The Non-Application of Annuity Due Assumptions in Conventional Investment Method of Valuation in South-East, Nigeria

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Abstract- Due to the increasing criticism that the value estimated from conventional investment method of property valuation practice in the country does not accurately predict market price, this study examined the ability of estate surveyors and valuers to estimate accurately the selling prices of residential properties in the south-east geopolitical zone of the country using conventional investment method and reasons for the unreliability, if any. The aim of this study is to identify factors responsible for non-use of annuity due in conventional investment method of properly valuation, if proven unreliable. To achieve the objectives of the study, questionnaire backed up with interviews were administered on the population of ninety-eight (98) registered firms in Aba, Enugu. Onitsha, and Owerri towns. Data obtained were analyzed with the use of the relative importance indices (RII). From the analysis, the factors which may be responsible for unreliability of the convention investment method we; lack of standardized valuation inputs and problem of lack of up to date property data bank to assist valuers in determining valuation inputs. The challenges of the method in the study area are; lack of standardized approach to determination of valuation inputs and this affects the variability of results. The analyses also, show problems of lack of standardized up to property data bank to assist the valuers in determining the inputs to use for conventional investment method of valuation assignments. The study therefore recommends that the Nigerian institution of estate surveyors and valuer (NIES67 in collaboration with estate surveyors and valuers registration board of Nigeria (ESVARBON) should encourage the application of annuity due valuation models in conventional investment method of valuation. The private entrepreneurs should be encouraged to undertake the establishment of computerized property data bank which should be globally accessible and regularly updated.

Indexed Terms- Conventional investment method reliability, annuity due models, South-East of Nigeria

I. INTRODUCTION

Though valuation is an estimate of opinion which is subjective, reflecting individual valuer's market information and experience; in a relatively stable market conditions, the acceptable margin of error is around plus or minus ten percent Hager[1985]. The need for a study that resolves the issues has been done by paying adequate attention to valuation methodologies in the United Kingdom, Australia, Canada and the United States of American Parker[1983]. The focus has been on the seemingly inability of the methods to represent market prices or serve as a measure of security for bank loans. In Britain, for example, the inadequacy of the valuation methods was clearly recognized in the property market collapse in 1973 and in 1990's when companies' property assets were at risk and properties were sold substantially below or in excess of valuation estimates Crosby, French, Ward [1993]. The estate surveyor and valuer, in an editorial on property valuation and the continuing credibility problem contained inter alia the following: "The valuation process has been the focus of recent debate and controversy both within and outside the profession NIESV[1998] Cases of two or more valuers giving as many different capital values, with wide margins of variation, for the same property are common". The editorial commented on a paper by Ogunba and Ajayi which concluded that valuations in Lagos are inaccurate, based on empirical studies in Lagos and stated that t*his should stir valuers in general into action, especially against background of*

the incursion attempt of competitors into several areas of our professional practice by engineers, facilities managers, quantity surveyors and accountants, Ogunba Ajayi [1998]. The editorial identified inadequate training and lack of professionalism among members as a major cause of credibility problems. Unfortunately, it appears that the concern and fears expressed in 1998 on the quality of valuation opinions with respect to the credibility problem (i.e. consistency of opinions amongst valuers) are still very much around. For example, in recent years, there has been report from the professional practice committee of the national council of Nigerian institution of estate surveyors and valuers, of two valuers expressing opinions of value on the same property with very wide margins. The problem is not that of inconsistency between firms but also bothers generally on reliability of value opinion being capable of predicting the market price of the property. In their assessment of accuracy of valuation in the residential property market of Lagos, Ogunba and Ajayi found that valuation estimates were not a good proxy for actual sale prices in Lagos *Ogunba Ajayi [1998]. The* statistical tests undertaken in their study depicted high degree of unreliability of valuation estimates relative to market prices in Lagos therefore the main issue relates to both non-reliability and inconsistency of valuation in Nigeria, the additional factors inherent in the country's property market such as payment of rent in advance, capitalization rate and dearth of market evidence, contributed to the unreliability of the use of conventional investment method of valuation adopted from the United Kingdom. The cost of borrowing is also so high in the country that a wise borrower will not set up a low sinking find as is usually the case in the valuation, thus the problem of low accumulative rate as well as the existence of three variables as stated above by Kalu, which increase discrepancies in the result of valuers, Kalu [2001]. The conventional term and reversion investment model presented in successive edition of the standard text book, modem methods of valuation, (and employed in Nigeria) is facing increasing criticism worldwide as overvaluing the term and under valuing the reversion. The over valuation of the term is due to the use of yield which has growth potential to capitalize an income that is fixed (rent in term is fixed). The under valuation of the reversion arises because of the conventional use of the full rental value as at the date of valuation for valuing

