

## Consumption, Housing Market and Demand for Mortgage Finance: Some Crucial Theoretical Discussions towards an Appropriate Model for an Emerging Economy



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**ABSTRACT:** This paper focus on the consumption function theoretical perspective and how this can used to derive suitable models for the demand for mortgage finance. This study will critically examine the various consumption functions in economic science which have been developed over the last century. The review of the various models will focus on the structure, characteristics, variables, data sets and sources that were used and the critical findings of the models.

This paper examined existing literature on the consumption functions discussions, identified the critical characteristics from the model and identified the differences among the various consumption model. Furthermore, the consumption functions were linked to the various demand for mortgage financing models in this work.

This study spanned the years 1923 through 2023 where these important tools can be vital to the understanding of the various economic cycle and significant instruments for effective decisions regarding investment, monetary and fiscal policy. The periods experienced critical economic shocks such as credit boom, a financial recession, a rebound, and strong economic expansion.

In this study piece, a systematic literature review (SLR) was performed, and the research revealed crucial consumption functions analysis to enable this paper identify suitable demand for Mortgage finance model for an emerging economy. A SLR was performed using a sample of 100 research articles chosen from a pool of 400 papers obtained from Scopus, Web of Science, Google Scholar, ABS journal and, among other sources.

As a result of the review, the paper recommended a hybrid model that blended the theoretical perspective of consumption functions and relevant characteristics that is suitable for an emerging economy. This model will be useful for mortgage analysts, Credit Managers, Governments and Bankers to implement and enhance the movements in the mortgage market. This will also enhance and assist in facilitating the effective implementation of the Nigerian mortgage finance policy.

**KEYWORDS:** Consumption Function, Mortgage Finance, Mortgage Market, Demand for Mortgage Finance, Financial Market, Housing Market, Financial Economics.

### 1.0 INTRODUCTION

The critical role housing plays in the development of a country's economy cannot be overemphasized. Housing is regarded as the most essential for households in any society. As a consequent of this, housing is a necessity for human existence. Adequate housing is more than just a physical enclosure but it should be a respectable dwelling that provide a normal healthy living where good standard of living can be achieved.

This is because a dwelling provides the psychological and physiological needs for privacy and personal space. It provides a physical barrier against unwanted interferences, thus protecting the household from attack and from the severe weather. The household ownership of such accommodation described above is very expensive and a lot of household are deprived of such.

The international covenant on economic, social and cultural rights (ICESCR) article 11.1 (1991) emphasized the right of households to adequate housing and provided clear characteristics of adequate housing which are: legal security of tenure, availability of services, materials, facilities and infrastructure, affordability, habitability, accessibility, location and cultural adequacy.

The availability of basic infrastructures is a sine qua non for a habitable accommodation. Home access to basic infrastructures provide sustainable living. For instance, safe drinking water, energy for cooking, heating and lighting etc should be available. Also,

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an adequate housing should be located anywhere with the adequate infrastructures. For instance, Cities and state capitals in developing countries have all the basic infrastructures which increase the demand on the available rental properties.

Onibokun (1985) and Ebie (2003) papers provided evidence of housing issues in emerging economies and found out that about 60% of the average household income is spent on rented occupation. However, based on the findings, household thus have limited spendable funds, which will reduce their savings for the initial deposit if they want to buy a house from their current level of income.

Adequate housing should be habitable for living. Protection of the households should be guaranteed from life threatening diseases and structural hazards. Affordability and accessibility are also a concern when considering buying a property. Households will consider the financial cost in term of their mortgage payment and other non-housing consumption before deciding on buying a property. Jones (1995) study have established that non-housing consumption have a great influence on consumption. For instance, an instantaneous increase in the mortgages rate could disrupt the household financial plans and obligations. Such could discourage household ability to buy a property especially in developing countries because it will be too expensive for the average family to afford.

Adequate housing should be accessible to all households; however, some are deprived of its consumption. However, the article (1991) entrenched that disadvantaged groups/liquidity constrained households should have a sustainable access to adequate housing. However, policies should be put in place to assist constrained households to buy their dream houses. For instance, the help to buy scheme in the UK which assist first time buyers that cannot afford the initial down payment to access the needed mortgage.

Chamber et al (2009) argued that the importance of housing to the household and the economy cannot be overemphasized. From the household perspective, housing consumption is the largest transaction the households will ever take in their lifetime, how it is being financed is highly important. This is because the impact on the expenditure pattern and asset accumulation is huge. From the macroeconomic view, housing investment account for more than two-thirds of the gross domestic product (Leece, 2004, Chiquier and Lea 2009, Hypostat 2012). The size, structure and characteristic have a great influence on the economic performance as well as on the welfare and social life of households (Leece 2004).

Furthermore, Leece (2004) argued that given the advantages of owner occupation, access to mortgage finance will affect the living standard of the populace in an economy. This is more prominent in emerging economies. For instance, in Nigeria, where the ratio is one house to seventeen occupants. Chiquier and Lea (2009) emphasized that a well-functioning housing system will not only expand home ownership but also improve economic growth, increase job creation, infrastructural development, fiscal returns, social and political stability. In addition, it is a means to accumulate wealth and retirement strategy for the households. Buckley et al (2009) stressed the link between a well-functioning housing system and economic growth will alleviate poverty. Such sector in an emerging economy should be developed and a model for such sector should be grounded in economic science of consumption theory.

Hugher (2012) argued that movements in the housing sector could have a significant impact on the growth of the economy. His study analysed the United States economy during the recession of 2007 and he emphasized that boom in the housing sector will be needed catalyst for economic recovery. To corroborate this arguments, Rosengren (2011) evidenced that in the past recessions in the United States, recovery started from the growth in residential investment and that if there is a steady growth in the housing market and the economy will grow and recovery should be attainable.

Hugher (2012) and Chiquier and Lea (2009) argued that the housing sector create employment opportunities. He emphasized that house sector employed one in five of the working class in the United States, thus in the fore front of employment generation and one of the major tax revenue earners for the government. Hugher (2012) emphasized if the housing sector is to boost its employment generation potentials, the current tight lending standards should be relaxed to increase the demand for houses. This is because investment in the small and medium scale businesses depends on a growing housing sector. Schwetzer and Shane (2010) paper evidenced that one in every four small business owners in United States economy depends on home equity to finance their business, thus further emphasizing the critical importance of the housing market.

Green and Wachter (2007) argued that the changes in the housing finance mechanisms are drivers of changes in the housing markets in industrialised countries. Chiquier and Lea (2009) added that favourable macroeconomics conditions, falling inflation and mortgage rates, urbanization and demographical issues, financial liberation, legal system and improvement in technology have been influential variables in their model of the housing finance in an emerging economy.

The developed and less developed economies have some common characteristics but with respect to housing and financial services, there was a big gap. The differences are unfavourable financial, political and economic environment, greater range and

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quantum risks to manage, limited fiscal space which constrained government policies and activities. These will lead to shortage of housing both in quality and quantity (Chiquier and Lea, 2009).

However, from the discussions above, housing and its demand plays an integral part from the perspective of the households and the economy. This implies that an effective demand for housing required functioning financial systems that can deliver the needed finance for the household to purchase their desired property. The demand for housing is positively related to the demand for mortgage finance.

The household demand for a mortgage is imperative because the cost outlay to outrightly buy a house is huge and such huge amount may not be saved during their lifetime. This situation is even worst in developing countries where average level of income is very low. A system to grant access to the needed finance now and the household pay from their income in the future is the key to housing consumption.

Theoretically, the demand for mortgage finance will be grounded on the consumption function and emphasized the principles of inter-temporal substitution principles. This can simply be stated as consumption of future housing in current period. Historically, Keynes (1936) argued that household consumption depends on their income and as the household income changes, so will their consumption. However, Keynes study was rooted on macro foundations which set the pace for the studies of Friedman (1957) and Modigliani and Brumbery (1954).

