

## **2. LITERATURE REVIEW**

### **2.1 Introduction**

This chapter focuses on two main areas relating to the research topic. The first part reviews definitions of retirement in the literature and how previous studies defined and measured retirement. The second part reviews previous research and literature on the concepts and ideas of life-cycle theories relating to consumption, saving and investing pertaining to financial planning for retirement.

### **2.2 Defining Retirement**

The traditional concept of retirement is changing. The previous notion of life was divided into three distinct periods: schooling, working years, and retirement. Today, retirees may choose to continue working, either at the same place or different place and place (AARP, 2002). For some, retirement could mean taking up part-time employment. Many older workers are continuing to work after retirement either remaining in the same job or taking up alternative employment. About 70 percent of older workers in a US study expected to continue to work after retirement (AARP, 2002; 2003). The common definition of retirement is the cessation of full-time employment (Hall and Johnson, 1980; Montalto, Yuh, and Hanna, 2000)

Feldman (1994) define retirement as a state of exit from a current job that has been held for some time, with the intent of less commitment to work, and a decision that is taken sometime after the individual's middle age. Retirement has historically been

defined from an economic perspective (Gustman, Mitchell, and Steinmeier, 1995). For most people, retirement means the end of a full-time working life and the beginning of a different life, but without the identity, prestige and status (AARP, 2003). In sum retirement is a normative transition in the life course.

There are basically two competing perspectives prevailing in the literature on retirement adaptation: role theory and continuity theory. From the perspective of role theory, retirement may render individuals vulnerable because leaving the labour market undermines the social role associated with being employed (Miller, 1965; George, 1993). Consequently, role theory view work and employment relations as an important source of identity, and loss of this role might have negative consequences on the well-being of the individual. Continuity theory, on the other hand, emphasizes that individuals tend to preserve their social roles, lifestyles, and values even when going into retirement (Atchley, 1976, 1985, 1993 as cited in Jaeger and Hom, 2004). Other studies argue that retirement should be seen as one of several transitions in the life-course of individuals that are embedded in historical, social, and personal contexts (Moen, 1996, 1998; Kim and Moen, 2001, 2002 as cited in Jaeger and Hom, 2004). That is retirement is affected by the macro-social phenomena, such as how pension systems operate and ruling norms in society concerning the right timing of retirement (Moen *et al.*, 1992; Han and Moen, 1999), and the employment patterns of spouse and other family members. The theory basically states that retirement should be viewed as a gradual process in which the individual, interacting with societal norms, may experience rupture or continuity in well-being as a consequence of retirement (Jaeger and Holm, 2004).

Atchley (1971) developed the theory of continuity which posits that individuals will voluntarily retire if they have the financial resources to maintain their preferred lifestyle. Retirement has also been described as a process, a state (Atchley, 1982); as an event, a role, and a process, involving a life transition from employment for income (Evans, Ekerdt and Bosse, 1985; Ekerdt, 1987). It was viewed previously as an end rather than a beginning – something that should be put off as long as possible. Miller (1965) links a person's identity to work, and views retirement as an occasion for an identity crisis, with an accompanying loss of self-respect and feelings of uselessness.

Decreased work hours among older people often proxy the demand for leisure (Hamermesh, 1984). Recently, a more positive view of retirement has been put forward, which relates to adjustment to retirement, to pre-retirement attitudes held with respect to the notion of retirement (Thompson, Streib, and Kosa, 1960; Streib and Schneider, 1971). Those who are prepared for retirement may view the event more positively (Glasmer, 1981). Research indicates that planning for retirement is positively related to satisfaction during retirement (Thompson, 1958; Ash, 1966; Glasmer, 1981; Szinovacz, 1982). Most retirement planning programs focus on health and finances. Few retirees actually miss their jobs (Atchley, 1976; Ward, 1979).

As people transition from the usual highly organised and habitual work routine to retirement, they may find themselves having to take more personal responsibility for planning their daily living and new routine and ongoing relationships (Hartford, 1984). Changes that come with retirement are: self-identity, sense of importance and value as an individual and member of the community, relationships with family and friends,

daily activities, financial status, and living arrangements (Hornstein and Wapner, 1985). People are expected to make their own plans and schedules, to enjoy their own company, to make new connections, to form new relationships, and to be accepted for who they are as individuals, rather than for a title and position in an organisation (Hartford, 1984). Adequate retirement planning should include inter alia the psychological and social aspects as well (Tan and Folk, 2011).

### **2.3 Retirement Span**

Two factors determine the retirement span – the retirement age and life expectancy. In a life-cycle savings context, retirement age determines the period for saving and for dis-saving. Retirement age is important as it determines the duration of a person's working life and therefore how many years he has to earn income and build up the financial security for the future. This in turn determine the duration of the post-retirement period and the number of years the person will need to finance himself after his retirement. The increase in the retirement span among Malaysians reflects improved life expectancy – the typical Malaysian previously retiring at say 55 years old will spend about 20 years in retirement. The individual's responsibility for retirement security includes making an estimate of one's life span, apart from other important factors such as – retirement investment returns, future expenses in later years, and increases in the cost of living. Therefore, people face the prospect of having to support themselves for a long time on their accumulated retirement assets. A realistic option for most people may be to work longer given that more Malaysians are

living longer and healthier lives and that employment has shifted from physically-demanding goods-producing jobs to less arduous service-oriented jobs.

Most developed countries have a retirement age of 65 years. While some countries such as Sweden is proposing to increase the retirement age to 67 years, other countries such as Japan and Germany are increasing their retirement age from 60 to 65 years (El-Hamidi, 2006). Often the individual's financial position determines the retirement date, rather than personal choice (Salter, 2003). Hansson *et al.* (1997) identify three main influences on the retirement decisions: financial status, physical limitations and health problems that inhibit a person's ability to work, and psychological factors such as diminished job attachment, satisfaction with career attainment, and anxieties about separation from the workplace. Phillipson (2004) find that financial circumstances influenced the decision to continue working or to retire. Gustman and Steinmeier (1994) identify that pension-plan incentives (financial) and physical limitations and health problems influenced the retirement decision. Psychological influence such as job satisfaction has been identified to affect the retirement decision (Gustman and Steinmeier, 1994; Rosenman and McDonald 1995).

Most retirement planning programs focus on the material aspects of transition from employment into retirement. Not enough attention has been given to the psychological factors that are of increasing importance. Retirees, who made a gradual transition into retirement as opposed to immediate retirement, have been found to have greater satisfaction during retirement (Quinn, 1981). Gradual retirement creates less discontinuity in an individual's life than a sudden retirement (George, 1980). Another

factor influencing retirement plans is an increasing positive attitude toward leisure (McPherson and Guppy, 1979; Poitrenaud, Vallery-Masson, Vallerson, Demeestere, and Lion, 1979; Hwalek, Firestone, and Hoffman, 1982).

Anderson and Weber (1993) investigated the impact of pre-retirement planning on life satisfaction during retirement. Their findings indicate that retirement preparatory programs are most useful if they are performed or provided in a timely manner; that there are significant differences in the life satisfaction expressed by retirees who planned retirement on their own, compared with those who participated in structured pre-retirement programs, and those who did not plan for retirement. Higher retirement income means a greater likelihood of continuing a pre-retirement lifestyle. Ultimately, it is the responsibility of the individual to prepare for retirement.