the reversion in future. At the same time, the conventional investment model is rigidly facing criticism from stock broker for using yield which is not comparable with yields used in the stock market for other investment media (Stocks, shares etc.) [7]. These business professionals desire to have yields from real estate to use for cross investment media performance measurement (in portfolio management), and have been calling for a new model in valuation which values the terms and reversion appropriately and at the same time uses a type of yields that are used in other investment markets (equated yields). The study therefore aimed at identifying factors which may be responsible for the inaccuracy of conventional investment method of property valuation.

II. LITERATURE REVIEW

The present value of an annuity of N1 is called years purchase, defined as :the value of the right to receive or the obligation to pay N1 each year for a given number of years at a given rates of compound interests" The term 'year's purchase' probably derives from the fact that the value of an annuity is the product of one year's net income and the present value of N per annum factor (i.e capitalized annuities). In the process of capitalization of het income, account should be made of whether the annuity income is received at the beginning of the time period (in advance) or at the end of the time period (in arrears). If the payments are made at the end of each time period, it is called an ordinary annuity. These annuity series for ordinary annuities (i.e. when rent is receivable in arrears represented as following

$$YP = \frac{1}{(1+I)} + \frac{1}{(1+I)^2} \quad n \quad + \quad \frac{1}{(1+I)}$$
…………………………… (1.1)

But where the payments are due at the beginning of the period, it is called an annuity due. The rent receivable in advance coincides with the end of year (n-i). Thus, the annuity would accordingly be represented as follows

$$YP = 1 + 1/(1+i)^{+1}/\ldots+1/(1+i)^2/(1+I)^{n-1}$$
…………………1.2)

The difference in annuity streams between ordinary annuity and annuity due situations in equations (1) and (2) above give rise to considerable variation in the YP models for rent in advance and rent in arrears. In Nigeria, lease and rent payment are largely based on rent Payments in advance and most lease and tenancy agreement contained such, and therefore valuation models should reflect annuity due modeling. However, most valuation practitioners still used valuation tables based on ordinary annuity (rent payment in arrears) and this invariable leads to irrationality and in some cases inaccuracy of the valuations. Some factors are responsible for the continued usage of this ordinary annuity assumptions contained investment valuation models in valuation tables even when the rent payment terms in Nigeria leases do not agree with assumptions of the valuation tables modeling. This section of the research work will review literatures with a view to teasing out factors that potentially militate against the use of annuity models.

The first edition of Parry's Valuation Tables published by the Estate Gazette in 1913 assumed that rental income was receivable annually in arrears because rent at that time was being paid at the end of the leases instead of at the beginning of the leases in UK. The annuity series adopted was that of:

$$\frac{1}{(1+I)} + \frac{1}{(1+I)} + \frac{1}{(1+I)}$$
……………………..(1.3)

$$YP_{single\ rate} = 1\text{-}PV = \frac{\frac{1}{(1+I)}}{i} = \frac{1-1}{\begin{array}{c} n \\ \hline i \end{array}} = A\text{-}1$$
……………………..(1.4)

A - 1

Using this annuity pattern of equation Parry's tables summarized the VP single rate formula as:

$$YP_{single\ rate} = \frac{1-(1+i)\text{................................}(2.5)}{4[1-\ 1\ ]}$$