Friedman (1957) introduced the permanent income hypothesis and argued that what households consume depends on their permanent income. Modigliani (1954) introduced the life cycle hypothesis and argued that household consumption is based on their lifetime income. Both studies are rooted in the micro foundations. Hall (1978) paper introduced the random walk theory to the permanent income hypothesis and argued that with all relevant information about future income known, household consumption in the current period will be same as consumption in the future. He introduced uncertainty to the analysis.

The paper will be grounded on the theoretical basis which is, household based their permanent income (that is their expected future lifetime income) against which they borrow in the financial market to fund housing purchase today. Under condition of certainty, household consumption should smoothen, that is they should be able to borrow without any constraints. However, due to uncertainty, consumption may not smoothen as a result of constraints which prevents the households from borrowing against their future income to purchase their desired property.

This paper will critically investigate the following

1. The theoretical relationship between consumption functions and the housing market
2. How a housing demand model can be derived for an emerging economy?
3. Based on the above, identify a hybrid model suitable for emerging economy?

The remainder of this paper is structured as follows: The study methodology section was introduced in Section 2. The theoretical perspective was described in part 3, and the empirical literature evaluation to address the study questions are presented in section 4. The Justifications for the model of the paper are presented in Section 5, and the conclusion and implications of the paper are presented in Section 6.

### **2.0 RESEARCH METHODOLOGY**

This paper focused on extensive and comprehensive literature review (SLR). This method was used to identify, select, and critically assess research to address a specific question. The systematic literature review established a well stated approach or plan before conducting the review, with the criteria clearly outlined. The author summarized the primary sources of literature for each of the study areas given using the above identified method. The authors used a sample of 100 research papers to perform an SLR. These articles were chosen from a pool of 400 papers obtained from Google Scholar, Web of Science, and Scopus. The publications were chosen based on the number of citations in Google Scholar and Scopus, as well as the impact factor of the journals in Scopus. The grounded seminar papers on consumptions from Keynes, Friedman and Modigliani who are prominent scholars were reviewed vigorously. Based on the synthesis of the established literatures, the paper tends to establish the theoretical relationship between consumption functions and the housing market. After the review, identify a suitable hybrid model suitable for an emerging economy.

Due to the theoretical nature of this piece of work, the authors chose relevant papers from 1923 to 2023 which are well cited by many academics globally. The review is then carried out in five steps: locating relevant literature, screening for inclusion, grading the quality, extracting data, and analysing and synthesising the findings. Ultimately, the review is reported on, with a summary of the findings (Xiao & Watson, 2019).

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The next section will provide a detailed discussion on the theoretical perspective of consumption function and critically discuss the relevant aspect of the model suitable for this paper.

### **3.0 THEORETICAL PERSPECTIVE**

#### **The Consumption Function**

This section critically examined the theoretical basis for this paper and establish the importance of consumption functions to the analysis of the demand side of the mortgage finance. The section focused on the principles, methods used in the studies, findings and develop a conceptual framework that will form the background for the demand for mortgage. This research considered the principle of intertemporal substitution, which simply states that the household maximize their utility by trading-off allocated resources between two periods. This implies that when the household is young and have limited resources in the earlier years (Period 1), then the household can consume their desired products now and pay for them when their circumstance has changed in period 2.

The underpinning background here, is that when the households are young and have prepared themselves either by acquiring the formal education or training/apprenticeship may want to outrightly buy houses to live in now but they may not be able to pay or outrightly purchase the property because they are constrained by their current earnings. However, they borrow from the financial institutions the total amount (mortgage) of the property and continue to pay throughout the working lifetime for the consumption of property. The discussion of the consumption functions started with the analysis of the consumption function developed by John Maynard Keynes.

#### **Keynes Consumption Function**

The idea of consumption function was popularised by Keynes in his General theory which was considered to be the origin of macroeconomics. His idea of consumption was based on the foundation of the knowledge of human nature and detailed fact of experience. He emphasized that the consumption of a household is determined by their disposable income that is total income net of taxes. The theory postulates that households will increase their consumption as income increases but not in the same proportion of the increase in their incomes (Keynes 1936 Pp. 87-88). Keynes considered the idea of the household utility maximization in aggregate term but his analysis was not supported with numerical data. The Keynesian consumption model states that current consumption expenditure depends on the current disposable income, thus, established a positive relationship between current consumption and disposable income. The Keynesian consumption function is linear in nature and can be specified as  $C = a + bY$ . The "a" in the consumption function is the autonomous consumption, that is consumption independent of the current income. In other words, the coefficient b is referred to as the marginal propensity to consume. The marginal propensity to consume is the change in consumption as a result of a change in income ( $C/aY$ ). The average propensity to consume is defined as  $C/Y = (a/Y) + MPC$ . However, the change in the average propensity to consume (APC) is determined by the autonomous consumption. When the autonomous consumption is greater than zero, that implies marginal propensity to consume is less than average propensity to consume. This means that household consumes less of their part of the income that increased. If the autonomous consumption is equal to zero, that implies that there is no significant difference between the marginal propensity to consume and average propensity to consume. The means that consumption level will not change.

The absolute income hypothesis has important properties known as Keynes conjectures. Firstly, the only determinant of current aggregate consumption is current income. This implies an increase or decrease in consumption will result from an increase or decrease in income but not in the same proportion. The short run average propensity to consume is greater than the marginal propensity to consume. This is because short run autonomous consumption does not vary with the level of income. However, in the long run, as wealth and income increases, consumption increases. Secondly, as the income increases, consumption increases and MPC is positive but less than one. (Keynes 1936 Pp 87-88). This implies as the income increases; the APC will decrease. The increase in the household income will lead to the large proportion of the income being saved. What was lacking in Keynes analysis was the utility maximization from the household perspective and did not consider the theory of rational choice.

Some authors have criticized Keynes theory. Kuznets (1942) argued that the linearity of the Keynes consumption cannot be explained and he established that Keynes' theory when applied to statistical data are contradictory. He used data on aggregate consumption spending and gross domestic product from United States from 1869 to 1938 excluding the depression years. He observed that saving's share of national income had not undergone a long-term increase but remained constant over the period notwithstanding the huge increase in personal incomes. In the short run, however, both the time series estimates and cross-section individual aggregate consumption estimates confirmed that the Keynes theory of a diminishing average propensity to consume.

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Parker (2010) and Meghir (2004) emphasized that the Keynesian consumption was deficient. This is because Keynes could not explain the basis why the MPC was less than APC in the short run for households. This implies that household spend a decreasing proportion of their income when income increases. Also, the long run data established that marginal propensity to consume is equal to average propensity to consume and the aggregate consumption was proportional to income over the long run conflict was not resolved. These are important concept which were not explained by the Keynes model. However, due to the inconsistencies in the Keynes model, other consumption functions were examined.

The two post Keynesian theories analyzed are the permanent income hypothesis developed by Milton Friedman and the life-cycle model established by Franco Modigliani. The models are grounded on micro- foundations of consumer choice. Based on their similarities both the permanent income and life-cycle models have been merged to become the foundation of modern consumption theory and are called the intertemporal utility maximization which is an extension of the microeconomic theory developed by Irvin Fisher. The intertemporal utility maximization is the trade-off between satisfaction of consumption in period one and satisfaction derived in period two. For instance, the household wants to consume more in period one through borrowings and paying back through lifetime income which will be paid back at the end of period two. The difference between them are, permanent income hypothesis emphasized that infinite stream of income while the life-cycle model establishes variability of income over definite lifetime.

### Modigliani Life Cycle Hypothesis Modigliani and Brumberg (1954)

The model was called the life Cycle Hypothesis and was built on the idea that came from the work Keynes absolute income hypothesis. The rationale for the study was to establish the relationship aggregate consumption, income and other relevant variables that could affect consumption using empirical evidence. Modigliani and Brumberg (1954) provided a methodical framework through the use of marginal utility analysis and they used the life cycle hypothesis to show how the individual behaviour can be applied to dataset.

