natural risks (such as fire, flood and earthquakes) that it has been pointed out that there is no one "correct" estimate of value (Natalwala, 2011). Acknowledging the diversity of 'value' concepts in the marketplace, International Valuation Standards Council (2000) and Appraisal Institute (2001) suggest "market value" as the more widely used conceptualization in investment market analysis, describing it as the most probable price a property should fetch on the date of valuation in a competitive and open market under all considerations requisite to a fair sale, the buyer and seller acting prudently and knowledgeably and assuming the price is not affected by compulsion or undue stimulus. Standard valuation practice for financial services therefore often differentiate "value" from "cost". This fundamental valuation concept has probably informed the inclusion of "valuation standards" in "financial reporting" under the recent Financial Reporting Council of Nigeria Act (2011). Value is the amount a particular purchaser agrees to pay and a particular seller agrees to accept under the circumstances surrounding the transaction. Cost, on the other hand, applies to production of real estate as different from its price (Appraisal Institute, 2001). This is a vital distinction, because in real estate valuation theory, the current value is usually not based on its historical costs; rather, it is based on the market participants' perceptions of the future benefits of its acquisition (Ifediora, 2009). In other words, the value of income-producing property is based on the income it will produce in the future; however, this does not imply ultimate future value since neither the experts nor the investors are expected to be fortune-tellers! Rather, robust valuation is the equilibrium price which incorporates all the information (location, urbanization, growth available to investors at the time of valuation (Brealey *et al*, 2014; Appraisal Institute, 2001; Aluko, 2007).

Minimizing the confusion about 'Price', 'Cost', and 'Value' in valuation framework

Under section 6 of the July 2015 proposed amendments proposed amendments to the international valuation standards exposure draft by the International Valuation Standards Council [IVSC] (2015), *Price* is an historical fact being the amount asked, offered or paid to exchange an asset or liability. IVSC recognizes that price paid may be different from the value which might be ascribed to the asset or liability by others, because of the financial capabilities, motivations or special interests of a given buyer or seller. On the other hand, *Cost* is the amount required to acquire or create an asset or to cancel a liability. When that asset or liability has been acquired, or created or cancelled, its cost is a fact. The IVSC establishes that *Price* is related to *Cost* because the price paid for an asset becomes its cost to the buyer and the price paid to cancel a liability is the cost to the holder, but neither Price nor Cost is to be equated to Value which is a different concept entirely, and a crucial one for mortgage valuations, because, unlike Price and Cost, *Value* is not a fact but an opinion of either: (a) the most probable price to be paid for the exchange of an asset in an exchange or for the transfer, settlement or discharge of a liability or (b) the economic benefits of owning an asset or the economic cost of holding a liability. A value in exchange is a hypothetical price and the hypothesis on which the value is estimated is determined by the purpose of the valuation.

Thus IVSC process of valuation requires the valuer to make impartial judgments as to the reliance to be placed on different factual data, or the assumptions that may be appropriate or the approach to be adopted in arriving at a conclusion. For a valuation to be credible, it is important that those judgments are explicit enough in an environment that promotes transparency and minimizes the influence of any subjective factors on the process. While the international standards acknowledges that there will be cases where subjective inputs are unavoidable, a valuer is expected to make assumptions about the relevance or weight that can be attached to these inputs, basically to minimize the valuer's subjectivity as much as possible. Perhaps, as suggested by Gambo (2014), the Nigerian valuation standards and guidance notes (NIESV, 2006) needs to be updated to align with the foregoing IVSC clarifications so as to fulfill its goal of ensuring greater clarity and compliance by valuers, considering the preponderance of the use of the Cost approach even when conducting valuation for income-producing properties in flagrant negation of extant the valuation standards and guidance notes (Fatokun, 2007, p. 4; NIESV, 2006, pp. 20-21, 24).

Market value is not rational

It is opined that part of the reasons for the confusion and inaccuracy in valuation is the continued basing of valuation process on omnibus 'market value', whereas recognition is also given to 'investment value' which may be higher or lower than the market value of the property asset (NIESV, 2006, p. 21). The normal standard requires that subject property be viewed as if for sale on the open market. 'Market Value' is defined as 'the estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in arms' length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently and without compulsion'. Practitioners tend to forget that there is a proviso for applying the market value concept: the exercise knowledge, prudence, and no party having no 'compulsion' to sell, the latter which would be inherently untenable in mortgage transactions. In the mortgages context where the highest display of knowledge and prudence to minimize foreclosures spate is imperative, it is contended that the DCF-based technique will provide a more appropriate valuation, true investment value of mortgage assets. In this context, perhaps the claim (NIESV, 2006, p. 19) that market value is 'the basis for valuing most resources in market-based economies' need to be subjected to comprehensive empirical investigation in the light of recent macroeconomic developments across the globe and the renewed calls to revisit the so-called 'open market value' valuation basis in an increasingly imperfect, volatile and unpredictable global financial markets (Udo, 2014; Derman, 2009; Soros, 2004; Bernanke, 2015).

Mortgage Lending Value (MLV)

Taking lessons from its application to stabilizing the German and some other European property markets, suggestions have been made for MLV, a value-at-risk concept, to be implemented in the Nigeria (NIESV, 2006: 23; Aluko, 2007; Onyike, 2013). In reporting MLV, the valuer assesses future marketability of the subject property by taking into account the long-term sustainability aspect of the property, the obtainable market conditions, rental revenue prospects in terms of current and alternative permissible uses of the property, but speculative aspects must not be taken into consideration. In essence, MLV indicates the value a property would achieve at any time during the period of the loan, in an open market sale at arm's length without force or coercion (Quentin, 2009). While the valuation practice in many developing countries such as Nigeria is grappling with the basic techniques (Ogunba & Ajayi, 2007), an introduction of higher-level approach such as the MLV may be considered pre-matured at the prevailing stage of development. At best, MLA and related idea of Forced Sale Value (FSV) would be regarded as ancillaries to fundamental technique of DCF proposed in this paper.