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However, the pattern of receipt of rental annuity in UK changed in the later part of the twentieth century and rents began to be received quarterly in advance. However, several revisions of Parry's Tables till 1990's

continued with the assumption that rent was payable annually in arrears. Reason adduced for this was the conservatism nature of the UK community, which did not allow it to respond quickly to investment formula changes required by the change in rent payment patterns. Ajayi (2010) cited in Ogunba (2012) said that another factor that could possibly be responsible for the reluctance to change is the supposition that the investment model based on ordinary annuity assumptions could still give accurate results, the wrong annuity assumptions not withstanding since Crosby (1992) observes that if all Valuers in a market employ the same methods, then an accurate model tends to result notwithstanding, but the irrationality is a critical point here and should not be ignored. Valuation literature in the UK by 1970's started to recognize inappropriateness of the existing ordinary basis of Parry's Tables and the academic began to derive YP formulae for annuities based on rent in advance. The first formula based in rent payment in advance was put forward by Rose (1977). He believed that a factor that might possible inhibit the valuation practitioners in adopting rent in advance formulae might be the lack of valuation tables, he consequently, produced tables based on dual rate YP tables adjusted for tax and calculated on the basis of rents and sinking fund Statements, being paid annually or quarterly in advance. Rose's Tables considered income receivable quarterly in advance with interest credited annually. His formula for the YP to be applied to an income receivable quarterly in advance was where the annual nominal rate of interest is. Yet another advocate for change in investment modeling based on rent payment patterns was Babcock (1978) who also produced rent in advance tables to assist the valuation community in transiting to rent in advance based formula. He thus, considered the formulae of income receivable quarterly in advance and interest credited half yearly. Compare to Rose, he produced this tables based on the fact that when one refers to a nominal rate of say 8% one is talking of an effective rate of return higher than 8%. He considered that most investments have less than annual conversions and that most investment interests are actually converted on a half-yearly basis. His tables employed the same formulae as Rose's, except that in the formulae represented the annual effective rate of interest rather than nominal rate. Valuation texts produced by the UK academia in the 1980's and 1990's such as Enever (1981), Richmond

(1985), Baum & Mackmin (1989) and Isaac & Steley (1991), began to include the rent in advance formulae in their texts, nothing the greater appropriateness and accuracy would result from the profession changing over to rent in advance formulae. Isaac and Steley (1991) noted that recognition of the rent income pattern is essential for analysis so that the correct discount rate is used for the income pattern being valued. The various texts equally noted that in their country, it was customary for interest to be credited at periods of less than annually, confirming Babcock (1978) assertion. The texts therefore emphasized that the of interest used in calculations of compounding and discounting must be effective rate for the period rather than the nominal rate. Worthy to note is that advocacy for annuity due modeling are contained only in isolated chapters of all these texts. The other chapters adopted the rent in arrears credited annually assumptions because according to them, arrears assumptions were still what it is "most familiar to practitioners (Enever & Isaac, 2002). This suggest that a factor that could potentially militate against the use annuity due in Nigeria is Valuers non-familiarly with rent in advance formulae i.e. lack of popularity of annuity due modeling. Baum and Mackmin (1989) had that Valuer who switches over to the use of quarterly in advance formulae must be sure that they adopt the proper market relationship between income patterns and yields in their valuation work, that where the basis of quoted market is an arrears basis for instance, it would be inappropriate to transpose it to an in advance calculation. They also pointed out that the use of quarterly in advance tables for the valuation of income received on the basis may be questionable, as it is very rate that a valuation date will coincide with the date when an installment of rent is due; and again, the actual income pattern may in fact resemble a quarterly in arrears income even though the lease may stipulate a quarterly in advance payments. Not withstanding the view enunciated by the UK academia on the appropriateness and accuracy of the use of annuity assumptions, the professions in the country continued to use rent in arrears formulae both in practice and their textbooks. The advocacy for a wide spread use of rent in advance formulae issued a paper in 1991 propagating the use of quarterly in advance valuations. They rejected the continued use of the all-risk yield as a nominal market bench marks based on the assumptions that rents are received annually in arrears

arguing that this did not reflect the reality of the market and advocated that UK practitioners should move towards valuation techniques that reflect the actual timing of the cash flow. Their tables (based Co rents receivable quarterly in advance) is based on the assumptions that capital values would remain the same -as the profession changed to a quarterly approach. This is another - evidence that the absence of annuity due tables could potentially militate against the use of the annuity due models. This prompted Davidson (2002) to include the quarterly in advance table formulae in the twelfth edition of Parry's Valuation Tables. The tables provided for the direct conversion of nominal yields where income is received annually in arrears to effective yield (or equivalent yield) where income is received quarterly in advance and vice versa.