## **2.4 Life-Cycle Theories of Savings**

The two principal theories of saving are the life-cycle hypothesis (Modigliani and Brumberg, 1954; Modigliani and Ando, 1957; and Ando and Modigliani, 1963), and the permanent income hypothesis (Friedman, 1957). Both of these theories assume that individuals and households try to smooth consumption over their lifetimes. The basic idea behind the life-cycle model associated with Modigliani and Brumberg (1954 and 1980) is that individuals try to smooth their consumption over time by accumulating resources during the periods of higher earnings for later expenditure, mainly for retirement. Since their labour income varies over time, and as household size varies over time, their saving rates will vary over time. According to the model, the typical

households will accumulate savings (assets) during their matured working years, while savings will be negative for the young and the retirees (Modigliani and Brumberg, 1954, 1980; Modigliani, 1986a). In the face of labour income fluctuations over the course of life, these theories imply that saving rates will be uneven over the course of life (Coleman, 2006). Milton Friedman (1956) proposed in his permanent income hypothesis that people spend a fixed fraction of their permanent income on consumption. Permanent income is defined as the annuity value of lifetime income and wealth (Palley, 2005); the sum of non-human wealth and human wealth (that is, one's present and future income), which represents the present value for current and future income (Flavin, 1981).

The main difference between life-cycle hypothesis and permanent income hypothesis concerns the length of the period. In the Modigliani-Brumberg's life-cycle theory, the planning period is finite, whereas for Friedman, the planning period is infinite, meaning that people save not only for themselves but also for their descendants (Jappelli, 2005). The life-cycle hypothesis and permanent income hypothesis share some similar predictions about individual behaviour: income shocks (transitory taxes and rebates) and capital gains or losses can be expected to have small effects on consumption (Modigliani, 1986b).

Modigliani's life-cycle theory of saving identified that the need to provide for retirement is one of the most important motives for saving. In the saving context, this means moving resources from good times, when one is working and earning money, to bad times, when one is retired and earning nothing. In the investment context, it means

diversifying one's resources so that there is something to eat not just when the stock market booms, but also when it crashes (Kotlikoff, 2008). Gourinchas and Parker (2002) define saving as equal to investment income – liquid and illiquid – plus labour income minus consumption. They define life-cycle saving as the difference between total income and life-cycle consumption. Bodie (2003) identifies as a paradigm of life-cycle investing that “a person's welfare depends not only on her end-of-period wealth but also on the consumption of goods and leisure over her entire lifetime”.

The theories imply that people are concerned about long-term consumption and help explain saving and consumption in terms of expected future income. Since consumption is determined by anticipated lifetime resources (rather than current resources), saving over short periods of time (example, one year) is expected to reflect departures of current income from average lifetime resources. When current income falls below average expected lifetime income, saving decreases, and individuals and households may even borrow to finance consumption. When current income exceeds average expected lifetime resources, individuals and households save. Therefore, savings rates will be low during early adult years, will rise with age as income increases, and will decrease and become negative in retirement as earnings fall (Coleman, 2006).

According to Borsch-Supan and Lusardi (2003), the main saving motive in the life-cycle model is consumption smoothing due to a declining marginal utility of consumption, and the fact that income after retirement is generally lower than before. Figure 2.1 illustrates this life-cycle profile of saving. With relatively low earnings at



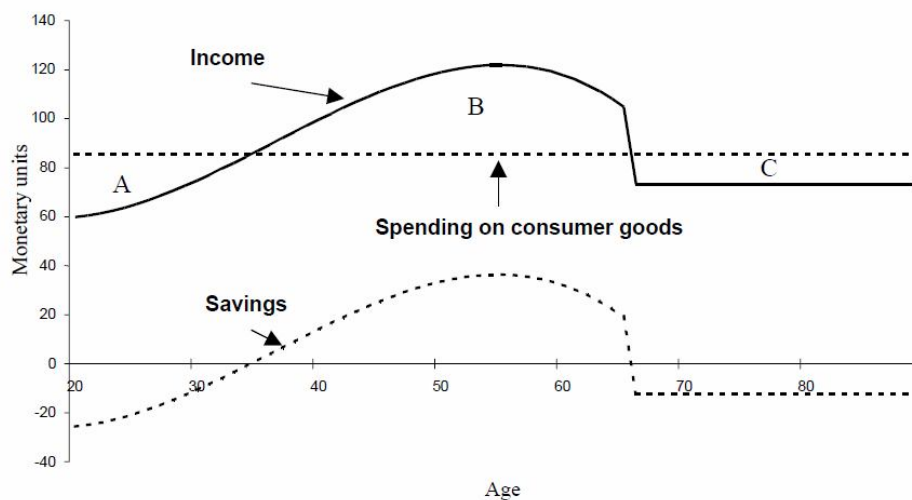
the beginning of the career, consumption is smoothened by borrowing (via financial markets or a loan from the family) (area A). Increasing earnings makes saving possible (area B), which is then decumulated after retirement (area C). This profile, however, rests on a number of simplifying assumptions: for example, the introduction of uncertainty and market imperfections. Borrowing constraints are likely to prevent young households from smoothing consumption before the symbolic age of 35 years in Figure 2.1 (Jappelli and Pagano, 1989, 1994; Alessie, Devereux, and Weber, 1997). Higher saving rates are expected (especially at younger ages) in the face of more stringent borrowing constraints.

Figure 2.1 assumes that the time of death is known for the life-cycle computation. In fact, there is uncertainty about the time of death (Davies, 1981; Rodepeter and Winter, 1998); and a great deal of income uncertainty over the life course. Thus, saving not only serves to offset the decline of income after retirement, but also to shield households against income shocks (Zeldes, 1989a; Caballero, 1990; Deaton, 1992; Carroll, 1994, 1997). Uncertainty becomes particularly relevant when households face borrowing constraints (Deaton, 1991). Individuals face uncertainty not only in income and in the length of life, but also in all kinds of future economic circumstances such as healthcare costs in old age (Hubbard, Skinner, and Zeldes, 1995; Palumbo, 1999; Kennickell and Lusardi, 2001). There thus exists a precautionary motive to save and not just a retirement motive. Probably because of the pervasiveness of uncertainty and imperfections in the insurance and financial markets, there exist various public and social safety nets. These safety nets may in turn replace the need for savings, for example by reducing the gap between earned and actual income that needs to be filled

in Figure 2.1 below and by insuring against shocks. Countries with a high replacement of earnings by pension annuities are therefore likely to feature lower wealth at retirement, and less decumulation of wealth after retirement. Similarly, unemployment benefits (Lusardi, 1998; Engen and Gruber, 2001) and other welfare policies (Hubbard, Skinner, and Zeldes, 1995; Gruber and Yelowitz, 1999) which aim to reduce changes and shocks to life-time income, is likely to reduce the amount of precautionary savings (Browning and Lusardi, 1996).

In addition to public safety nets, individuals may also rely on the network of relatives and friends to offset shocks (Lusardi, 2000a). Such informal borrowing opportunities may replace formal capital market interactions and reduce further the need to save.

**Figure 2.1: Income, Consumption and Life-Cycle Saving**



Source: Borsch-Supan and Lusardi (2003)

A fairly restrictive version of the life-cycle model specifies that the only uncertainty is the date of death (Yaari, 1965). Yaari (1965) suggested that a rational retiree lacking a bequest motive would annuitize all his assets. A moderate extension of the life-cycle model allows for unexpected outcomes both for earnings and for expenses (Browning and Lusardi, 1996). For example, families have unexpected expenditures such as uninsured medical expenses or higher than expected educational expenses. These families may have planned to reach retirement with adequate resources, but were not able to realize their plans. Unexpected events can generate substantial variation in wealth outcomes even though individuals are behaving optimally.