Nigerian mortgage industry in the global context

As earlier noted, the Nigerian mortgage industry is just evolving unlike in the developed economies of the world where the mortgage sector is a major contributor to economic development. Mortgage market depth and scope vary from country to country in terms of interest rate, property values, tenure, underwriting and risk management culture, default and foreclosure rates, as well as regulatory and supervisory coverage. For instance, the US mortgage industry is a major financial sector, with several initiatives created to enhance mortgage loans, property construction and home ownership. These initiatives include Government National Mortgage Association (known as the Genie Mae), The Federal National Mortgage Association (known as the Fannie Mae), and the Federal Home Loan Mortgage Corporation (known as the Freddie Mac). The US mortgage sector has been the center of major financial crises over the last century, with deficient mortgages resulting in the national Mortgage Crisis of the 1930s and the 1990s as well as the subprime mortgage crisis of 2007 which led to the 2010 foreclosure crisis which should serve as lessons to emerging markets like Nigeria (Simkovic, 2013). In Canada, CMHC (Canada Mortgage and Housing Corporation), the country's national housing agency created in 1946 to address the country's post-war housing deficit, provides mortgage loan insurance, mortgage-backed securities, housing policy and programmes, and housing research to Canadians, and generally help the citizens to achieve their homeownership aspirations. The UK mortgage industry of the United Kingdom has traditionally been dominated by building societies until recently when the share of the new mortgage loans market held by building societies significantly declined, as banks and hundreds of other financial institutions including, specialized mortgage corporations, insurance companies, and pension funds began to show more than passing interest in mortgages.

Part of the Federal Government of Nigeria's initiatives towards addressing the problem of scarcity of low-cost funding of the Primary Mortgage Institutions (PMIs) was the enactment of National Housing Fund (NHF) policy in 1992 which made it compulsory for every Nigeria earning up to ₦3, 000 (US\$15) monthly to contribute 2.5 percent of his monthly salary to the NHF. Commercial and merchant banks in Nigeria were to invest 10 percent of their loans and advances portfolio to the Fund, while the insurance companies were mandated to invest 20 percent and 40 percent of non-life and life funds respectively in the housing sector with 50 percent of this sum going into the Fund being managed by the Federal Mortgage Bank of Nigeria (FMBN) for on-lending to the PMIs and Real Estate Operating Companies (REOCs) or estate developers. In 2003, the federal government established the Federal Ministry of Housing and Urban Development and proposed a housing reform aimed at increasing the role of the private sector in housing delivery in the country, while government role would be limited to the development of primary infrastructure for new estate development, but the same FMHUD has now re-merged with Power and Works under the new Buhari Administration.

The overall challenges characterizing the Nigerian real estate mortgage industry have been well documented in many places, notably, Ebie (2011), Walley (2011), Subair (2010). The challenges include the following low homeownership rate with housing shortfall estimated at 17 million units, low level of effective demand arising from widespread poverty/generally low income of potential homeowners (only 20-25 percent of Nigerians are believed to be homeowners), lack of affordable housing with average level of GDP invested in mortgage housing is currently less than 0.5 percent compared to 25 and over 60 percent in some emerging and matured economies, high interest rate, cumbersome title acquisition, transfer, and perfection process, heterogeneous land practices in various parts of the country, high transaction cost compounded by the estimate that infrastructure costs account for up to 30 percent of housing projects, integrity problems among developers, inefficient building technology leading to high cost of construction, lack of uniform underwriting standards among mortgage companies (although this

now being addressed with the recent establishment of NMRC), dearth of long-term capital compounded by lack of a secondary mortgage market, inadequate skills/capacity due to lack of trained personnel in the industry, lack of empirical data/statistics especially of the informal sector, lack of credit history and ratings, lack of ability to verify income sources; weak enforcement of development control laws and regulations, and absence of clearly defined foreclosure law. Thus, the Nigerian real estate mortgage industry still has a long way to go in meeting the housing and capital needs of a rising population.

On the other hand, the increasing land cost provides opportunities for discerning mortgage lenders to initiate strategic alliances with landowners/governments for affordable, quality housing projects, taking cognizance of the zeal for higher standard of dwellings among Nigerians. Similarly, the high financing cost (manifested in the high interest rates and service charges) and inadequacy of mortgage loans present opportunities to PMIs to develop new, creative mortgage solutions, attractive mortgage instruments and real estate investment tools for pooling funds from various classes of investors for increased housing/mortgage development.

Valuation and recent developments in mortgage loan underwriting requirements

The new National Mortgage Refinancing Company (NMRC) is expected to become a major operator in the secondary mortgage markets towards ensuring access to adequate funding and create investor confidence in the Nigerian mortgage industry. The mortgage refinancing corporation is also expected to provide the much needed market stability and growth. Also, the development of uniform underwriting standards for the industry being facilitated by IFC/World Bank Group is expected to jumpstart the secondary mortgage market by creating pools of mortgages with similar characteristics, thus ensuring quality mortgages with PMIs adopting common underwriting standards.