The conversion tables were based on the following formulae:

$$i = 4[1-(1+r)-1/4]\dots\dots\dots\dots\dots\dots\dots\dots(1.6)$$
$$\frac{(1)}{-1}$$

$$r \qquad = \qquad 1(-^1/^4)^4$$
$$\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1.7)$$

i. Here is the nominal yield, while r is the effective yield. Parry's Tables nevertheless, retained the traditional approach to calculate of year's purchase, where income is deemed to be received annually in arrears in the same volume in the effort to satisfy both advocates of quarterly in advance valuation and traditional adherents to annual rent in arrears valuations. Davison's provision of conversion tables suggests that a factor that could encourage adoption of rent in advance formulae is the provision of conversion tables. The campaign for the adoption of rent in advance tables in the UK has not yet affected the principal UK valuation textbook Johnson et al (2000) in the preface to the ninth (the most recent) edition of the standard UK text "Modem method of valuation", noted the campaign of the investment property forum (IPF) to persuade Valuers to switch over from the rental payment assumptions of annuity in arrears to quarterly in advance and stated that they actually discussed the issue with the IPF. The authors however decided to retain the use of ordinary

annually formulae and tables as they believed that this still reflects.

ii. The general practice throughout the profession. They, however, observed in their prefatory comments that they "would not be surprised if they had to switch to quarterly in advance for tenth edition". Such observations again suggest to us that two factors potentially militating against the use of rent in advance formulae are by the non-familiarly with rent in advance formulae by the value, and the absence of regulatory instructions from RICS which apparently has not taken a firm stand on the matter. Tipping (2006), more recently observed that there is an increasing tendency towards a monthly in advance residential rent payment pattern in the UK following residential tenancy reform in eighties and nineties. He observed that Parry's table (Davidson, 2002) provides formulae to change from nominal annuity in arrears tables to effective quarterly in advance table, but argued that it is now appropriate to also present formulae to address monthly conversion. He observed that this should not be a problem for Valuers especially since the computer has made the formulation and use of valuation models easier. Using Davidson (2002) approach for the conversion of nominal and effective yields with respect to monthly in advance rental patterns as followings for the conversion from the effective yield based upon rents receivable monthly in advance to nominal yield:

$$i = 12 \ (1-[1+r]^{-1/12}) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. \ (1.8)$$

For the conversion from the nominal yield to the effective yield based upon rent receivable monthly in advance:

$$r = \boxed{\dfrac{1}{1(-1/12)^{12-1}}} \qquad \ldots\ldots\ldots\ldots (1.9)$$

The observations of Tipping (2006) suggest that a factor that could potentially militate against the use of annuity due models in place of quarterly in arrears modeling is that quarterly in advance modeling does not reflect the emerging monthly in advance that are increasingly common in UK leases, and there is no modeling available to take care of the monthly modeling. Yet another reason why historic practice

may have to continued in the UK is the relatively low yields on prime properties, meaning that the impact of the changing the formula used was not very significant on capital values and was relatively small compared with Changes in the yields when interest or term structures move up or down. Again the historic Practice may continue because the investment method is just one method of arriving at a capitavalue. The direct comparison method was and is still available as a check on the reliability, of value figures derived by the investment method of valuation. However, this comparison method as a check does not make the traditional method, if used to become rational method. In summary, some progress has been made in UK towards appropriate annuity modeling, though the professionals and textbooks are still conservatively reluctant to make a full conversion from annuity in arrears to quarterly or monthly in advance.