Another type of explanation for differences in savings across households has to do with the varying subjective time rates of discount; some people strongly prefer present consumption to future consumption causing them rationally to choose not to save (Dynan, 1993). On the earnings side, workers may have anticipated smoothly rising earnings, which would cause them to delay saving until their earnings were higher, but instead they may encountered periods of unemployment or perhaps their earnings were flat. From a lifetime perspective, they would not have saved enough early in their work life, and so they would not have reached retirement with enough actual savings relative to their lifetime incomes (Hurd and Zissimopoulos, 2003).

The life-cycle theory is one in which the wealth of the nation gets passed around; the very young have little wealth, middle aged people have more, and peak wealth is reached just before people retire. As they live through their golden years, retirees sell off their assets to provide for food, housing, and recreation in retirement. The assets

shed by the old are taken up by the young who are still in the accumulation part of the cycle (Deaton, 2005). With population growth, there are more young people than old, more people are saving than are dissaving, so that the total dissaving of the old will be less than the total saving of the young, and there will be net positive saving. If incomes are growing, the young will be saving on a larger scale than the old are dissaving so that economic growth, like population growth, causes positive saving, and the faster the growth, the higher the saving rate. It does not matter whether it is population growth or growth in per capita incomes, what matters for saving is simply the rate of growth of total income. In an economy with no growth, wealth will just be passed around; no new wealth will be created. The total wealth in the economy depends on the length of retirement, and in simple cases, the ratio of a country's wealth to its income is a half of the average length of retirement, a prediction remarkable for its precision, simplicity, and lack of unspecified parameters. More generally, the ratio of wealth to income is lower the faster is the rate of growth of the economy, and is at its largest when the rate of growth is zero (Deaton, 2005).

Some economists are sceptical of the life-cycle theory; for example, contrary to the theory, many American workers are entering retirement without any assets. And a large percentage of workers who do have assets apparently continue to add to them after they retire. Neither of these phenomena is easy to reconcile with simple versions of the life-cycle model (Burtless, 2004). Another limitation of the life-cycle hypothesis is the omission of bequests as a factor determining saving. Kotlikoff and Summers (1981) maintain that the desire to make bequests is an important factor driving saving.

However, saving for bequest also to some extent could be likened to saving for retirement.

Some studies have found that the elderly do not dispose off their assets in the way that the theory requires and indeed that many of the elderly appear to save part of their incomes. Saving for retirement seems to start only in middle-age, and to be insufficient to prevent a sharp fall in consumption at retirement, and such a fall has been well documented (Banks, Blundell, and Tanner, 1998). Uncertainty about the date of death may limit the extent to which retirees are willing to run down their assets, which in itself will generate “unintended” bequests. Tobin (1967 as cited in Deaton, 2005) noted that if each person expects their incomes to grow throughout their life, then the life-cycle hypothesis would mean that they should consume more than their income in early life, so that there would be dissaving at both ends of the life cycle, financed by saving in middle-age. However, in practice, because it seems unlikely that young people would be able to borrow enough to secure living standards that was much beyond their current means. As they move into middle-age, there will come a point where they need to start accumulating assets for retirement, even if they would have liked to have borrowed at the beginning of the life-cycle.

Alternative models to the life-cycle hypothesis and permanent income hypothesis have been proposed: the “buffer-stock” models of saving (Deaton, 1991; Carroll, 1997; Carroll and Samwick, 1997, Ziliak, 1999). These models emphasise a precautionary motive for saving (being prepared for emergencies as the most important reason for saving), particularly for younger households and for households facing greater income

uncertainty. Kotlikoff (1988) also stressed the importance of the bequest motive. This bequest motive has been drawn to explain why saving does not reduce during old age as would be expected from the life-cycle hypothesis. Bequest can be accidental (Davies, 1981; Abel, 1985) strategic (Bernheim *et. al.*, 1985), or the result of decreased consumption due to an unexpected deterioration of health (Borsch-Supan and Stahl, 1991 as cited in Borsch-Supan, Axel and Annamaria Lusardi, 2003). Kotlikoff (1989) showed that in the United States, about 30 percent of household saving is precautionary. People seem to save because of anxieties about retirement and old age. They save to have a buffer. Denizer, Wolf, and Ying (2000) find that the unusually high savings of elderly may be explained by the precautionary motive. This precautionary or buffer saving has been found to be an important saving motive not only in Western countries but in many other countries as well (Alessie *et al.*, 1997; Horioka and Watanabe, 1997; Warneryd, 1999). Precautionary saving is the complement of life-cycle saving. Younger cohorts facing no income would like to borrow (Gourinchas and Parker, 2002). These economic theories assume that people are rational, forward looking and concerned about consumption patterns, preferences are fixed or very stable, and people have perfect information.

Variations on the standard economic theories include the behavioural, psychological, and sociological theories. Behavioural theories emphasise financial management strategies and self-imposed incentives and constraints (Shefrin and Thaler, 1988). The behavioural life-cycle hypothesis incorporates self-control, mental accounting, and framing. It proposes that individuals use systems of mental accounts and that the propensity to spend varies across accounts. Shefrin and Thaler (1988) suggested that

people treat income from different sources differently. Three mental accounts are considered to be relevant when people think about their wealth: current income, current assets (savings), and future income. The temptation to spend money is supposedly the greatest with current income. In addition, the marginal propensity to save or spend is different with each of these mental accounts. Thaler (1990) introduced the concept of mental accounting. Warneryd (1999) find that many consumers use their own special budgetary system to monitor expenditures through different mental budgets: a specific amount of money is allocated to a different mental budget.

Behavioural theories do not assume that individuals have perfect information, and may behave “irrationally”. These theories suggest that individuals sometimes have trouble resisting temptations to spend. Therefore, individuals may create their own behavioural incentives and constraints (Shefrin and Thaler, 1988). Behavioural theories suggest that saving and asset accumulation are likely to increase when mechanisms of contractual saving or other pre-commitment constraints are available. Such mechanisms make it difficult to choose current consumption at the expense of future consumption (Maital, 1986; Shefrin and Thaler, 1988; Maital and Maital, 1994). Psychological and sociological theories do not assume that consumer preferences are fixed, but rather change with economic and social stimuli (Duesenberry, 1949; Katona, 1975). Psychological and sociological theories of saving seek to explain saving-related preferences, aspirations, and expectations. Katona (1975) noted that saving is a function of two sets of factors: the ability to save and the willingness to save. The emphasis on ability to save acknowledges that some individuals, because of limited economic resources, special consumption needs, or other circumstances, find it more

difficult to defer consumption than others. Psychological theory focuses on the choice that individuals who can postpone consumption must choose to do so; which decision requires some degree of willpower. Variations on psychological and sociological theories consider the effects of families (Cohen, 1994), peers (Duesenberry, 1949), and past saving experiences (Katona, 1975; Furnham, 1985) on saving-related beliefs, aspirations for saving, and consumption patterns.

Another reason given for not saving is procrastination using the concept of “hyperbolic discounting (Laibson, 1997; Laibson and Harris, 2001). Under hyperbolic discounting, people wait too long to get started on saving for retirement, which can be a costly error given the power of compound interest (Deaton, 2005). The relation between life-cycle hypothesis and social security has been found to correlate through the “extended life-cycle model” (Munnell, 1974; Feldstein, 1976). They pointed out that pension wealth should be counted as part of the individuals’ resources, and that the transition to a social security regime would affect discretionary saving. If the life-cycle hypothesis posits that total saving is controlled by a target accumulation to support retirement, then one may conclude that social security and discretionary (saving) should largely offset each other. This is substitution effect – pension saving crowding out discretionary saving (Jappelli, 2005).