Under the NMRC (2015) eligibility criteria, a mortgage loan may be used to finance the purchase of an existing home or refinance an existing mortgage loan. The eligible property for this purpose must be a single-family home or an apartment in a multi-unit building. Corporations are not eligible residential mortgagors under the Nigerian extant policy; only natural persons (including married couples) are eligible to borrow under the mortgage refinancing facility arrangement. The permissible mortgage amounts range between ₦1.5m (US\$7,500) to ₦50m (US\$250,000), for tenures ranging between 5 years and 20 years and current interest rate structure is fixed for the minimum period equivalent to the corresponding refinance. Prospective mortgagors should be PENCOM-compliant by ensuring that they maintain active Retirement Savings Account (RSA) with an approved Pension Fund Administrator (PFA).

Range of property values and valuation

Mortgagors are required to make equity contribution up to the respective amounts specified in Table 1, based on the value of the property determined at the time that the mortgage is underwritten and the equity must not come through a third party loan. The size of the required equity contribution or down-payment depends on the status of the mortgagors as self-employed persons have different requirements as specified in Table 1.

Table 1
Property values and equity contribution requirements for mortgage loan underwriting

Property Value (₦'000)	Required down-payment for employees	Required down-payment for the self-employed borrowers
0 - 20,000	20%	30%
20,001 – 40,000	25%	40%
40,001 – 50,000	30%	50%

Source: Nigeria Mortgage Refinance Company [NMRC] (2015)

The NMRC requires that the valuer must be professionally qualified in good standing with the Nigerian Institution of Estate Surveyors and Valuers (NIESV) and National Insurance Commission (NAICOM). However, mortgage valuers are expected to adopt “uniform appraisal process”, and international valuation standards, as well as to meet “certain minimum requirements” which are so far unspecified. Also, the lower of the purchase price and “Open Market Value” (OMV) of the property will form the basis for the mortgage loan. It is pertinent to observe that so far, the NMRC has not gone as far as to specify the exact valuation method that should be adopted by valuers when conducting mortgage valuation under the mortgage refinance facility. This methodological omission may again compound the general problem of valuation inaccuracy that motivated this study.

Future prospects of the mortgage industry in Nigeria

Going forward, the mortgage sector is likely to see a flight to quality in terms of better corporate governance, enhanced risk management practices and procedures with expected introduction of uniform mortgage underwriting and documentation standards/processes, improvements in the legal and administrative framework to support mortgage operations, commencement of Liquidity Facility Company as a pre-cursor to the secondary mortgage market for stable long-term funds, aggressive mortgage product innovation and improved customer services, increased participation of Pension Funds Administrators (PFAs) and insurance companies in housing finance, increased specialization/skills in housing and finance, implementation of the proposed ₦400 billion mortgage intervention Fund for developers under the FMBN, and increased mobilization of funds from the capital market through large-scale securitization of mortgage portfolio. A renewed mandate of PFAs to invest in mortgage-backed securities will be a harbinger to more floatation of Real Estate Investment Trusts (REITs), as well as a big incentive to profitable operations of PMIs. In all, the key success factors for the mortgage sub-sector includes access to long-term funding, existence of a functional secondary mortgage market, strong recapitalization, strengthening the legal and administrative framework to support robust mortgage operations, adequate risk management practices and procedures, product innovation, continuous research, and enhanced institutional capacity, skills and competence

Research gap

A summary of the literature reviewed for this study has been presented in Appendix A. Many previous studies provide a great deal of knowledge on mortgage finance and valuation in Nigeria, there is no known previous study that has explored the extent to which the DCF can be used to address the reoccurring problem of valuation inconsistency and inaccuracy. Descriptive studies on the industry such as those of Olaleye and Adegoke (2007), Baridoma and Ekenta (2013), and Onyike (2013) were insightful,

but the authors' contributions were on the mortgage finance sector generally without a particular focus on the valuation credibility issue that poses a risk to the sector. Others as detailed in Appendix A addressed various dimensions of the problem such as causes of client influence and exact margins of variance in valuation reports, which is a globally acknowledged issue as earlier noted (Damodaran, 2011) but research on the application of the DCF method to mortgage valuation process remains almost totally lacking. Therefore, the present paper is an attempt in filling this vacuum. The contribution of Ogunba and Ojo (2007) was particularly inspiring to this paper because of the authors' unambiguous suggestion that valuers should shift over to using the DCF method to ensure valuation rationality. Thus, the main contribution of this paper to the growing valuation debate is in reexamining the utility of the DCF model as a problem-solving paradigm shift towards facilitating and enhancing overall credibility and reliability of the appraisal process, particularly in Nigeria.

Objectives

An attempt is therefore made in this paper to explore the extent to which the DCF model can be able to address some of the 'credibility' concerns in conducting mortgage valuation, particularly in the Nigerian context. Specifically, the study was designed to achieve the following objectives:

1. To ascertain the level of adoption of investor-focused valuation approaches such as the DCF model in Nigeria.
2. To explore the utility of DCF in providing the true value of properties for primary mortgage finance in Nigeria.