Most of the limited Nigeria discussion on annuity due models were mainly in textbooks. Valuation teachings in the country were originally based on the UK textbooks, particularly the "Modem Methods of Valuation", which is still reluctant to use rent in advance formulae. The indigenous valuation textbooks (Ifediora, 1993; Ajayi, 1998; Kuye, 2000; Kalu, 2001; Udechukwu, 2006; Kuye, 2009 etc) equally based their calculations on the assumption of rent receivable in arrears. The reason given by the authors for the continued use of ordinary annuity assumptions is that rent in advance formulae is not yet popular in use. This is similar to the reason put forward by authors of "Modem Method of Valuation". Also out of the three valuation tables produced in Nigeria, two tables (Ifediora, 1996 and Udechukwu, 2009) use the same ordinary annuity formulae as that employed in early editions of Parry's Tables. The third table (Adeyemi, 1998) however, partly used annuity due formulae with interest credited annually. Adeyemi in his prefatory notes suggested that factor responsible for the continued use of the ordinary annuity models in Nigeria was that there are "no tables to assist Valuers in this respect so as to arrive at a dependable solution to the problem of how much which usually confronts property investors". His tables were significant step in advocacy for annuity due modeling assumptions. He however, uses rent in advance formulae for some computations in his tables and rent in arrears computations for others. Some recent

valuation textbooks (Udo, 2003; Ifediora, 2005) presented rent in advance formulae as exercise in model building, even though calculations in their respective texts still mostly reflect the use of old UK rent in arrears formulae. The UK rent in advance series YP for rent received annually in advance was summated in Udo's text to;

$$YP \quad 1 - 1$$
$$(1+i)^{n-1} \quad \dots\dots\dots\dots\dots\dots\dots (1.10)$$
$$YP = 1 + YP_{(n-1)} = 1 + i$$

The alternative US oriented formula put forward in Ifediora's text is as follows:

$$YP = \frac{(1-PV)(1+i)}{i} \quad or \quad \frac{(A-1)(1+i)}{iA} \dots\dots\dots\dots\dots (1.11)$$

Though the two formulae appear different, they are both correct, and provide the same answer (Ogunba, 2012). Only three academic papers (Okoye, 1994; Ajayi, 2010; Ogunba, 2012) have discussed the issue, advocating for the use of rent in advance formulae. Okoye's paper used worked examples to demonstrate the arithmetic inaccuracy of rent in arrears calculations. Ajayi's paper was an inaugural lecture which among other things advocated for increased rationality through the use of rent in advance formulae in Nigeria while Ogunba's paper carried out an empirical study on factors driving continued use of ordinary annuity modeling, but concentrated on Lagos metropolis alone. The above shows that there is a substantial gap in the literature on the use of rent in advance formulae in Nigeria, especially in the south East.

III.   METHODOLOGY

Data for study was collected from the sample size of 98 estate surveyors and valuers from 98 estate surveying and valuation firms in the four major towns in the south east geographical zones, where estate surveying and valuation practice is most active: The towns are Aba, Enugu, Onitsha, and Owerri. A total number of 98 registered estate surveying and valuation firms have their offices in these towns. This figure

represented about 100% of the total population of estate surveying and valuers firms, which is in line with the recommendation of Nwana, which recommended a minimum of 40% of the total population when the population is in few hundredS [37]. The data collected was analyzed using relative important indices (RII).

IV.   ANALYSIS OF DATA

In attempt to determine empirically whether Estate Surveyors and Valuers in South-East, Nigeria, make use of annuity due assumptions (payment of rent in advance) tables in their valuation assignment, the respondent Estate Surveyors and Valuers were asked to indicate how often they use annuity due assumption when adopting investment method of valuation. The responses are as indicated in Table 1.9 below.

Table 1: How often do you use annuity due assumption when adopting Investment Method of Valuation. Response

Response	Frequency	Percentage
Always	2	3%
Most of the time	3	5%
Sometimes	5	8%
Never	50	84%
Total	60	100%

Table 1 shows that majority of the Estate Surveyors and Valuers in the South-East about (84) never make use of annuity due assumption (payment of rent in advance) even when rents are being paid in advance, sometimes up to 5years. To really fmd out why the continuous application of ordinary Annuity (Rent in arrears) models instead of Annuity due (Rent in advance) models, when rent are actually being paid in Advances in the country, the study inquired into factors responsible for these continuous use of the Ordinary Annuity model for investment valuation purpose. Table 2 indicates result of the reasons for their continuous adoption of the models.