The theoretical foundations of Modigliani life-cycle model focus were on how saving is a determinant of consumption from one period of the household lifetime to the next. In the early life, the household income is low. As the household continue to work, income continue to rise and get to the highest in the last part of the household working life and drastically reduced after retirement. The household will smoothen consumption by borrowing at the early years in their lifetime when their they income is low, repay the loans and accumulate wealth when their income is high in the later part of their working life and consume all the accumulated savings during retirement. In the theoretical analysis, consumer utility was grounded on the consumer choice theory, which emphasized that household utility maximization at any point in time is subjected to their budget constraints. Modigliani and Brumberg (1954) argued that individual consumption the at period  $t$  of his life ( $C_t$ ) directly influenced by the income of the individual at the period  $t$  ( $Y_t$ ), and other variables such as Saving in the period  $t$  ( $S_t$ ), Asset at the beginning of Age period  $t$ , Rate of interest, Earning period ( $N$ ), the retirement Span ( $M$ ), Life span of economics significance ( $L$ ). They defined life span of economics significance as the addition of the household periods of earnings ( $N$ ) and retirement Span ( $M$ ). Utility is the satisfaction one receives from the consumption of a commodity where durable or non-durable. The assumption here is that the household maximize their utility only from present and future consumption and from assets to be bequeathed where applicable. This is not applicable to all household, only those left with accumulated assets. In addition, to the above assumption, price of consumable commodities will remain unchanged over the life span. Thus, consumption may be similar for individual within the same age range. The lifetime utility function can be specified as  $U = U (C_t, C_{t+1}, \dots, C_L, a_{L+1})$ .

From the above utility function  $C_i$  denotes ( $i = t, t + 1, L$ ) which are planned consumption at various ages of the household and  $L$  is the age the household is expected to die.  $a_{L+1}$  is the non-human wealth (financial and physical assets) in period 2. The household utility function is maximized subject to his lifetime budget constraint since the household plan to use all its resources during his lifetime. The rate of interest ( $r$ ) is not expected to change over the life time of the individual and the budget constraint was specified

$$at + \sum_{T=0}^n \frac{Y_t}{(1+r)^{t+1-t}}$$

Where  $at$  is the value of current nonhuman (financial or physical) assets,  $Y_t$  is the stream of household income and  $r$  is the real interest rate. The lifetime budget constraint determines the consumption at various periods in the household lifetime. The trade-off between the period of the current consumption and period of the future consumption determines the slope of the budget constraint which is  $-(1+r)$ . The  $r$  denotes the rate of interest which the household lend and borrow. The household wealth is the present value of lifetime earnings which make up the budget constraint.

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Based on this background, Modigliani and Brumberg (1954) identified reasons the household should save. The first reason for household to save is their desire to increase their wealth. In this instance, such wealth when transferred to the household children in the future could be used as part of their down payment (deposit) to acquire a property. The second reason is for precautionary motive. The precautionary motive of savings for the household is to acquire assets through their savings to meet up with emergencies and unforeseen circumstances. This could be a buffer when there is a temporary fall in income below the planned level or current consumption. The ability of any household to save can be a good reason to consider the buying for a property as this can be used for down payment of such property. Inability to save have constrained many households to buying of their desired properties and based on the life cycle principles accumulated saving could influence consumption.

Modigliani and Brumberg (1954) emphasized the following that assumptions. The first assumption is that the household have no asset at the early years and at the end of their life. The second assumption is that taste determines the household total resources devoted to consumption not particularly the size of their resources. Given that the assets are homogeneous in nature, consumption of assets will be more in the middle years towards retirement than the other periods given the rate of interest. Household will have to fall back on their saving after retirement. The third assumption is the rate of interest is zero. This is because rate of Interest may constrain the household consumption if the rate of interest that is too high. The fourth assumption is that the average income throughout the household lifetime is the same. Due to this, they can borrow for current consumption against their expected future income. They further emphasized that determination of the household savings depends on their economic position which is the accustomed level. The accustomed level is the average expected income which the household is used to. Any change in the average expected income will affect saving of the household. For instance, if there is an unexpected rise in the current income above the accustomed level, the saving will increase more than the previous income level before the change. If there is an expected fall, household saving will fall or dissave. The unexpected fall in income of the household can be permanent or transitory. If the unexpected fall in household income is transitory in nature, household will adjust to their new position by reducing savings to keep up with their current consumption plan. However, if the fall in household income is permanent, the household will have to dissave and in order to achieve the optimum consumption plan with the new position, the household will have to draw-down on their savings to support current consumption.

Modigliani and Brumberg (1954) model affirm that savings of the household depends on the difference between change in the current income level and the previous level of income. If the current level of income is greater than the accustomed level of income, the household is saving an abnormal proportion of their income. The household will save very small or dissave if their current income is below the accustomed income. This proposition is quite different from Keynes model that household saving increases as real income increases. Modigliani and Brumberg (1954, p 31) claimed that the Life Cycle Hypothesis rest on two important propositions: Firstly, 'that the major purpose of saving is to provide a cushion against the major variations in income that typically occur during the life of the household as well as against less systematic short-term fluctuations in income and needs. Secondly, that the provisions the household would wish to make and can afford to make, for retirement as well as for emergencies, must be basically proportional to the average of its basic earning capacity, while the number of years over which these provisions can be made is largely independent of income levels.

Modigliani and Ando (1963) argued that Friedman model could not be used to test a series of empirically hypothesis with time series data. They empirically tested the Life Cycle Hypothesis on data from the United States from 1929 to 1959 while excluding the second war years 1941-1946. The focus was to analyse data on consumption, labour net income and net worth. In carrying out the test, a mixed method was used to obtain a more accurate result which was significant. They confirmed that the coefficient of all the identified variables were highly significant, which thus confirm that the variables does influence the household consumption and R<sup>2</sup> was very high. From the result obtained Modigliani and Ando (1963) concluded that consumption is homogeneous in income and assets. In order to confirm the results obtained, Modigliani and Ando (1963) carried out an empirical investigation using a different data set from 1900 to 1928, a similar result was obtained from the data set from 1929 to 1959, they obtained result in both cases that are consistent with the theory and all the variables are significant.

In summary, wealth accumulated through saving is an important determinant of consumption and household with a sufficient wealth can consider the demand for mortgage finance. This is because down payment which is an important determinant for the demand for mortgage can be paid from accumulated wealth. However, inability of the household to accumulate wealth through savings implies that their desire to enter owner occupation may not be realized.

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## Friedman Consumption Function

Friedman theoretical constructs centred on the problems the households encounter when there are fluctuations in their level of income. The fluctuations in the level of income can be due to life-cycle effects and business cycle. However, fluctuations in the household income due to life-cycle effects happens due to the various stages in the household lifetime, early period is characterised with low income and towards the end of the period is characterised with high income. Business cycle may impact on household income; recession have a negative impact on income while boom period is economically viable for the household income because their circumstances may change. Friedman did not consider an end period for the household, in his view the household lives forever. He was able to distinguish between the level of income that the household will earn in their lifetime which is called the permanent income and the unprecedented income arising from an unforeseen event that could either increase or reduce income which is termed transitory income. In the same vein, Friedman differentiated permanent consumption from transitory consumption. The household consumption that is planned and steady over time is the permanent consumption and the unexpected or not constant consumption is termed the transitory consumption. Friedman emphasized that permanent and transitory consumption are not dependent on transitory income and also the transitory consumption is not dependent on permanent income.