Theoretical basis for the study

An action or proposal that is not informed by a philosophical or conceptual compass is shallow and often unsustainable (Moghalu, 2014), hence, to avoid such superficial outcome, the present study drew much theoretical inspiration from a wide range of value-creation theories contained in the valuation literature which basically conceives of value-creation in relation to 'market', 'cost', and 'cash' dimensions (Appraisal Institute, 2001; Kuye, 2008; Ifediora, 2009). Sustainable value-creation devoid of market emotionalism and sentimentalism thrives within the realm of intelligent investing based on intrinsic asset value and fundamental analysis thinking as promoted and advanced notably by Benjamin Graham, Warren Buffet, and Aswath Damodaran (Hagstrom, 1997; Graham, 2004; Graham & Dodd, 2009). In the end, this paper decided to follow the essential idea that a capital asset is no worth more than the net present value of its future cash flow (Hindle, 2008; Piketty, 2014), hence the paper's emphasis on the high utility of the DCF framework developed to transparently detail and evaluate this stream of financial benefits. In this context, it is further contended that reliable and consistent valuation is only obtainable in a system where all the practitioners use the same valuation method and almost the same data to solve the same valuation problem (Ogunba & Ojo, 2007; Crosby, 1992).

Methodology

The methodology adopted for the study is basically exploratory, proposing judicious and intelligent application of the DCF model towards reducing mortgage valuation subjectivity, more accurately defining standards and expectations, reflecting measures of mortgage value, and generally building more credibility and investors' confidence in the valuation system. The approach emphasizes the DCF because, in the final analysis, if true value is related to worth or economic benefit of an asset, the DCF model should rank top to determining assets intrinsic value if we are to avoid speculative estimates of

true value (Damodaran, 2011). The research design is justified by the need to obtain relevant evidence with optimum effort, time, and expenditure, having regard to the main purpose of the study which is purely formulative. Thus, the study was guided by the recommendations of Kothari and Garg (2014) which advise three general methods for exploratory studies, namely (i) survey of relevant literature, (ii) the experience survey, and (iii) analysis of 'insight-stimulating' examples, all directed towards enhancing better knowledge of the subject-matter. Online and offline sources for academic papers, conference proceedings, and websites and books that dealt with the subject-matter were searched and reviewed.

Case analysis

The case highlights further critical implications of relying upon three basic valuation approaches, namely, are DCF (Discounted Cash Flow, or Investment/income Capitalisation Method), DMC (Direct Market Comparison) and DRC (Depreciated Replacement Cost) methods (Damodaran, 2011; Ifediora, 2009). Following Stine and Foster (2011) and Susskind and Susskind (2015), the Microsoft Excel spreadsheet package was used for the analysis. The DCF model follows the formula given in equation 1, using 30 years tenure for the subject asset which is assumed to be a relatively newly-built standardized 3-bedroom bungalow in a medium density estate in Sangotedo area, Lekki. Discount rate was adjusted appropriately from prime property yield evidence (Ikoyi/VI, Lagos) currently averages 5.30-6.50% (UPDC REIT, 2014). Property and market data obtained for the analysis were as of 28th August 2015. At this time, the prevailing selling price of similar single-family units like the subject property was in the region of ₦22 million (US\$112,000). More sophisticated risk analysis and use of subjective probability estimates were excluded from the analysis for the purpose of maintaining simplicity and focus on the core aspects of the DCF; moreover, these additional variables remain tractable with the use of computer simulations.

Assumptions used on DCF and income-capitalization methods

- i. Number of years: Unexpired lease in the property is 30 years.
- ii. Rate of outgoing (deduction for repairs and maintenance): 10% of gross rental income.
- iii. Service charge for the maintenance of common facilities: Borne by the occupier along with other estate residents.
- iv. Current rental income: ₦900, 000 (US\$4,500) payable yearly in advance.
- v. Rent revision: 10% upward revision every three years
- vi. Capitalization rate (Income-capitalization): Prime (5.9%) + 1% = 6.9%
- vii. Capitalization rate (DCF): Prime (5.9%) + 0.5% = 6.4% (Risk-adjusted for higher-level certainty arising from the reflection of time value of cash flow revisions)

Assumptions used on DRC method (following NIESV, 2006, p. 24)

- i. Plot size: 410m²
- ii. Land value: ₦24,000 per m²
- iii. Gross Building Area: 110m²
- iv. Construction cost per m²: ₦183,000 per m²
- v. Add for external works: 5%
- vi. Add for construction professional fees: 5%
- vii. Depreciation rate: Nil; rather, real estate historically appreciates in value (Stutes, 2004).

Results and Discussion

It has been demonstrated (Table 2) that only 1 percent of practitioners deploy the DCF technique with more than half using the DRC approach, which, as we have seen have very limited role to play in investment valuations like we have in the Mortgages context.

Table 2
Valuation approaches adopted by Nigerian valuers

Valuation Approach	% Valuers adopting the Technique
Direct Market Comparison (DMC)	14%
Investment (Income-Capitalization)	8%
Depreciated Replacement Cost (DRC)	57%
Discounted Cash Flow (DCF)	1%
Others (Combined approaches, excluding DCF)	20%
Total	100%

Source: Gambo (2014)

Corroborating earlier findings (Aluko, 2007), Table 2 shows that, as of 2014, Cost or Contractor's method remains the most frequently used in mortgage valuation practice with more half of the respondents deploying the technique, despite that view of the literature that suggests the investment approach. At mere 1 percent user level, the DCF is virtually unused. The current evidence suggests that core valuation practice and expertise in Nigeria may be gradually eroded and being replaced with the unsustainable emphasis on contractor's approach to wealth assessment.