Table 2: The Assessment of factors responsible for the continuous use of the ordinary Annuity (Rent in Arrears) model by Estate Surveyors and Valuers in South-East Nigeria for Investment Valuation purposes.

Factors/Reasons	Strongly Agreed W=4	Agreed W=3	Disagreed W=2	Strongly Disagreed W=1	Total	RII	Ranking
Non-familiarity with rent advance method because it is not taught in school.	15 wf=60	20 wf=60	13 wf=26	12 wf=12	60 (158)	2.63	2nd
Reluctances of valuers to adopt models that are not yet in popular	14 wf=56	20 wf=60	13 wf=26	13 wf=13	60 (155)	2.58	5th
Non-available of rent in advance valuation tables	15 wf=60	17 wf=51	15 wf=30	13 wf=13	60 (154)	2.57	6th
Rent in advance tables are available but not easily procured.	14 wf=56	16 wf=48	14 wf=28	16 wf=16	60 (148)	2.47	7th
Ordinary annuity calculation give reliable opimix of value.	15 wf=60	18 wf=54	16 wf=32	10 wf=10	60 (156)	2.6	3rd
The rent in arrears model is the model client understand.	9 wf=36	19 wf=57	18 wf=36	14 wf=14	60 (143)	2.38	8th
Absence of regulatory instructions from NIESV & ESVARBON to reflect Annuity Due model	15 wf=60	20 wf=60	11 wf=22	14 wf=14	60 (156)	2.6	3rd
Valuation accuracy does not depend on model but the valuers experience.	21 wf=84	19 wf=57	11 wf=22	9 wf=9	60 (172)	3.87	1st

Cursory look to Table 2 above shows a bewildering array of reasons why Estate Surveyors and Valuers in the South-East geopolitical zone still adopt annuity due in their investment valuation assignments. These ranges from their belief that valuation accuracy does not depend on the model applied but the Valuers experience, (R11=2.87), non-familiarity with rent in advance model because they were not taught that in school (R11=2.63), ordinary annuity calculations give a reliable opinion of value (RI1=2.6) and absence of regulatory instruction from the Institution and the Board (NIESV & ESVARBON) to reflect annuity due in their valuation assignment (R11=2.6). Other reasons are; the reluctance of Valuers to adopt models that are not yet in popular use (RTI=2.58), none availability of rent in advance valuation tables (R11=2.57), rent in advance tables are available but not easily procured (R11=-2.47) and lastly, that the rent in arrears model is the model client understand. These reasons adduced above are completely not true especially such as reasons like non availability of rent in advance table, the high cost of procuring the available once, the accuracy of the use of rent in arrears models etc. However the regulating body such as the Nigerian Institution of Estate Surveyors and Valuers (NIESV) and the Estate Surveyors and Valuers Registration Board of Nigeria are encouraged to make it a policy for Valuers to adopt the annuity due model in the valuation assignment when using Investment method of valuation in order to reflect the current reality in property market.

CONCLUSION

The study has shown that the causes of non-use of annuity due models (if any) could be traceable to inappropriate and inconsistent use of valuation inputs (annuity due models). This raises various implications on the quality of academic and professional training received by most practicing estate surveyors and valuers. The study therefore recommends that NIESV should make it mandatory for all estate surveyors and valuers to submit relevant data (sale figures, rental values, outgoings, yield rates etc.) on all transactions with respect to property sales and letting compulsorily for the purpose of building and regularly updating a data bank. Each state chapter of NIESV should be mandated to establish such a property data bank and review periodically to make such data continually relevant. Such information so collated could serve as a reference point for comparison between states and among investors in Nigerian who may wish to invest in any state within the country. Such property data bank would assist researchers in producing property market indices for performance measurement and reliability test, especially in the application of the conventional investment method of property valuation.

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