## **2.5 Life-Cycle Theories of Consumption**

According to the life-cycle theory, individuals and households choose a consumption path that will maximise lifetime utility subject to their lifetime budget constraint (Hurd and Zissimopoulos, 2003). Lifetime utility could be increased by reallocating some



consumption from the working life to the post-retirement period. An important prediction is that households will accumulate savings during their working life, and spend some of the savings to finance consumption after retirement. On average, workers save at high rates during their 50s, when their earning usually reach a maximum and expenses have declined from the child-raising ages (Hurd and Zissimopoulos, 2003).

The life-cycle approach makes a number of important contributions. First, it introduces utility maximization, thereby introducing agency into consumption agency. This treatment reconciled macroeconomic consumption theory with microeconomic choice theory. Second, lifecycle consumption theory is also forward looking since it includes lifetime income expectations in the lifetime budget constraint. Third, the constrained utility maximization framework introduces credit markets and borrowing and lending. Fourth, this also introduces the effects of interest rates and time preference on consumption. Fifth, lifecycle theory incorporates a sociological dimension, explicitly recognizing that consumption expenditures may vary by stage of life. At the empirical level this is confirmed by evidence that population age distribution affects aggregate consumption (Fair and Dominguez, 1991 as cited in Palley, 2005).

Within the life-cycle framework, retirement behaviour is viewed as a result of decisions about consumption and labour supply: the time allocation between leisure and market work, wealth, and family structure. The saving decision is driven by the preferences between present and future consumption. The basic assumption is that people find an optimal retirement age and consumption level to maximise their utility

over a lifetime. The life-cycle theory also implies that the level of wealth decreases after reaching a peak, at middle age. In many regards, Modigliani and Brumberg's lifecycle model can be viewed as a compromise between the theories of Keynes and Friedman. Thus, the lifecycle approach generates a permanent income consumption function if: (1) the borrowing rate, lending rate, and rate of time preference all equal zero; and (2) there are no constraints on borrowing. If households are liquidity-constrained, their marginal propensity to consume is unity. The reason is that credit constrained households would like to borrow to finance additional consumption but they cannot. According to the life-cycle theory, individuals choose a lifetime pattern of consumption that maximizes their lifetime utility subject to their lifetime budget constraint. Life-cycle consumption theory is forward looking since it includes lifetime income expectations in the lifetime budget constraint. The theory also incorporates a sociological dimension, explicitly recognizing that consumption expenditures may vary across the life stage as mentioned earlier (Palley, 2005).

The life-cycle hypothesis and permanent income hypothesis predict that current income is not the key predictor of current consumption because the marginal propensity to consume out of permanent income is large, while the marginal propensity to consume out of transitory income is small. By taking in future income, people attempt to maintain a fairly constant standard of living even though their incomes may vary considerably over the short term period. Therefore, any increases and decreases in income that people see as temporary have little effect on their consumption spending (Bryant, 1990). The basic permanent income hypothesis posits that individuals consume a fraction of this permanent income in each period and thus

the average propensity to consume would equal the marginal propensity to consume (Meghir, 2002).

Another relevant theory was Duesenberry's (1948) relative income theory of consumption. Duesenberry's theory maintains that consumption decisions are motivated by "relative" consumption concerns i.e. "keeping up with the Joneses". Another claim is that consumption patterns are subject to habit and are slow to fall in face of income reductions (Duesenberry, 1948 as cited in Palley, 2005). An extension of the Life-Cycle Permanent Income models is the theory of precautionary savings; that savings function not only as an income reallocation over the life cycle, but also as an insurance against income shocks. Precautionary savings lead to consumption cut-backs and the accumulation of wealth to insure against uncertainty or risk; particularly the income risk. With individual income uncertainty and prudence, households hold liquid wealth to insure themselves against future contingencies. Hubbard, Skinner, and Zeldes (1994 as cited in Gourinchas and Parker, 2002) demonstrate that this uncertainty can lead to hump-shaped consumption profiles as households save for precautionary reasons early in life and run down these assets during retirement due to lower levels of uncertainty and an increased probability of death.

Gourinchas and Parker (2002) find that consumption rises with age, until around age 45 when it begins to drop. Consumption smoothing posits that households seek to spread their spending power over time as well as across times – times that is good and bad. This follows from the assumption of diminishing marginal utility; that spending more and more at a given point in time yields less and less additional pleasure, which

economists call utility. Borrowing constraints may cause the inability of households to fully smooth their living standards by borrowing more money than is feasible or desired. Borrowing constraint appears to affect about two thirds of young and middle-aged households. Such households typically either have high mortgage, education expenses, loan repayments, or other expenses. Whereas conventional financial planning focuses simply on finding the fixed annual saving amount or fixed annual saving rate needed to achieve arbitrary retirement spending targets (Kotlikoff, 2008).

It was found that in more rapidly growing economies; the young are relatively much richer than the old. If the life-cycle hypothesis is correct, the age profile of consumption should be relatively higher for the young than the old in more rapidly growing economies, so that higher growth should rotate the cross-sectional age-profile of consumption clockwise (Carroll and Summers, 1989). For each individual, it is assumed (by appropriate assumptions about preferences) that increases in life-time resources lead to proportionate increases in consumption in all periods of life. As a result, consumption is proportional to life-time resources or, what is more or less the same thing, to average income over the life span. By building up and running down assets, working people can make provision for their retirement, and more generally, tailor their consumption patterns to their needs at different ages, independently of their incomes at each age. One of the biggest challenges to the life-cycle hypothesis is whether the data really support the fact that people save when they are young and run down their assets when they are old. If the life-cycle hypothesis is correct, even in part, the age profile of consumption should be relatively higher for the young than the old in

more rapidly growing economies, so that the higher growth should rotate the cross-sectional age-profile of consumption clockwise.

Borrowing constraints appear to affect the younger households; such households typically either have high mortgages, education expenses, loan payments, or other off-the-top expenses. For example, a typical middle class household whose children will graduate from college will be likely be constrained until the children graduate. This means the household needs a plan to achieve a stable living standard before the children graduate as well as a separate plan for a stable, but higher living standard for the years thereafter (Kotlikoff, 2008).

Modigliani (as cited in Deaton, 2005) argued that the main effect of uncertainty would be to generate a demand for precautionary saving; except perhaps among the very young, the accumulated assets of life-cycle savers could serve a double purpose, not only for retirement, but as a buffer against unexpected emergencies. Carroll (1997) has shown that people with uncertain future earnings who are sufficiently prudent will never borrow, if there is the possibility, however remote, that they will not earn enough to be able to repay their debts. If such people expect their earnings to grow over time, they will nevertheless keep their consumption with their current incomes, thus inducing a close articulation or “tracking” between consumption and income. Therefore, people are maximizing their expected lifetime utility, as postulated by the life-cycle theory under uncertainty; their consumption is effectively constrained by their current incomes. People can save to smooth out their consumption, but they

cannot have consumption greater than their income, except when they already have assets in the bank (Deaton, 2005).

The most fundamental challenge to the life-cycle model has been directed at its basic underlying assumption, that people make rational, consistent, intertemporal plans, that they act as if they are maximizing a utility function defined over the periods of life, according to the “received theory of consumer choice over time (Deaton, 2005).