Valuation results of the Case analysis

Based on the above-mentioned assumptions, the tradition investment method will yield the results displayed on the computer as shown in Appendix B₁. Note that, in many practices, the traditional approach do not usually take into account the variations in cash flows as may be occasioned by void (vacancy) or rent revisions. In any case, the practitioner will usually proceed to round up the mathematical results and opine that the mortgage property is worth approximately ₦12 million (US\$61,000). Similar procedure is adopted in the case of the cost method which, as shown in the Appendix B₂, yield a value indication of ₦32 million (US\$161,000) for the same accommodation. However, when we applied the DCF method with all the requisite details of expected cash flow and time periods, the true value is reflected as approximately ₦15 million for the same property, as shown in Appendix B₃. In all, the resultant variances in methods and valuation results are summarized in Table 3.

Table 3
Case analysis: The variances in contemporary valuation methods and results

	DCF approach	Traditional Income-Capitalization method	Cost Method	Direct Market Comparison (DMC)Method
Valuation	₦15m (US\$76,000)	₦12m (US\$61,000)	₦32m (US\$162,000)	₦22m (US\$112,000)
Variance (i.e. valuation)	-			

times the true value approximated by the DCF)		0.80×	2.13×	1.5×
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Source: Author's analysis

Thus, as predicted by preponderant literature in the field, the Cost method overstates the mortgage value by more than twice, while the DMC displays variance of 1.5 times. A familiar result to seasoned Nigerian practitioners, the traditional income capitalization understates the asset's value by 20 percent, hence valuers disregards its usage. Notice that the three classical approaches – DMC, DRC, and Income-capitalization, do not give full consideration to the 'time' value of money, and it is this disregard for 'time' that forms part of the explanation for Africa's current state of underdevelopment (Moghalu, 2014: 20). However, the DCF has been shown to be more explicit and robust to reflect all the investor-desired 'time' parameters of asset value. Computer technologies are available (Appendices B₁, B₂, & B₃) to simplify the seeming complexity in using the DCF tool and to make the analysis easy for the average student or practitioner. Additionally, the computer can help to simulate and to demonstrate to the client the immediate implications of any manipulation or use of unrealistic assumptions, thereby minimizing the client influence syndrome. In essence, as indicated in some previous studies, notably, Ogunba and Ojo (2007), the current evidence in this paper has have gone some way in revalidating the utility of DCF tool as a veritable provider of true, consistent, rational value of qualified properties for sustainable mortgage finance in Nigeria.

Summary of findings and implications

The following critical findings emerge from this study:

- i. While several factors have been found to have caused the general inaccuracy of valuation among practitioners, variations in the methods used as a major cause of the problem has so far received limited attention. Application of the DCF tool to mortgage valuation has so far been negligible (1% user level) and this is traceable to a number of factors including lack of knowledge / awareness of the applicability of the concept by practitioners, lack of data, and lack of comprehensive valuation standards and guidance notes specifically on the DCF and mortgage valuations. The DCF valuation, being cash-and-time-based and thus an approximation of true asset value would not necessarily reflect the judgment of the market with all its greed, emotions, and sentiment (Udo, 2014; Damodaran 2011).
- ii. As shown in this paper, different appraisers adopting different methods in valuing the same asset will logically yield different results; as shown in this paper, the DRC overstates the mortgage value by more than twice, the DMC, by 1.5 times, while the traditional income capitalization understates the asset's value by 20 percent. In an environment where client influence on valuers is considered dominant (Nwuba *et al*, 2015), the use of such speculative methodological tools as DRC and DMC for solving purely investment problem as we have in

mortgages, is likely to overstate or understate the real worth of citizens' wealth, and this will not augur well for sought-after sustainable housing finance, overall financial system stability and sustainable economic development.

Conclusion

An attempt is made in this paper to proffer solution to the mortgagee valuation credibility problem in the Nigerian economic environment by proposing alternative valuation methodology founded upon the DCF model based on the ideals of greater accuracy and robust, explicit valuation. While many previous studies have looked at this problem from diverse perspectives but with some over-emphasis on the 'human factor', the present paper tried to provoke a paradigm shift to see the major issue at stake as one of 'methodology'. The current evidence suggests that core principles of valuation and expertise in Nigeria may be gradually eroded and being replaced with the unsustainable emphasis on contractor's approach to wealth assessment. The paper showed how deficiency in full and transparent application of pivotal valuation metrics of cash flow, risk, and growth might have contributed to the recurring valuation credibility problem in the Nigerian environment. Evidently, desirable reliable mortgage values could be more effectively and transparently captured by the Discounted Cash Flow (DCF) model, especially as this aligns with the preference of the investor for income-based estimates (Ajayi, 1998 & 2003; Ogunba & Ojo, 2007; Aluko, 2007). Thus, the paper has gone some way to reinforce the case for more consistent, supportable, and auditable mortgage valuations that the DCF model offers. In view of the results of this research study, a few recommendations are apposite:

- i. Specific valuation standards and guidance notes on mortgage valuation is currently lacking in the Nigerian context and this should be redressed urgently by ESVARBON and NIESV. The need for clearer and more comprehensive practice guidance notes on mortgage valuation is more pressing than ever before, having regard to the sustainability threat that persistent credibility problem poses to the future of valuation profession in a modern society that is continuously demanding higher-level services. There should be continuous demand for higher-level disclosure in mortgage valuation and, with 'market value' readily confused with 'market price', a more sustainable valuation paradigm shift towards discovering DCF-generated "intrinsic values" rather than the traditionally fluid "market values", is strongly advocated.
- ii. Mortgage lenders (PMIs) and NMRC should retain well-trained in-house valuers who will be required to verify all major inputs to independent valuation reports, and review the valuation methods used, as well as constructively engage with external valuers for clarifications where necessary. Leveraging technology (Susskind & Susskind, 2015), mortgage portfolios should be revalued with the DCF technique every 2-3 years so as to keep portfolio values in step with property market dynamics.
- iii. It is acknowledged that the DCF model is largely research-driven; for instance, strong research and statistical capabilities are needed to deal with realistic estimations of discount rate and growth rate of cash flows in DCF applications. To this end (so that valuers can "speak a common professional language" – Udo, 2015), the ESVARBON is urged to establish a CIPVD (Central Investment Property Valuation Database) to assist valuation practitioners nation-wide. Mortgage lenders should also be encouraged to maintain a similar database of mortgage values to track movements in property values