Parker (2010) emphasized that consumption of the household at any time is made up of the planned part that depends on permanent income and transitory part which is not dependent on income. In a linear consumption function regression, the value of the transitory consumption depends on the random error. The Friedman permanent income model aimed to estimate the relationship between consumption and the measured income for household's unit separately and used evidence from other time periods to interpret household consumption. However, before the discussion of the structure of the Friedman's permanent income, the study of Friedman and Kuznets (1954) provided the foundation for the income structure which Friedman developed into the permanent income hypothesis. Friedman and Kuznets (1954) analysed the income structure from different professions in 1933 using data from 1929-1933. To them, income structure can be divided into three components, which are permanent, quasi-permanent and transitory component. Friedman and Kuznets (1954) critically examine income differences among professional in various fields. They argued that ability of an individual to practice a profession is not only his educational capability but also his ability to finance the professional training and both his entry and success depends on his background and connection. Institutional factors such as professional training, how lucrative the profession is, risks attached to the profession may also be a causal factor in income differential (Friedman and Kuznets, 1954, p. 391). The components of the permanent income are determined by the location of the practice, experience in the practice, the kind of practice, the organisational structure, ability, social and business connections and personality and good fortune. The transitory components are factors that affect income within a single unit.

Friedman (1957) denoted household measured income as  $Y$  and income is divided into two which are permanent components  $Y_p$  and the transitory component  $Y_t$ .  $Y = Y_p + Y_t$ . The permanent component is determined by the capital value/wealth and non-human wealth of the household, the personal attributes of the income earners in the household. The personal attributes that can influence permanent income are training, ability, personality, occupation and location of the economic activity.

The transitory component are factors or events that may occur by accident or chance. Events like cyclical fluctuation in economic activities. Losses due to speculative activities and illness are not part of transitory components. Friedman (1957) represented the household consumption expenditure with  $C$  and consumption is the addition of permanent components  $C_p$  and transitory component  $C_t$ .  $C = C_p + C_t$ .

The factors that influence the transitory components of consumption are sickness, favourable opportunity to purchase. Friedman (1957, p 23) states that "the permanent component is the average lifetime values and the transitory components is the difference between the lifetime averages and the measured valued in a specific time period". Friedman studies emphasized that Age is another factor affecting consumption and Income. As the household progress in Age the mean lifetime income tends to be higher. This is because the household move from one age band to the other, consumption pattern is the same for the age band. The reason for this is because the hypothesis is based on adaptive expectation. For the household to smooth consumption, they can borrow on the basis of the expected receipts from human and non-human wealth, given the same interest rate at which they can lend accumulated non-human wealth(Friedman 1957, p 25).

From the above, permanent income hypothesis is given by the following equations.

$$C_p = K(i, w, u) Y_p \dots\dots\dots 1$$

$$Y = Y_p + Y_t \dots\dots\dots 2$$

$$C = C_p + C_t \dots\dots\dots 3$$

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The first equation establishes that relationship between permanent income and permanent consumption. In his view, Friedman (1957) argued that permanent consumption is dependent on ratio of permanent income which are the rate of interest ( $i$ ), Property and non-property income is the ratio of non-human wealth to income ( $w$ ), Other qualitative factors like household tastes and preferences also can influence consumption are denoted by  $u$ . Permanent income is the household income that is regular. Based on this assumption that permanent income are regular flow of income through the lifetime of the household, thus, we can deduce that expected future income will be the same as the current income. However, given that the expected future income pattern is known, the permanent income can be calculated from the budget constraints.

$$\sum_{t=0}^{\infty} \frac{Y_P}{(1+r)^t} = A_0 + \sum_{t=0}^{\infty} \frac{Y_t}{(1+r)^t}$$

From the above,  $Y_P$  is the permanent income which is made up of capital value/wealth, non-human wealth and other personal attributes that can earn the household income. Parker (2010) emphasized that this is an indication of the close association between the life-cycle hypothesis which is centred on consumption depending on wealth and the permanent income hypothesis which emphasized the dependence of consumption on permanent income.

### Permanent Changes and Transitory Changes in Income

This section compared and contracted the two models. The aim was to bring out the salient points that are relevant to the study. The discussion of the impact of the permanent and transitory changes in household income on their consumption is not significantly different in both the life-cycle hypothesis and permanent income hypothesis. From the life-cycle hypothesis perspective, when there is an increase in the permanent component of the household income, this will lead to a large increase in the lifetime wealth of the household. The household consumption will rise by almost as the income rises. The increase in the household purchasing power will enable the household increase consumption in the current period and spread it over the rest of their lifetime. And this will make the MPC component of the permanent change in income will be close to one. However, the impact of a transitory increase in income is only in the current period in the lifetime of the household. This is because lifetime wealth of the household is not affected by any changes in transitory income. The household can smooth consumption by spreading the temporary increase in income over the remaining part of their lifetime. The MPC component of the transitory changes in income is small. Permanent Income hypothesis emphasized that any permanent change in the permanent income will lead to a significant change in consumption. The MPC will be very close to one. However, a transitory change in income will have no direct impact on the household consumption. When there is a one-time increase in income, lifetime wealth is likely to increase by that magnitude and this will have a little influence on permanent income.

Modigliani's life cycle and Friedman's permanent income hypothesis used the changes in permanent and transitory income to confirm the Kuznets paradox which is in the long run, MPC is high and it is equal to the APC. Modigliani and Friedman believed that changes in consumption that is affected by income are due to the constancy of growth forces in the long run. This will make the MPC to be high and when the household consumption increases proportional to the increase in income, this is consistent with the theory (Parker, 2010). A short run analysis of the impact of a temporary reduction of income revealed that household consumption does not fall drastically. The life-cycle and Permanent income hypothesis emphasized that the household will slightly reduce their consumption when there is a reduction in income over their entire lives. The short run MPC is smaller which is due to the temporary nature of the fluctuation.

### Hall's Random Walk Hypothesis

Hall (1978) introduced uncertainty to the life-cycle permanent income hypothesis and introduced the idea of rational expectations into the consumption models. Rational expectation theory postulated that the expectation of the household is not only based on the past experience about their earnings but also on the forecast of the future. This assumes that the households have all the relevant information about their expected future income and can use the information to forecast their future income. Hall (1978) argued that if the household include all relevant information in the estimate of their future income, then consumption should smoothen. However, the only reason that household consumption could be change is if there is an unexpected change in income. But with this, the best estimate of next year consumption ( $C_{t+1}$ ) is the current year consumption ( $C_t$ ). Hall (1978) sets up the model so that consumers will maximize their utility.  $E_t \sum_{t=0}^{\infty} (1+\vartheta)^t u(C_{t+1})$  Subject to  $\sum_{t=0}^{\infty} (1+r)^{-t} (C_t - W_t - T) = A_t$ .

Hall (1978) denoted  $E_t$  as mathematical expectation conditional on every information available in  $t$ ,  $\vartheta$  refers to rate of subjective time preference,  $r$  denotes real rate of interest,  $T$  stands for length of economic life,  $u(.) =$  One-period utility function,  $C_t$  stands for consumption,  $W_t$  stands for earnings and  $A_t$  stands for assets apart from human capital.

Hall (1978) emphasized that the uncertainty in the model is the household earnings. The household choose a consumption pattern which will maximize their expected lifetime utility given the information available at that period. He emphasized that the household know their earnings when choosing their consumption pattern and use the information available to forecast future



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earnings. The household choice to enter owner occupation is a decision based on their current earnings and expected income which allow them to borrow against future consumption.

### **LIFE CYCLE PERSPECTIVES TO THE HOUSING AND MORTGAGE DEMAND**

The application of the life cycle approach to the analysis of the demand for mortgage finance can be overemphasized. There is an extensive theoretical and empirical literature of the life cycle approach regarding the household choice on the demand for finance on data from United States, United Kingdom and Canada. However, there are a few on emerging economies, particularly, Nigeria. This section critically reviewed the life cycle perspective on the household housing and mortgage decision. This was carried out by (1) by bringing out the similarity with the life cycle theory. (2) analysis the empirical findings of the research (3) identify the variables used for the estimation, the econometric methods used and identify any econometrics issued for the study (4) Ultimately, identify possible variables that could be used to determine the demand for housing and mortgage finance in the Nigeria context.