## **2.6 Saving Behaviour**

The literature emphasize that there is considerable heterogeneity in household saving behaviour. Keynes outlines eight motives for saving (as cited in Browning and Lusardi, 1996):

1. Precaution, which implies building up a reserve against unforeseen circumstances;
2. Foresight, which includes providing for anticipated future relationship between the income and expenditure (life-cycle motive);
3. Calculation, which refers to the wish to earn interest and appreciation;
4. Improvement, which means to enjoy a gradually improving standard of living over time;
5. Independence, which refers to the need to feel independent and to have the power to do things;
6. Enterprise, which means having the freedom to invest money if and when it is favourable;

7. Pride, which concerns leaving money to heirs (the bequest motive); and
8. Avarice or pure miserliness.

Browning and Lusardi (1996) added a ninth motive: the down payment motive. This is to accumulate deposits to buy houses, cars and other durable goods. Browning and Lusardi (1996) emphasized there are other motives to save apart from providing for retirement. Households many save to leave a bequest to future generations; and a precautionary saving motive. Lusardi (2001) accounts for the fact that households accumulate little because they can rely on help from relatives and friends in case they run into severe financial difficulties in the future. Households whose head has a high education have higher savings. Married couples have high savings, while children have a depressing effect on wealth. Households who experienced negative shocks in the past end up having lower wealth, while receiving inheritances or other transfers leads to higher savings. Households with a bequest motive accumulate more, while those who are impatient accumulate less. Households who have a large pension accumulate more rather than less wealth, showing that households who have much in retirement assets also have more in other forms of accumulation (Gustman and Steinmeier, 1999 as cited in Lusardi, 2001).

Several studies show that there are vast disparities in wealth holdings and the disparities persist even among households of similar age and economic status. Not only do wealth holdings vary widely across households, but many families report low savings even close to retirement (Diamond and Hausman, 1984; Poterba *et al.*, 1994; Venti and Wise, 1997, 1998; Lusardi, 1999). Diamond and Hausman (1984 as cited in

Lusardi, 2001) found that a large fraction of households arrive at retirement in the US with as little as \$1,500 (in 1966 dollars). Other studies note that wealth holdings are particularly low for households whose head has low education (Bernheim and Scholz, 1993; Hubbard *et al.*, 1995).

Warneryd (1999) defines saving as the excess of income over consumption over certain period of time. Saving is considered as the residual of income minus consumption (Browning and Lusardi, 1996). Katona (1975) classifies saving into three categories: residual saving, contractual saving, and discretionary saving. For residual saving, no active saving decision is needed, because saving represents whatever money left. Contractual saving refers to regular savings like a retirement pension scheme, and buying a life insurance. For contractual saving, at least one decision is needed to set aside a certain amount of money as soon as the income is received. Discretionary saving refers to the freedom to save or to spend the money that is available after expenditures or necessities. This saving happens when the individual decides in advance that a certain amount of money should be left at the end of a certain period of time. Discretionary saving is of more interest to psychologists, as people make saving and spending decisions about their discretionary income. Saving behaviour implies that the perception of future needs a saving decision and a saving action (Warneryd, 1999). Saving provides a means by which households and individuals can distribute their income over the life course, providing themselves with financial security for possible hard times ahead and for their retirement (Modigliani, 1970).



Katona (1975) pointed out that the decisions of individuals to save or spend their money collectively influence the economy, because personal savings comprise a significant source of investment funds. Katona (1975) suggested that disposable income was a direct measure of a person's ability to save. He proposed that the ability to save resulted from how optimistic or pessimistic the person felt about the state of the economy. He noted most people save because of: emergencies, retirement, children and family needs, and for other purposes such as buying a house, durables, or for holidays. Warneryd (1989) argues that the psychological concept of self-control underlies most theories of saving: saving results from the ability to resist the temptation to spend, and this ability is held to be greater in people who are older, more educated and more middle class. Gasparski (1991) considers saving as the results of decisions which are influenced by individual perceptions, cognitions and values. Engen *et al.* (2004) consider household to be saving adequately if it is accumulating enough wealth to be able to smooth its marginal utility of consumption over time in accordance with optimizing consumption. Before retirement, consumption is financed by labour earnings, decumulations of previous savings, and inheritances. After retirement, consumption is financed by previously accumulated savings/assets and post-retirement income (if any).

The life-cycle hypothesis is not without shortcomings. The theory predicts there are differences in saving behaviour over the life-cycle, but some studies could not confirm the expected saving behaviours of individuals or households at different stages in the life-cycle: the young and old did not behave as predicted (Juster, 1986; Thaler, 1990). According to the life-cycle hypothesis, young people should borrow to cover any

shortfall in their income and old people should spend more than they do. Bodie *et. al.*, (2008) have identified five concepts from the life-cycle model that are directly relevant to the practice of life-cycle planning:

1. The Lifetime Budget Constraint - the notion of a lifetime budget constraint;
2. The Importance of Constructing “Contingent Claims” - the relevance of contingent claims in life-cycle planning;
3. The Prices of Securities Matter - the trade-off imposed by varying costs of consumption over one’s lifetime;
4. Risky Assets in the Life-Cycle Model - the role of risky assets; and
5. Asset Allocation over the Life Cycle - the asset allocation decision over the life-cycle.

The standard results of the life-cycle theory of saving are: (1) the level of consumption at any point of time depends on the present value of the entire lifetime earnings; and (2) the proportionate rate of change of the marginal utility of consumption at any point of time is equal to the difference between the subjective discount rate and the objective discount rate or the rate of interest (Nagatani, 1972). George Katona (1975), an economic psychologist, noted that saving is a function of two sets of factors, ability to save and willingness to save. The ability to save acknowledges that some individuals, because of limited economic resources or special consumption needs, find it more difficult to defer consumption than others. Other individuals who defer consumption must choose to do so, a decision that requires some degree of willpower. For example,

households are expected to defer consumption and save for future security if their perceptions of household finances, interest rates, unemployment, and inflation, are pessimistic.

Behavioural theories of saving note that individuals have trouble resisting temptations to spend, even when they want to save. Behavioural economists explain individual savings in terms of mental accounting, which is a set of cognitive operations used by individuals and households to organise, evaluate, and keep track of financial activities (Thaler, 1998). The mental accounting concept incorporates social, cultural, and experiential influences and not just demographic and economic factors. It emphasises not just the level but also the composition of income and wealth in explaining saving behaviour (Asher, 2002). Policies that rely on workers to make their own decisions about retirement saving and investment seem reasonable if most workers make these choices rationally and competently. However, the same policies look less appealing when people base their retirement and saving choices on herd behaviour, faulty logic, or defective information. Recent empirical research on saving behaviour has focused on whether workers typically accumulate enough savings so that they can live comfortably during retirement? This has aroused considerable controversy because of disagreement over what constitutes adequate saving for retirement (Burtless, 2004). Lusardi (2001) reports that the median holdings of workers who had hardly thought about their retirement is less than one-half of the median wealth of workers who have thought of or a lot about retirement. By the time the retiree discovers he has retired too early or saved too little, he may not have the opportunity to undo his mistake by saving more or returning to work again (Burtless, 2004).