and this will additionally serve as additional source of data for the proposed CIPVD. The possibility of filing copies of practitioners' valuation reports with the CIPVD as part of data-gathering for market and practice development should also be explored.

- iv. While the DCF valuation framework may be criticized or despised as being 'academic' because its fundamental output will typically not accord with market moods or sentiments, perhaps a concerted investor-education drive may help in dealing with this erroneous perspective, reminding the same investors of their bitter experience from the 2007-2009 global financial crises which basically arose from false enjoyment of inflated, so-called 'market-based' valuations (Simkovic, 2013).

Scope for future research

A number of limitations in this study provide some useful scope for future studies. First, perhaps the mortgage valuation practice in more jurisdictions should be included in the next research so as to provide more comprehensive perspectives on the feasibility and prospects of DCF approach than has been provided by this paper. The claim (NIESV, 2006, p. 19) that market value is 'the basis for valuing most resources in market-based economies' need to be subjected to comprehensive empirical investigation in the light of recent macroeconomic developments across the globe. Second, as the present work is an exploratory contribution, the results should be subjected to further empirical investigations, focal group discussions, conferences and workshops on how the DCF model and related innovations like Mortgage Loan Value (MLV) can be leveraged to enhance mortgage valuation process, particularly in the Nigerian context.

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Appendix A

The Mortgage Valuation Debate in Nigeria: Summary of Literature Review

S/N	Authors	Data	Title/Aim	Methodology	Results
1	Nwuba <i>et al</i> (2015)	Focal Group Discussion	Client influence on valuation: valuers' motives	Cross-sectional survey	Evidenced existence of client influence on valuation and other factors
2	Nwuba <i>et al</i> (2015)	Focal Group Discussion	Clients' means of influence on mortgage valuation in Nigeria	Cross-sectional survey	Subtle client influence evidenced.
3	Boyd, <i>et al</i> (2014)	Delphi technique	Developing a practice-based body of real estate knowledge	Delphi technique	More practice-based knowledge is needed for real estate education and professional development
4	Akerele & Thomas (2014)	116 valuers in Lagos and Akure	Examining valuers' perception of the impact of client influence in residential property valuations in Nigeria	Descriptive and inferential statistics, factor analysis, Regression	Subjectivity and reward factors do not influence Nigerian valuers (It was not clear from the paper whether this

					evidence relates to Akure or Lagos or both)
5	Gambo (2014)	114 valuers in Abuja, Jos, and Bauchi (87% of the total population)	Response of Nigerian valuers to international valuation standards application: How far the journey?	Survey Design	74% of the valuers are not aware or do not consult international standards manual
6	Babawale & Ajayi (2011)	250 residential properties in Lagos metropolis	Variance in residential property valuation in Lagos Nigeria	Econometrics	Valuations exhibit inaccuracy
7	Ajibola (2010)	150 valuers in Lagos metropolis	Valuation inaccuracy: An examination of causes in Lagos	Survey Design	Key causes include dearth of data, outdated approach, and client influence
8	Ukabam (2008)	25 valuers in Lagos metropolis	Analysis of outgoings in income-generating properties in Lagos metropolis	Survey Design, descriptive statistics	Valuers' treatment of outgoings is diverse and arbitrary.
9	Iroham & Ogunba (2008)	195 valuers in Lagos metropolis	A search for an acceptable margin of valuation error: The Nigerian position	Survey Design, descriptive statistics	Valuers demonstrated as high as 17.5% variance due to client influence, among other factors.
10	Oloyede & Ayedun (2008)	129 Federal Government of Nigeria properties in four GRAs	Estate Surveyors and Valuers: Value inventors or assessors?	Secondary data	69% of valuations fell outside the $\pm 20\%$ reasonable margin of variance between the valuations and the final bid figures

Appendix A (Continued)