### **LIFE CYCLE APPROACHES**

The models that will be explored in this research will be such that combines the life cycle/permanent income perspective on the housing and mortgage decisions made by households. Such models should emphasize the principle of intertemporal substitution of housing consumption on the household from the life cycle perspective when making decision on buying a property. In order to bring out the salient arguments, the research identified those studies grounded on theoretical basis of the life cycle principle which should form the basis for the models that will be used to identify factors that establish the relationship between consumption function and demand for housing and mortgage finance in Nigeria.

Smith et al (1988) argued that since housing consumption is the largest single consumption the household will engage in, one period model utility maximization subject to current price, permanent income cannot capture the life cycle perspective of the housing decision. He argued for the application of the intertemporal structure in the housing consumption. He justified the following arguments. Firstly, if the household decide to buy a property, the household is required a down payment which is a saving from the previous period. This to Smith (1988) has an influence on both current and future consumption pattern. This arise because the household has a contractual obligation to make payment on both principal and interest on the mortgage contract. Secondly, the argument of a perfect capital market that enable the household to borrow and lend against future income. However, this cannot be done within a period in the household lifetime from the life cycle perspective. Thirdly, the changes in expected future prices particularly on the relative price of housing units. This could be due to an unexpected rise in the inflation. An unexpected rise in inflation will increase mortgage interest rate and such could lead to a tilt problem for the household when they cannot meet up with their obligations. Fourthly, the investment aspect of housing decision cannot be analysed without considering intertemporal substitution. Smith et al (1988) identified three important issues when extending the demand model to the life cycle framework. There are savings, future prices and investment issues. However, these have been incorporated into model developed by Modigliani and Friedman. Smith et al (1988) argued for the introduction of lagged framework developed by Hall (1978) to determine how expectation are formed which was not considered by Modigliani and Friedman models. This, he emphasized should be considered when estimating any model derived based on intertemporal substitution. From the life cycle framework, the household housing decision is based on the construction of current consumption plan to maximize lifetime satisfaction subjected to the different stage budget constraints. Invariably the budget constraints could arise as a result of current income, price level, interest rate, wealth, expectations regarding future income and interest rate.

Goodman (1988) analysed housing demand model and tenure choice using permanent income framework. He argued that the demand for housing is a function of real income, price of the housing service and other variables such as taste and household characteristics. He emphasized that long term income or permanent income is essential in any model which will be used to estimate housing demand and the permanent income can be impacted by the household level of education, age and training. Using a probit specification on annual housing survey dataset, Goodman (1988) found out that permanent income has a major influence on made tenure choice the household have made, whether to buy or continue to rent. This implies that the cost of renting a property could have a great influence on the capacity of the household of demand to buy a property. When there is an increase in rent, such will lead to an increase in the housing demand.

Haurin (1991) argued that using permanent income as an explanatory variable may not be appropriate in housing choice model. This is because tenure choice is greatly influence by the intertemporal variation of the household income. In a situation where the household streams of income are not certain, such may lead to a fall in the demand for properties. Based on this, Haurin (1991) emphasized that the permanent income should not be considered as an important determinant of housing consumption.

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However, a probit estimation of home ownership revealed that variation in the household stream of income reduced the chances of the household owning a house. An increase of the coefficient of variation by 20% reduces chances of homeownership by 1.5 percentage points. This result does not show any effect of the income variability on the quantity demanded on housing. The research finds that inability of the household to meet the down payment requirement is a constraint to home ownership, thus preventing household from obtaining a mortgage. Household current wealth to finance the down payment greatly reduce the ownership from 0.92 to 0.37. However, the households can only own a house if they downsize on the size of property they want to purchase and such reduction in property size will reduce the down payment requirement. Haurin (1991) concluded that permanent income may not suitable but suggest permanent wage. Using this same dataset, he finds out that if household earnings is increased by 10%, the probability of home ownership increased by 1.5 percentage point.

Jones (1990) study emphasized that net wealth of household is the determinant of the demand for housing consumption not the permanent income. An empirical investigation on Canadian microdata was conducted to analyse the impact of net wealth on first time buyer and it was revealed that by disintegrating permanent wealth of the household into net worth and permanent labour income, Jones (1990) findings was that net worth is more suitable than permanent labour income in the demand for housing. This was also confirmed from a higher elasticity in current wealth to returns from human capital. The study revealed that young married household are more likely to be affected by non-human wealth. This is because when mortgage providers require down payment for the acquisition of a property, however, the demand for the property becomes highly sensitive to the household net wealth. This may not have anything to do with their permanent income.

Brueckner (1986) argued that the household housing consumption will be sensitive to current income and wealth depending on the impact of down payment. Using a life-cycle framework, Brueckner (1986) analysed the impact of down payment as a binding constraint to determine if the household is to buy or continue renting a property. He argued that a high down payment with relatively low current income will make the household defer housing demand or reduce their house size which require a lower down payment. Analysing down payment constraint implies that liquidity constrained households will have to reduce their current housing consumption for them to enter owner occupation. And a household with fluctuation in income level or regular income may not be able to be able to enter owner occupation in their lifetime.

Engelhardt (1996) argued that liquidity constraint has an important implication in the housing decision and the mortgage market. Household willing to own their first property will have to save for the down payment to meet up. However, this becomes a problem, if the household do not have the capacity to meet the required and such housing consumption will be deferred, Engelhardt (1996) emphasized that household without any private loans or gifts are more affected by the down payment constraints. And as a consequent, the household will have to forgone to current consumption to accumulate the required amount. Engelhardt (1996) paper empirically examined household consumption behaviour for first time house buyer in the United State by analysing the impact of down payment constraints. He argued that down payment is obviously a liquidity constraint. This, he argued that household without a property will have to reduce their current consumption in order to save for the down payment of a property. Engelhardt (1996) further argued that after the buying the property, household consumption should increase substantially. On this ground, the examined used down payment as a proxy to capture liquidity constraints. Household dataset from panel study income dynamics from 1975 to 1985 for the United States were used and information on household consumption, real-after tax interest rate, family size, real family disposable income was extracted. He found out that there was an increase of 10% in real consumption than the period when the households were constrained by down payment. He concluded that the ability of the household to get a mortgage depend on down payment and such can be used to test the impact of liquidity constraints on consumption of housing.

Hayashi et al (1987) focused on the impact of down payment requirement on entry on owner occupation and the aggregate saving rate. Hayashi et al (1987) applied the Slemrod model in the simulation technique used in the study. The study simulated the impact of down payment constraints using a two-period life cycle model to compare both the Japanese and United States housing finance systems. The investigation revealed that despite the fact that the Japanese financial system did not engage in tax saving policy and subsidy on mortgage interest rate, Japanese household are induced to save more in their early life to meet higher down payment than the US. This can deduce that there is a positive relationship between saving rate and down payment ratio. The model establishes the sensitive of housing tenure pattern with respect to changes in the down payment ratio. That is if a change in the down payment requirement does affect the housing tenure pattern. This is because the household is more likely to forgo home ownership or reduce the size of the property to be purchased than to reduce consumption in the early period in their lifecycle.

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In summary, it can be deduced from the above that the research of housing demand should incorporate the life cycle framework. This has also shown that the housing choice is made in an intertemporal structure based on the empirical specification of the various models used. In addition, from the permanent income perspective that permanent income determines consumption, most of the studies on housing demand, however, doubted the suitability of the permanent income to have a great influence on housing demand. From the findings, it revealed the permanent income may not be suitable due to estimation issues. No studies or Suitable model have been developed to estimate permanent income. Household income are determined based on education, training, experience, race, health and location which may not be known accurately when estimating household permanent income. The probability to enter owner occupation and increase the demand for mortgage finance should be influenced by current income and net wealth. This is because down payment for a property will be paid from the household net wealth and the principal and interest of the loan will be maintained from current income. Furthermore, the household current income and net wealth, other household attributes such as sex, age, number of children, employment statuses, household head, educational qualifications could influence the housing consumption and could be constrains/limiting factors to its consumption.