If people accumulate assets for their own retirement, they should dissave when they retire. But empirical evidence suggests that retired people typically do not spend all of their retirement income. Poterba (1994) found that saving rates among retired people were positive in six “group of seven” countries, and in excess of 30 percent in Italy and Japan. Such empirical evidence has often been used to discredit the life-cycle model. However, Jappelli and Modigliani (1998) found the results from most household surveys use an incorrect definition of income, treating social security contributions as taxes and pension benefits as earned income. They argued that social security contributions should be treated as mandatory savings, and pension benefits should be treated as a mixture of capital income and capital decumulation. In cases where these adjustments have been made, they found that saving rates of retirees are negative, even though retirees do not spend all the income they receive. Brugiavini and Padula (2003 as cited in Coleman, 2006) estimated that retired people in Italy save about 20 percent of their retirement income when their pension was treated as earned income, but negative 20 percent when a portion of their pension was counted as capital decumulation.

In terms of macroeconomics, the life-cycle model predicts that aggregate saving rates should be an increasing function of the overall country growth rate. This is because the lifetime income of the young is high relative to the old when economic growth is high, so the saving of the young should exceed the dissaving of the old (Coleman, 2006). The life-cycle model of saving is based on the assumption that people have the knowledge to forecast their needs in the future and the discipline and skill to act on those forecasts. To properly forecast retirement needs and how much they should save

each year, people need to predict their earnings over their lifetime, how long they will be able to work, how much they will earn on their assets, and their life expectancy (Munnell, 2006). The current work in behavioural finance, which brings together, economics, finance, and psychology, has tried to identify some of the factors to poor preparation for retirement. Among the problems identified are: (1) myopia; (2) “hyperbolic discount”; and (3) self-control.

### **2.6.1 Myopia**

People are absorbed in their daily routines, or prefer not to think of their own age, and fail to see what lies in the future. This myopia is enhanced by the fact that saving and investment decisions are complicated. Benartzi and Thaler (2002) show that investors prefer the portfolios chosen by other people rather than the ones chosen by themselves, suggesting that task difficulty prevents people from reaching optimal decisions. Campbell and Mankiw (1989) find that roughly 40 percent of all agents are “hand to mouth”.

### **2.6.2 Hyperbolic Discount**

A second problem is the low value many people seem to place on their future well-being. Psychologists and economists attribute this to people being “hyperbolic” discounters, in that their near-term discount rates are much higher than their long-term discount rates. In the case of a Ringgit saved today is seen as growing fast in the short run, but slowly thereafter, so benefits more than a short period away have very little value.

### **2.6.3 Self-Control**

Many people know that they should be saving for retirement, but find it very difficult to act on that knowledge. Inertia and procrastination are major components of the

discipline problem with regard to saving behaviour. The literature on saving finds that making decisions about retirement is one area where people are likely to procrastinate. Deferring the start of saving has no immediate penalty. Because of lack of discipline, people often need commitment devices to ensure that they put money aside. Most people lack the foresight and discipline to save and accumulate resources while working to support themselves in retirement, in the absence of institutionalized savings arrangements.

## **2.7 Understanding Consumption in Retirement**

During retirement, consumption may be even higher early on as people pursue their retirement dreams, such as travel and new leisure activities. Consumption levels may also change - people having larger homes might like to downsize, even if not for economic reasons, for example, the cost and problem of caring for larger homes can be substantial later in life. Medical costs and the need for long term care are likely to increase during retirement.

Understanding changes in consumption (changes in household expenditures) after retirement from the labour force is important for determining a financially sound retirement plan, and ensuring the economic wellbeing and health of the retirees. As people live longer, question arises on whether retirees can maintain their consumption well into retirement. Retirees may be able to smooth their consumption as they transition into retirement but are they able to sustain that consumption level over their remaining lifetimes? Several studies have shown that the baby-boomers generation in

the US are not saving enough to maintain current levels of consumption into their retirement years (Bernheim, 1996; Moore and Mitchell, 1997; Yuh, Montalto, and Hanna, 1998). Nieswiadomy and Rubin (1995) found that with increased life expectancy and better health, the propensity for retirees to purchase leisure related services doubled. Health care expenditures correlated positively with age, as older retirees greatly increased the amount spent on health care (Hatcher, 2007). Households may decrease consumption because of a lack of financial planning. Under the life-cycle model, consumption eventually starts to decrease (Hanna, Fan, and Chang, (1995).

Popular financial advice suggests that households should strive to replace between 65 and 85 percent of their pre-retirement income in retirement (Uccello, 2001). Retirees have lower consumption needs than workers because they do not incur work-related expenses. Housing costs tend to decline at older ages once homeowners pay off their mortgages. In addition, older adults no longer need to save for retirement, and they typically pay lower taxes than younger people. On the other hand, health care costs tend to rise at older ages, and many elderly people who lack private health insurance face catastrophic medical expenses (Crystal *et al.*, 2000; Goldman and Zissimopoulos, 2003).

The life-cycle hypothesis posits that consumption remains smooth during the transition from work into retirement (Modigliani and Brumberg, 1954; Hurst, 2007). However, empirical evidence has shown that people consume less in retirement (Banks *et al.*,

1998; Engen *et al.*, 1999, Bernheim, Skinner and Weinberg, 2001; Hurd and Rohwedder, 2003; Aguiar and Hurst, 2005). This decline has been referred to as the “retirement consumption puzzle” (Attanasio, 1999). One possible explanation is that increased mortality risk at older ages makes consumption less desirable. The observed decline raises the questions whether the life-cycle hypothesis is correct or whether people underestimate their needs in retirement. Understanding consumption changes among newly retired is also important for individuals who are trying to assess how much income they will need in their retirement, what the experience has been of cohorts older than themselves, and what more they need to do before retirement to continue to enjoy the same level of economic well-being that they now experience (Fisher *et al.*, 2005).

Lundberg, Startz, and Stillman (2003) and Hurst (2004) found substantial average declines in food expenditures as respondents moved from work to retirement. Bernheim, Skinner, and Weinberg (2001) went beyond food expenditures and found a 14 percent decline in mean expenditures in the first two years of retirement. Aguiar and Hurst (2005) found that while food expenditures decline 17 percent at retirement, the quantity and quality of food consumed did not change. They conclude that given time to produce food at home and additional time to shop for bargains, the elderly spent less on food while maintaining their well-being. Laitner and Silverman (2005) found a 16 percent decline in total consumption upon retirement. On the other hand, Hurd and Rohwedder (2003) reported that total spending increases by 3 percent within two years of retirement. The retirement consumption puzzle changes character with each change in the definition of consumption. As the definition of consumption



broadens beyond food expenditures, the gap between consumption while working and consumption at retirement grows smaller (Fisher *et al*, 2005).

Hamermesh (1985a as cited in Burtless, 2004) found that consumption early in retirement is 14 percent higher than their retirement income can support, forcing them to reduce their consumption in later old age. Hausman and Paquestte (1987 as cited in Burtless, 2004) found that retirement led to a decline in expenditures in food of about 14 percent of pre-retirement consumption. For workers who were forced to leave their jobs because of layoff or deterioration in health, the drop in consumption was even bigger – an additional 9 percent of pre-retirement food consumption. Hurd and Rohwedder (2003 as cited in Burtless, 2004) confirm that consumption falls at retirement; the average decline is about 15 percent to 20 percent of pre-retirement consumption. Workers experiencing significant reductions in consumption after they retire could possibly indicate that they were short-sighted in their saving or unpleasantly surprised by the drop in income that followed retirement. Another explanation for the fall in consumption is that workers have lower spending needs after leaving work. The drop in consumption spending may not be connected with a decline in welfare (Burtless, 2004).