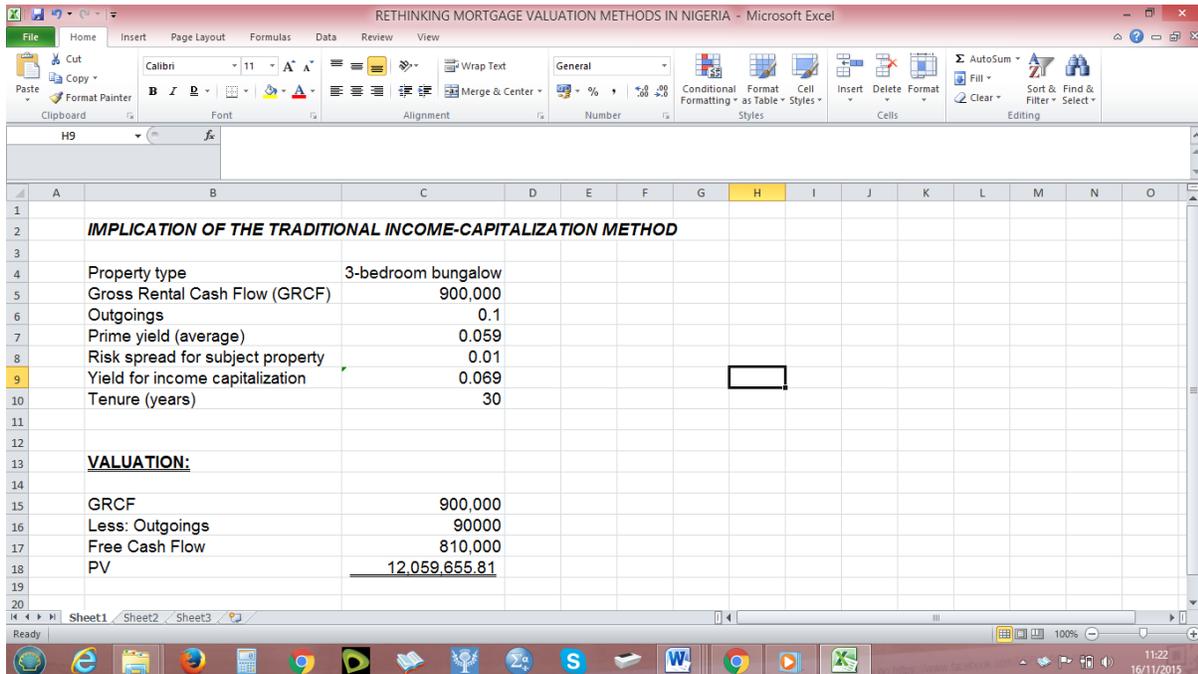
The Mortgage Valuation Debate: Summary of Empirical Literature Review

S/N o	Authors	Data	Title/Aim	Methodology	Results
11	Dugeri & Olaleye (2007)	Secondary data	Real estate portfolio management practice: The relevance of the Capital Asset Pricing Model (CAPM).	Content analysis	Relevance of CAPM revalidated
12	Adegoke & Aluko (2007)	122 valuers in Lagos metropolis	Heuristic behaviour in valuation practice in Lagos metropolis	Survey design	Valuers used anchoring and adjustment heuristic behaviour in arriving at their valuation.
13	Ogunba & Ojo (2007)	Content analysis of valuation theory and practice	Resolving reliability, consistency, and rationality problems of professionally prepared valuations in Nigerian practice	Exploratory design	All valuers should use the same economically sensible method (investment method). DCF model recommended.
14	Aluko (2007)	59 valuers in Lagos Metropolis	Implications of the current trend in mortgage valuation practice in Nigeria	Descriptive methods, ranking mean, relative important index ranking	Inconsistency among valuers demonstrated; also mortgage valuation reports were found not to have met the requirements of lending institutions.
15	Ogunba & Ajayi (2007)	Content analysis using the UK valuation	Response of Nigerian valuers to increasing sophistication in	Content analysis	Nigeria is in stage two of the seven-stage process of movement

		transition stages	investors' requirements.		towards investor-focused practice.
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Source: Compiled by the author (2015)

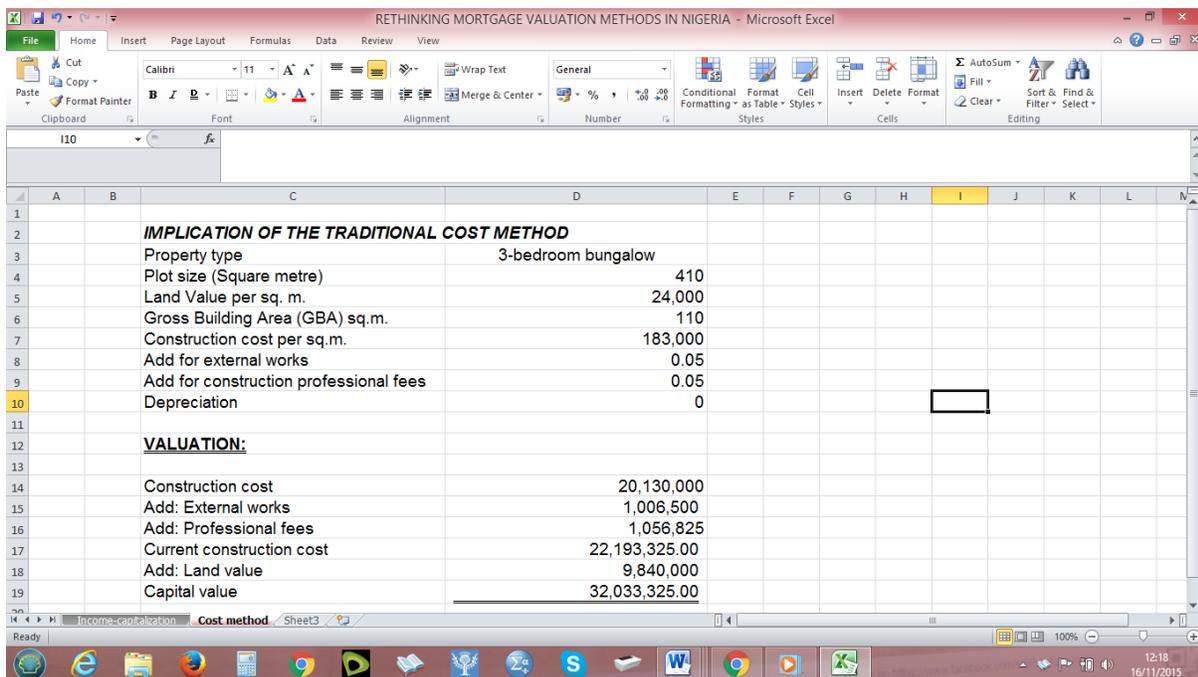
Appendix B₁: Implication of the traditional income-capitalization method