The next section will examine theoretical and empirical models that incorporated the life cycle perspectives on the demand for mortgage finance and based on the review, a suitable model will be adopted to investigate the factors that could influence the demand for housing and demand for mortgage finance in the Nigeria.

### 4. EMPIRICAL LITERATURE

There are many relevant studies that have empirically applied the life cycle perspective to the demand for housing. This research will focus on the model below.

#### Ling and McGill (1998) demand for mortgage finance Model.

Ling and McGill (1998) piece of work investigated the impact of household consumption, periodic income, non-housing wealth, household income tax position, expected mobility and other micro-level characteristic that influence household risk preferences and life cycle effects on demand for mortgage finance.

Theoretically, Ling and McGill (1998) paper built upon the studies like Jones (1994 and 1995) and Brueckner (1994). These studies argued from the household utility maximization paradigm which leads to sets of demand equations for consumption and investment goods, includes housing and mortgage finance and such framework that can be simultaneously estimated considering the life cycle perspective. This is particularly important because most demand for mortgage finance model did not consider the life cycle perspective in their studies.

There is an argument that states that what determine the optimal demand for mortgage finance is dependent on the relationship that exist between after-tax cost of mortgage debt,  $r_m$  and the after-tax interest on non-housing assets,  $r$ . Using the paradigm of utility maximization, for a household to maximize its utility on housing consumption, that is for the household to consume maximum mortgage (optimal loan to house value)  $v$ ,  $v^* = 1$ , then  $r_m < r$ , that means that a rational household should consume the maximum loan to house value when the cost of mortgage finance is less after tax interest on non-housing asset. That means it is cheap to mortgage finance compared to equity. However,  $v^* = 0$ , if  $r_m > r$ . The household will not demand for mortgage finance when cost of mortgage debt is more than equity. This simply means more expensive to finance the purchase of a property using mortgage finance.

Although, for a debt minimizing household,  $v = 0$ . This household will not finance the purchase of their property with mortgage or any type of finance whether short or long term. However, such household are constrained by household wealth endowment or intergenerational transfers. Intergenerational transfer is wealth passed down from parents to their offspring. Modigliani (1963), Cox and Jappelli (1990, pp. 445-454) argued that individual with intergenerational transfers have the purchasing power and the ability to meet up with their desired consumption levels compared to others without. On the other hand, a debt maximizing household will demand for the optimal mortgage finance,  $v = 1$ , not constrained by cost of mortgage finance. But those households in this category are constrained by income criteria used to access the affordability of the debt.

Empirically, Ling and McGill (1998) built on the models previously used in the studies of Ioannides (1989). Jones (1993, 1994, 1995), Follarin and Dunsky (1997), Cho et al, (1996) and Hendershott et al, (1997). The studies established that apart from the relative cost of mortgage debt and housing equity, there are other important determinants of the demand for mortgage finance. They argued that a suitable model should include household characteristics that encompasses household leverage choice.

There is an important assumption which is demand for mortgage finance is highly interconnected with the demand for housing. Apparently, there will be no demand for mortgage finance without a demand for housing. A positive relationship does exist.

Jones (1995) argued that demand for mortgage debt is increased by household refinancing their homes, home improvements and

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some getting a second mortgage. He argued that a sizable portion of the household borrowing on home equity is done in order to free up available resources for consumption of non-housing assets.

Hendershott et al, (1997) submitted that household that could not meet up with the mortgage requirements of their desired house will purchase a property based on the value of the house they can afford. It can be deduced that house value is an important determinant to consider when considering a property. Ling and McGill (1998 p. 395) argued that a house value is a choice variable not a parameter and they emphasized that considering including house value in the mortgage demand equation estimation such should be carried out in a simultaneous structure.

Apart for house value discussed above, the demand for mortgage finance is also constrained by household level of income. Household income is what they receive in payment for work done. This is used to measure the affordability capacity of the household. A high income may not be constraint for rich households but not the same for the low-income households. This will be a peculiar problem in less developing and emerging economies where more than 50% of the population survive on less than two dollars a day.

Studies of Ioannides (1989), Linneman and Watcher (1989) emphasized that the amount the household receives in income regularly has positively influence the household demand for mortgage, thus following the traditional consumption theory as postulated by Adam Smith. However, Follarin and Dunsky (1997) argued that if the society is segmented into high- and low-income groups, a generalized positive relationship between household income and demand for mortgage finance may not apply. They emphasized that a positive relationship exists between demand for mortgages and household income for low income group who are likely to be constrained income. On the other hand, a negative relationship exists for high income group. In contrast to the nonlinear result from Follarin and Dunsky (1997), Cho et al (1997) established a negative relationship between household leverage rate and their income level.

Argument emerged that non-housing wealth could be a substitute for demand for mortgage finance. Ling and McGill (1998) emphasized that as the household non-housing wealth increases, the demand for mortgage finance should reduce, all things being the same. However, most household does not fall into this category. Buying a property is a big investment which may not be brought from the accumulated non-housing wealth. Jones (1995) paper have established that household increase their demand for mortgage finance (excess demand) in order to increase the non-housing consumption. Thus, showing that there is a positive relationship between non-housing wealth and demand for mortgage finance.

Several household characteristics have been identified to influence the demand for mortgage finance. There are: age, marital status and the number of children etc. These household characteristics have been included in empirical specification of mortgage demand equations to understand how variations in these household characteristics could influence the household leverage decision.

Ling and McGill (1998) research model specification of household mortgage decision is an interrelationship between the amount of owner-occupied housing to be consumed and the proportion of the house value to be finance with debt and not equity. As argued above, household demand for mortgage finance is a function of predetermined factors ranging from amount of housing consumed, household income and built-up non-housing wealth, the characteristics of the tax system relating to housing, which is how the tax system treatment could impact on the household leverage decision.

A simultaneous equation specification was controlled for the household leverage decision and housing quantity decision (Ling and McGill, 1998 p 397). And as a result, the following equations were postulated, and the relationship were set forth as:

$$\begin{aligned}
 H_i &= \gamma_1 M_i^* + b_1 x_{1i} + \mu_{1i} \\
 M_i^* &= \gamma_2 H_i + b_2 x_{2i} + \mu_{2i} \\
 M_i &= \begin{cases} M_i^* & \text{if } M_i^* > 0, \\ 0 & \text{otherwise} \end{cases} \quad i = 1, 2 \dots N
 \end{aligned}$$

From the three equations above,  $H_i$  represent the current market value of the property purchased by the household,  $M_i$  represent the total mortgage amount demanded by the household at a given period to finance the purchase of the property  $H_i$  at a given period and  $M_i^*$  represent the household desired mortgage amount,  $\gamma_1$  and  $\gamma_2$  are parameter estimates of housing level equation  $H_i$  and the mortgage demand equation  $M_i^*$ ,  $b_1$  on the other hand represents the row vector of coefficients, and  $x_{1i}$  represents the vector of variables that explains the household's housing size decision,  $b_2$  also represent the row vector of coefficients and,  $x_{2i}$  represents the vector of variables that explains the household mortgage size decision, and thus  $x_{2i} \neq x_{1i}$  which means that the vector of variables that explains the mortgage size decision and the housing size decisions are not equal.  $\mu_{1i}$  represents the random errors in the housing size decision equation and  $\mu_{2i}$  is the random error in the mortgage demand equation.  $\mu_{1i}$ ,  $\mu_{2i}$  are i.i.d. bivariate normal variables (Ling and McGill, (1989, p 397).