Recent research revealed that essentially all the declines in expenditure at the time of retirement occur in two consumption categories: work related expenses (such as clothing and transportation expenditures) and food (meals at home and meals away from home). The fact that work related expenses decline in retirement is not all surprising. Becker (1965, as cited in Aguiar and Hurst, 2007) formalized the notion

that consumption is the output of a production function that combines market goods and time. Such a “home production” function allows households to optimally substitute time for expenditures in response to fluctuations in the relative cost of time. In a study focusing on the differential lifecycle spending patterns for different consumption categories, Aguiar and Hurst (2007) find that “spending on total food, clothing and non-durable transportation” falls for people between their early and late 60s, by 10, 22, and 20 percent respectively. Conversely, spending on housing services, utilities, charitable giving, net gambling receipts, and entertainment remain constant or rise during the retirement years. Aguiar and Hurst (2007) demonstrate that older adults find lower prices for everyday items by spending more time shopping around. In particular, they highlight that food, a necessary good, declines relative to entertainment (and several other categories) in the second half of the lifecycle.

Why would households forgo food (a necessity) while simultaneously increasing their spending on entertainment and charitable giving? Aguiar and Hurst (2007) conclude that spending on goods that are complementary to time (like entertainment) will increase in retirement, while spending on goods that are substitutes to time (like food production) will fall during retirement. The decline in food expenditure can be explained by an increase in home production of food by retirees; the time allocated to food production goes up in retirement and actual food intake may not change. Bernheim, Skinner, and Weinberg (2001) examined food consumption declines among retirees and found that: essentially all households, irrespective of pre-retirement wealth and post-retirement income replacement rates, experienced a decline in food

expenditure during retirement; and the declines in expenditure are largest for households with the lowest retirement resources (Hurst, 2007).

The literature documents that retirees spend much more time on food production i.e. preparing meals and shopping for groceries, than their non-retired counterparts. The actual food intake (as measured by the quantity and quality of one's diet) remains constant through retirement despite the fall in food expenditure. There is substantial heterogeneity across individuals with respect to changing expenditures in retirement. Declines in expenditures are greatest for households that have accumulated little wealth prior to retirement (Hurst, 2007).

The literature also shows that there is substantial heterogeneity across households in the change in expenditure associated with retirement. Much of the heterogeneity can be explained by households involuntarily retiring due to deteriorating health. Health shock can affect the optimal consumption decision; households who are forced to retire earlier than expected will likely experience a sharp decline in their lifetime resources. Health shocks can cause a reallocation of the consumption bundle towards health expenditures away from other consumption categories. Someone stricken with a severe illness that affects his ability to work may also have decreased appetite causing him to spend less on food expenditure. Hurd and Rohwedder (2006a) examined expenditure changes for households who self report poor health as reason for their retirement; their findings show that those who experienced a poor health shock forcing them to retire were more likely to report expenditure declines at time of retirement. When retirement spending targets are set too high – higher than the appropriate living

standard-smoothing level, households are told to save too much and spend too little prior to retirement. When the targets are set too low, households are told to save too little and spend too much prior to retirement. Either way, when household reaches retirement age, its living standard will change abruptly – its consumption will be disrupted rather than smoothed. Kotlikoff (2008) demonstrated that targeting mistakes of 15 percent can readily induce 30 percent disruptions in living standards, pre- and post-retirement. Unfortunately, the size of the targeting mistakes associated with the ubiquitous 75-85 percent replacement rate rule-of-thumb is not 15 percent, but rather well above 50 percent. Households who are subjected to these rules of thumb can easily be told to save many times more than is appropriate (Kotlikoff, 2008).

## **2.8 Rating Replacement Rates**

Based on the life-cycle model (Modigliani and Ando, 1960) and the permanent income theory (Friedman, 1956), a replacement rate (post-retirement income divided by pre-retirement income) would be less than 100 percent only because of tax considerations and reduced need to save out of post-retirement income. The issue of adequacy of income after retirement has been the subject of a number of studies in the UK and the US (Bodie, 1990; Bernheim, 1992; Banks *et al.*, 1998, 2002; Blake 2004). The literature focuses on studying the changes in the living standards after retirement (Whiteford and Kennedy, 1995 as cited in Gough and Adami, 2008), by examining changes in income, expenditure or consumption (Adkinson, 1985 as cited in Gough and Adami, 2008). To measure post-retirement income adequacy, Engen *et al.* (2004) compare the levels of post-retirement income to poverty rates among the elderly. First,

poverty has been defined in different ways; Gough and Adami (2008) define as poor those individuals having resources (typically income) below 50 or 60 percent of the median income. They used 60 percent of median national income as poverty threshold (as indicated by Eurostat guidelines; Duncan *et al.*, 1993; Whelan *et al.*, 2003 as cited in Gough and Adami, 2008). The median definition has the advantage over the mean value of providing a better estimation of income, by avoiding small numbers of very high incomes. A 75 percent income replacement may support a comfortable retirement for someone who is in excellent health, which is likely to be the case in the early years of retirement. But the same replacement rate may be grossly inadequate to pay for necessities and medical expenses if the retiree's health deteriorates (Burtless, 2004).

Other studies examining the issue of retirement adequacy generally focus on one of two measures: the income replacement rate or the consumption replacement rate (Banks *et al.*, 1998). The income replacement rate measures retirement adequacy as the ratio of post-retirement income to pre-retirement income. The consumption replacement ratio considers the ratio of retirement wealth to estimated consumption needs during retirement (Cole and Liebenberg, 2008). Ibbotson *et al.* (2007a) adopts a very high 80 percent replacement rate. The calculation of target replacement rates is an exercise in reverse engineering. Researchers start with the pre-retirement income of households, then they get to the spending being done before retirement, and assume the income needs to be replaced. They calculate the pre-retirement income needed to cover that spending (Kotlikoff, 2008).

Gustman and Steinmeier (1998) consider an income replacement rate of 60 percent. Munnell and Soto (2005) also use an income replacement and find a replacement rate of 73.8 percent for couples and 86.3 percent for single individuals if lifetime earnings are used. Smith (2003) finds that income replacement rates increased during the 1980s and 1990s, reaching a high of 74 percent. Montalto (2001) and Butrica *et al.* (2005) use consumption in generating a measure of retirement adequacy. Montalto (2001) measures retirement adequacy as the ratio of retirement wealth relative to consumption needs. She finds consumption replacement rates ranging from 110 percent to 315 percent, depending on the planned retirement age. Butrica *et al.* (2005) examine the expenditure-to-income ratio (the inverse of the consumption replacement ratio in their study and find median ratios of 81 percent for married couples and 90 percent for single individuals. Considering the inverse of these ratios (a measure similar to the consumption replacement rate), the results of their study are comparable to those of Mantolto (2001). Haveman *et al.* (2005) estimate that consumption replacement rates (including home equity) range from between 88 percent for single males and 104 percent for married couples.

The use of the consumption replacement rate to measure retirement adequacy is rooted in the lifecycle literature (Cole and Liebenberg, 2008). Several studies find that consumption changes over a person's lifetime. Changes in consumption during retirement are hypothesised to primarily result from a drop in expenses from a variety of factors: the elimination of work-related, dependent-related, and/or household expenses; the elimination of retirement savings expenses, and the possible reduction in taxes paid (Bernheim, Skinner, and Weinberg, 2001; Gourinchas and Parker, 2002;

Munnell and Soto, 2005; Hurd and Rohwedder, 2006). The measurement of consumption has been found to be problematic; Banks *et al.* (1998) found that unanticipated shocks around the time of retirement can affect consumption levels of retirees, where a majority of individuals seem to have expectations about their future retirement income that exceed the effective pension entitlements. The problem with the use of replacement ratios is that the payments of lump sums skew the ratios themselves (Gough and Adami, 2008).