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2		IMPLICATION OF THE TRADITIONAL INCOME-CAPITALIZATION METHOD													
3															
4		Property type		3-bedroom bungalow											
5		Gross Rental Cash Flow (GRCF)		900,000											
6		Outgoings		0.1											
7		Prime yield (average)		0.059											
8		Risk spread for subject property		0.01											
9		Yield for income capitalization		0.069											
10		Tenure (years)		30											
11															
12															
13		VALUATION:													
14		GRCF		900,000											
15		Less: Outgoings		90000											
16		Free Cash Flow		810,000											
17		PV		<u>12,059,655.81</u>											

Source: Author's analysis (2015)

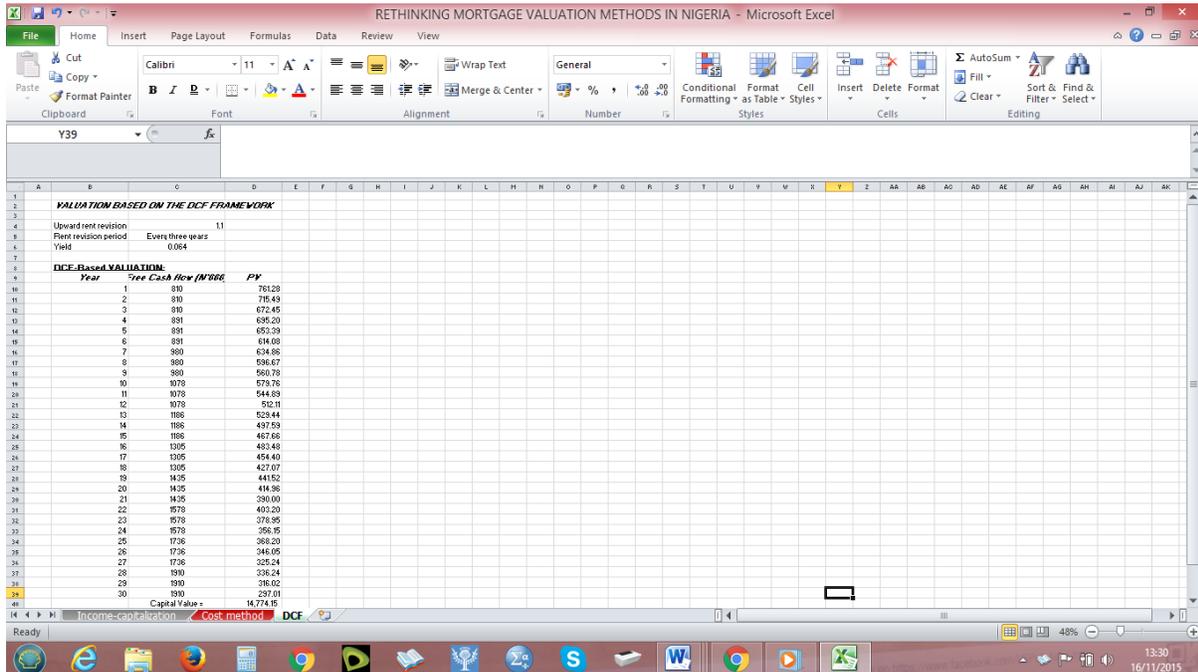
Appendix B₂: Implication of the traditional Cost method



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1															
2		IMPLICATION OF THE TRADITIONAL COST METHOD													
3															
4		Property type		3-bedroom bungalow											
5		Plot size (Square metre)		410											
6		Land Value per sq. m.		24,000											
7		Gross Building Area (GBA) sq.m.		110											
8		Construction cost per sq.m.		183,000											
9		Add for external works		0.05											
10		Add for construction professional fees		0.05											
11		Depreciation		0											
12															
13		VALUATION:													
14		Construction cost		20,130,000											
15		Add: External works		1,006,500											
16		Add: Professional fees		1,056,825											
17		Current construction cost		22,193,325.00											
18		Add: Land value		9,840,000											
19		Capital value		<u>32,033,325.00</u>											

Source: Author's analysis (2015)

Appendix B₃: Valuation based on the DCF method



The screenshot shows an Excel spreadsheet with the following data:

VALUATION BASED ON THE DCF FRAMEWORK			
Upward rent revision			11
Reversion period	Every three years		
Yield	0.064		
DCF Based VALUATION			
Year	Free Cash Flow (N'000)	PK	
1	810	761.29	
2	810	716.49	
3	810	672.45	
4	891	685.20	
5	891	653.29	
6	891	614.09	
7	880	634.86	
8	880	596.67	
9	880	560.79	
10	978	579.76	
11	978	544.59	
12	978	512.11	
13	1188	529.44	
14	1188	497.59	
15	1188	467.68	
16	1305	483.48	
17	1305	454.40	
18	1305	427.07	
19	1435	441.52	
20	1435	414.36	
21	1435	389.09	
22	1578	403.20	
23	1578	378.95	
24	1578	356.35	
25	1736	368.20	
26	1736	344.05	
27	1736	325.24	
28	1910	336.24	
29	1910	316.02	
30	1910	297.01	
Capital Value		14,774.15	

Source: Author's analysis (2015)