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The research paper emphasized that the most suitable approach to empirically test the model is to adopt a simultaneous equation limited dependent variable model. Ling and McGill (1998) suggested that the following steps in their estimation, the first step is to estimate the housing size equation with a reduced form method using ordinary least squares and the mortgage demand equation with a Tobit specification. In the second step, a structural estimation of both the housing equation and mortgage demand equation should be carried out using the predicated values of the housing level equation  $H_i$  and the mortgage demand equation  $M_i^*$ .

The paper made use of micro household-level dataset from U.S Department of Commerce. The two surveys of 1985 and 1989 micro-level was analysed to determine the factors influential to the demand of mortgage finance. The household micro dataset contained comprehensive information on the geographical location, age, marital status, income type and level, tenure status, original and current home value and property tax payment. Also included are critical information for the study such as: number and amount of mortgages, mortgage interest rates and payments. The following information were removed from the surveys to make it more suitable for the paper. The information removed are: households with unoccupied homes, households in rented properties, household in the high-income category, household with zero mortgage or negative mortgage and where the household heads are above 60 years.

The variables used for the econometric analyses for the housing and mortgage finance will be briefly discussed to show the source, measurement and the expected relationship and impact on the household decision to finance their property using mortgage finance.

The first variable to be considered is the Mortgage debt amount. Ling and McGill (1998) argued that what should be considered is the market value of the mortgage debt. Market value of a mortgage debt is defined as the present value of the outstanding balance on the mortgage contracts. Ling and McGill (1998) argued that the market value of the mortgage debt is more appropriate in the paper because it incorporate valuation of the household prepayment and default probabilities information. Based on this private information about the household, the actual value of the mortgage can be determined. This is against the book value of the mortgage debt. The book value of a mortgage debt is based on the household mortgage interest rate and the terms of the mortgage. With this, Ling and McGill (1998) argued that market value of a mortgage should be the best to determine more accurately the best measure of the impact of household demand for mortgage debt.

House Value. There is a dichotomy between the fair market value of a property and the actual market value. Ling and McGill (1998) argued that the fair market value of a property is based on the household's estimates. However, the household have the tendency to overstate the real worth of their property. My research disagrees with this view of fair market value because what should determine the value of a property should be the forces of demand and supply in the market. However, Ling and McGill (1998) was able to support their argument based on literatures such as Goodman and Ittner (1992) and Kain and Quigley (1972). A positive relationship should exist between the demand for mortgage finance and house value.

Earned Income. Ling and McGill (1998) defined this as the combination of all income received by the household over a period. The income includes salaries, wages, tip and commission earned by the household head and the spouse. As the household earned income increases, so should the demand for mortgage finance, all thing being equal. According to Ling and McGill (1998) a household total income can be divided into two, which are earned income and investment income. Investment income is captured as the monies or income received from previous investment outlay. Ling and McGill (1998) argued that investment income is the interest amount, dividend received, rental income, business and other income received. However, the availability of the data to execute this may be a daunting task. The impact of investment income on demand of mortgage finance depends on the expected relationship that exist. If investment income is used as a substitute for mortgage finance, then a negative relationship should exist. This simply implies that the higher the investment income to finance the purchase of a property, the less is the demand for mortgage finance. On the other hand, if the household frees up their equity and part of it is used to purchase a house that will lead to an increase in its demand for finance. Due to the possible measurement problem encountered Ling and McGill (1998) argued that investment income would not be considered as an explanatory variable in the model estimation.

Two Wage Earners. A regular household consist of two partners where one or both are earning a living. If both partners are working, such will lead to increased savings for a property. This incremental saving will have a positive relationship with the demand for mortgage finance. Ling and McGill (1998) argued that two income earners pulling resources together and thus enable the household to obtain more mortgage than compare to a single earner and then a bigger property. In addition to this, they argued that credit risk of two income earner is better compare to situation which is just a single wage earner. Demand for mortgage finance should increase with two wage earner and thus shows a positive relationship.

Potential Wasted Interest Deduction. The variable critically examines the impact of the income tax system on the demand for mortgage finance. The data requirement for the variable is quite enormous. Ling and McGill (1998) emphasized that the following

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estimation issue which will prevent the empirical estimation of the variable. The estimation of a marginal income tax rate require data which may not be readily available. They emphasized that data like itemized deductions and taxable investment income may not be easy to come and which should be estimated. Another perspective which made estimating the variable in the model is very difficult is the association of the household's marginal tax rate with earned income. This is because it will be a daunting task to separate impact of earned income and marginal tax rate on demand for mortgage finance. In order to capture this effect, Ling and McGill (1998) construct a variable which used to understand the impact of the rate at which a household deducts its mortgage interest. They argued that the variable called potential wasted interest reaction can be separated from that of the household income. This variable "Wasted" is determined by the simple model,  $\{WI = SD - (PNHE - PT)\}$ , where  $WI$  represent the Wasted (amount of interest),  $SD$  represent household standard deductions,  $PNHE$  represents the personal, nonhousing expenses,  $PT$  property taxes. Ling and McGill (1998, p 403) argued that there is an inverse relationship which exist between the amount of wasted interest and the cost of mortgage finance. It is because the larger the amount of wasted mortgage interest, the lower is the rate of tax of saving and the higher the cost of mortgage finance.

Probability of Move. Ling and McGill (1998) argued that if there are no costs involved in refinancing a property, then at any point in time the household would maintain the optimal loan to value ratio. This notwithstanding if the household would move afterword. This impact of transaction costs, whether monetary and non-monetary on the household to demand its optimal leverage rate could be much and thus could impact on its demand for mortgage finance. In order to investigate the impact of transaction costs on households financing their desired property with debt, Ling and McGill (1998) constructed a probit model for this variable "probability of move". The ability of a household to move with two years was tested to determine the mobility and impact of transaction cost on the household leverage decision. The explanatory variables are log of total income, age of the household head and its square, family size, number of rooms and other indicators such as: marital status, Educational level, if the household is first-time home owner, races whether African-American or Hispanic and mobility with the region. In addition to the above, rural location and regional population were considered. Ling and McGill (1998) argued that if this variable is significant, that implies that transaction cost could influence the household leverage choice.

Household Characteristic Variable. Ling and McGill (1998) demand for mortgage finance model emphasized the impact of life cycle perspective and peculiar to this, are the household characteristic which could have a significant influence demand for mortgage finance. Ling and McGill (1998) model examined more variables household characteristic than any other demand for mortgage model and such variables are used to capture the unobserved household risk. Prominent among the variables are: Age of the household head, marital status, head or spouse with a University degree, race, number of children, location whether rural or metropolis etc. Ling and McGill (1998) paper argued that due to the influence of the life cycle effects on demand for mortgage finance, they provided disaggregated sample estimates based on age bands.

The econometric results for the simultaneous estimation of the house value and mortgage debt for the 1985 and 1989 surveys revealed the followings. The econometric results are reported in two forms, which are the full sample form and disaggregated form. The full sample combines all the age bands and on the other hand, the disaggregated form which was differentiated by age bands. The first age ranges are head household less than 30 years, the second age band are head household between 30 – 39 years, the third age bands are household head between 40 - 49 years and the last group are between 50 – 59 years. I can deduce that household above 60 years were not considered because such household should be planning for their retirement based on the life cycle perspective.

The house market value coefficient was as expected. A positive and highly significant results were obtained for the full sample and the age subgroup. This simply implies that the higher the consumption of housing, the more household should demand for mortgage finance. This finding is also backed up by Follarin and Dunsky (1997) studies which obtained a positive relationship between house value and demand for mortgage finance.

A positive coefficient of earned income were obtained for the full sample and the age subgroup. This can be said that when the household circumstance changes, demand for a commodity should increase, thus demand for mortgage finance. Particularly, Ling and McGill (1998) argued that Follarin and Dunsky (1997), Cho et al (1996) obtained mixed results (both positive and negative effects) because of total after tax income was used, thus as a consequent of their inability to confound the difference between periodic income and nonhousing wealth. However, Ling and McGill (1998) was able to obtain a positive effect between marginal tax rate and the use of mortgage finance because earned income was used as a proxy for the household's marginal tax rate.

The coefficient of a household comprising of two partners earning wages revealed that they made use of more mortgage in the full sample and the age subgroup except for the under 30 age group. This is not unexpected because demand for mortgage finance for this age group may not be the utmost in their minds.

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The coefficient of potential wasted interest as a percentage of house value was negative but highly significant for the full sample and the age subgroup. The result obtained showed the sensitivity of the variable to the demand for mortgage finance. That is the larger the amount of wasted mortgage interest, the lower is the rate of tax of saving and the higher the cost of mortgage finance, thus reducing the demand for mortgage finance. Ling and McGill (1998) result here further confirm the findings of Follarin and Dunsky (1997) which is if the mortgage interest deduction is reduced, demand for mortgage finance will significantly be reduced. The probability of the household to move within 2 years across the age range shows the different level of mortgage debt, however, such could not be said of households in less than 30 years age band. Based on the coefficients of the variable, it could be suggested the explanatory power on house size and leverage decision of the household is significant. It can be deduced that to refinancing a property depends on the transaction cost and thus on the mortgage demand decisions. For the household in less than 30 years age range, from the life cycle perspective, most of them will be constrained by level of their income and considering the impact of transaction cost to refinance a property, such may discourage them from demanding a property and also demand for mortgage finance.

Ling and McGill (1998) argued that the level of mortgage finance increased with age at a decrease rate. From the life cycle perspective, as the household advances in age, the demand for mortgage finance should increase. The demand for mortgage finance should fall when the household advances in age and ready to retire. The results revealed that a positive relationship between age of the household head and demand for mortgage demand following the theoretical perspectives. However, the age subgroup revealed otherwise. The age band of less than 30 years and 50 – 59 years showed a negative relationship and significant, thus showing a household consumption of housing falls with age. The demand for housing consumption was at the highest when the households are in the 40 – 49-year age band.

From the paper, it does not show any evidence that the household marital status has any influence of their leverage decision. The full sample revealed that negative but significant relationship between marital status, but the age subgroup shows a mixed result. It was negative and significant for age bands less than 30 years and 50 -59 year and positive for 30- 39 years and 40 -49 years. The results above indicated the household not married use less of mortgage finance.

The role education plays cannot be over emphasized, as this educated household is likely to have a good life standard in term of quality of life, earnings etc. In Ling and McGill (1998), it was revealed that except for less 30 years age band, College educated household generally use less of mortgage finance to finance the purchase of their property. This justifies the use of disaggregating the sample by Age.

The family size was considered, and the number of children was used to capture the effect of family size of the household to demand for mortgage finance. Theoretically, the higher the family size, the higher is the demand for mortgage finance. The coefficient of the number of children showed a positive relationship and significant except of the less than 30 years age band. This may indicate the households less than 30 years may have a smaller number of children and may not be under pressure to get bigger property to accommodate their family compared to other age bands.

The study considers the impact of race/colour on the demand for mortgage finance. It was revealed that household head from some racial origin demanded more mortgage finance than the other except for those less than 30 years in the same category. African America and Hispanic heads demand more mortgage finance to other racial group.

The impact of location on the mortgage debt revealed mixed results. The coefficient of rural location varies across the age subgroup. Ling and McGill (1998) argued that young households in the rural areas used less mortgage finance compare to other folks in the other age bands. Rural Household of 40 years and above utilized more mortgage finance compared to their urban folks. This is a common phenomenon among all the age bands.

The 1989 survey produce similar results from the above discussions. However, where the results of two surveys are different will be discussed below.

Based on the results from the coefficient of two wage earner revealed that the variable is not significant influence of the demand for mortgage finance. The variable was constantly negative in the specification. Ling and McGill (1998) argued that household with two wage earners bought smaller properties with considerably more mortgage debt.

The impact of Age of the household heads on their mortgage debt was similar for the full samples on the 1985 and 1989 surveys. However, the 1989 survey revealed that age was an important influence on the demand for mortgage finance for household under 30 years and 30 -39 years age bands as the coefficient were positive and significant. But a negative relationship and significant exist for 40 -49 years age band. The results were similar to Follarin and Dunsky (1997) studies which captured this with a linear specification.

In Ling and McGill (1998) paper, it revealed a robust study of the factors that can influence the demand for mortgage finance. The

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theoretical and empirical relationship was established by building on previous studies and was able to correct most of the econometric errors made. Thus, they came up with a most effective simultaneous equation for the house value and mortgage debt. The study emphasized the importance of disaggregated by age and used the real impact of life cycle effects.

### **Justification for the adoption of a model**

The following task is to identify a suitable model for this study among the model looked at above. The following circumstances were considered before the model that was chosen were arrived at.

Firstly, the choice of a model should align with the aim of the research, Ling and McGill paper focus on the aim of my research which is to identify the variable that can influence the demand for mortgage finance. This is quite different from Jones (1995) paper which focussed on excess mortgage demand. That is the difference between actual mortgage demand and the minimum amount needed to purchase the property. Also, particularly different from Follain and Dunsky (1997) model which incorporated the uncertainty conditions to the estimation of demand for mortgage finance. Leece (2000) study emphasized the role/impact of choice of mortgage type in determining demand for housing and mortgage. Based on what other studies tends to achieve, factors affecting demand for mortgage finance is not one them. Ling and McGill (1998) is the most suitable model to be adopted and explored.

Secondly, available data necessitated the adoption of the Ling and McGill model. Based on the limitation of data, empirical model of Follarin and Dunsky (1997) could not be adopted. This is because their study assumes that household make their portfolio allocation decision on stochastic properties of the assets returns. This require extensive data on household shares, bonds and others to determine the household consumption pattern. The lack of such comprehensive data from an emerging economy like Nigeria limited this research to adopting Ling and McGill model.

In addition to the comprehensive data requirement, Follarin and Dunsky (1997) assumed that there is a perfect capital market with no transaction cost, independence of portfolio decision making and risk preference for the continuous trading of assets. The assumptions which is practically not possible in an economy and as such limited the adoption of their demand for mortgage finance model. As a consequent, Follarin and Dunsky (1997) is not suitable.

Ling and McGill (1998) study resolved a specification issue identified, thus treating house value as endogenous variable. Follarin and Dunsky (1997) model exclude house value as an explanatory variable to avoid simultaneity bias in the specification of mortgage demand despite its importance. Such exclusion did not enable Follarin and Dunsky (1997) to capture the importance of house size in mortgage decision. Jones (1995) model also did not include house value in his specification as well. This specification issue was corrected in Ling and McGill (1998) model, thus making Ling and McGill (1998) a more suitable model.

Ling and McGill (1998) study provided a robust and rigorous analysis across age groups which other studies did not provided. The disaggregation by age is necessary to the analysis of the demand for mortgage finance in Nigeria. This is because standard demographic variables alone cannot be able to control for the life cycle effects.

### **5.0 SUMMARY**

This section has critically investigated various models used to determine the demand for housing and demand for mortgage finance. Brueckner, Follarin and Dunsky and Ling and McGill models were discussed. The section review revealed the theoretical and empirical background for the models and discussion of the model. Brueckner's model emphasized the theoretical perspective but did not considered the impact of household characteristics on the demand for mortgage finance. Follarin and Dunsky model considered the impact of risks and returns on the demand for mortgage finance. However, data limitations would make the adoption of this model difficult especially in an emerging economy like Nigeria. Ling and McGill model provided a robust theoretical and empirical analysis to the demand for mortgage finance. A significant contribution is the disaggregated analysis based on Age. Based on the description of the model and the available data, this research identified a hybrid version of the Ling and McGill model for the further research.

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