Empirical studies find that consumption fall during retirement. These findings support the use of the consumption replacement rate approach as a viable method to determine whether a household is adequately prepared for retirement. Specifically, when considering the consumption replacement rate (rather than the income replacement rate) as a measure of retirement adequacy, research suggests that since consumption falls during retirement, a consumption rate of greater than 85 to 90 percent would likely be sufficient for the household to maintain a comparable standard of living during retirement (Cole and Liebenberg, 2008).

Kotlikoff (2008) outlines five critical problems with the replacement rate methodology. First, the calculation assumes that a household's spending after retirement will be precisely the same as its spending before retirement. This is strong assumption considering that the pre-retirement spending being measured includes all household expenditure i.e. on consumption, mortgage payments, support for children, education, medical expenses, etc. Second, the replacement rate method ignores new spending needs in retirement. Examples include taking care of parents who live longer

than expected, healthcare and nursing home care. Third, the replacement rate presumes that the household's demographic composition will remain constant throughout retirement, it ignores the fact that children will leave the household and that one spouse may be significantly younger than the other. Fourth, the replacement rate approach assumes that retirees use not one single penny of the principal of their retirement assets to finance their retirement consumption. The assumption is that retirees are able to spend only the income earned on their assets. Finally, the replacement rate method assumes that the household's current saving behaviour is consistent with consumption smoothing i.e. with maintaining the household's underlying living standard per person through time. However, if households are already saving the appropriate consumption-smoothing amounts, they have no need for a replacement target (Kotlikoff, 2008). Conventional planning has young and middle-aged households setting retirement spending targets, which are then used to make both saving and portfolio recommendations. When household retires, conventional planning drops its prior target and recommends a new one, namely that the household spend each year only 4 percent of the amount of assets it has at the initiation of retirement (Kotlikoff, 2008).

## **2.9 Life-Cycle Investing**

Life-cycle investing, especially investing for retirement, is today a matter of intense concern to millions of people around the world. The underlying theory is the "state preference" theory of optimal resource allocation under uncertainty of Arrow and Debreu (1954 as cited in Bodie, 2003). In that hypothetical world of complete markets



for all contingencies, every individual chooses the combination of elementary time-state claims that maximises that individual's expected utility (Bodie, 2003). Merton's theory of continuous-time finance provides a link, however, from the Arrow-Debreu world to the real world through the technology of dynamic replication. Merton's theory of continuous-time model is much more general than the older Markowitz mean-variance model of portfolio choice. The Markowitz model assumes that individuals make decisions in a static single-period framework. Merton's framework contains several distinct time horizons. The planning horizon is the length of time between decisions to revise the portfolio, which is controlled by the individual within certain limits. Some people review their portfolios at regular intervals – once a month or once a year. A sudden rise or fall in the price of an asset a person owns may trigger a review of the portfolio. People with substantial investments in stocks and bonds may review their portfolios every day or even more frequently (Bodie, 2003).

Bodie, Merton, and Samuelson (1992) added a third choice variable – the amount of work people choose to do. In this model, individuals start out with an initial endowment of financial wealth and earning power from labour (human capital). The market values of both components of wealth – financial and human capital – change continuously and stochastically. The wage rate (return on human capital) is perfectly positively correlated with the market return on traded assets. Consumption, wealth, and rates on return are all denominated in units of the consumption goods.

At each point in time, individuals determine the amount of their consumption, the proportion of their financial wealth to invest in risky assets (versus the safe assets), and

the fraction of their maximum possible labour income that they will “spend” on leisure so as to maximise their discounted lifetime expected utility. The model’s results indicate that the fraction of an individual’s financial wealth optimally invested in equity should “normally” decline with age for two reasons. First, the fact that human capital is usually less risky than equity and that the value of human capital usually declines as a proportion of an individual’s total wealth as one ages. Second, at any given age, the greater the flexibility an individual has to alter her labour supply, the greater the amount she will invest in risky assets. Individuals may be able to offset changes in the value of their financial wealth by changing the amount they work. They may have the opportunity to work longer hours, take on extra jobs, or delay retirement. If younger workers have more opportunity to alter their labour supply than older workers, the share of assets held as risky equity should decline with age. On the other hand, people with risky human capital, such as entrepreneurs or stock analysts, the optimal path may be to start out early in life with no stock market exposure in one’s investment portfolio and increase that exposure as one ages (Bodie, 2003).

Other continuous-time life-cycle models have incorporated the important effects of habit formation. Habit formation provides a strong rationale for financial products that guarantee that future consumption will not fall below a level established by prior consumption as a minimum acceptable standard of living (Bodie, 2003). Among the important insights of modern financial science identified by Bodie (2003) are:

1. A person’s welfare depends not only on her end-of-period wealth but also on the consumption of goods and leisure over her entire lifetime;

2. The value, riskiness, and flexibility of a person's labour earnings are of first-order importance in optimal portfolio selection at each stage of the life-cycle; and
3. Habit formation can give rise to a demand for guarantees against a decline in investment income.

### **2.10 Portfolio Allocation and Investment Strategies**

The growing importance of defined contribution pension arrangements is shifting the responsibility for managing retirement assets and income to the individuals and households. Individuals have to assume more responsibility for their own financial well-being after retirement. This has increased the sensitivity of retirement security to variation in the returns of selected investments and assets. Are individuals trained and sophisticated enough to make such financial decisions for themselves? They face the challenge of deciding how to allocate their retirement portfolios across broad asset classes and across many different financial products. Asset allocation decisions have important consequences for retirement wealth accumulation (Poterba, Rauh, Venti and Wise, 2006).

Poterba, Rauh, Venti, and Wise (2005) examine how different portfolio allocation strategies over the lifecycle affect retirement wealth; they find that the expected return on stocks has an important effect on the distribution of retirement wealth for alternative asset allocation rules. Greater exposure to stocks leads to a higher average retirement returns. As the risk aversion of a retiree increases, the optimal share of the

retirement portfolio that is held in stocks declines (Poterba, Rauh, Venti, and Wise, 2006). An important question for portfolio theory is whether the share of wealth should vary with age? According to Samuelson (1969), under normally assumed preference specification, there is no age variation in portfolio shares when capital income is a person's only source of income. This contradicts the common view of many financial advisers who counsel that older people should reduce the share held in stocks (Bodie and Crane, 1997). Bodie *et al.* (1992) show that if the ability to smooth income shocks by adjusting labour supply is greater for younger workers, then older people should hold less stock in their portfolios.

The standard investment advice calls for individuals to reduce the allocation to risky assets with age, or more precisely, as the investment horizon shortens. Canner *et al.* (1997) cite a rule of thumb stock allocation percentage of 100 minus age. Generally, the so-called lifecycle funds decrease the share in equities as the investor ages. The increasing popularity of lifecycle funds and associated investment strategies runs counter to a key finding by Samuelson (1969) that the portfolio allocation should be invariant to the investment horizon. Samuelson (1969) challenges the conventional wisdom that an investor with a long horizon should invest a larger fraction of his portfolio in risky assets because he has an opportunity to average returns over a longer period. Merton (1969) derives similar results in the context of a lifetime dynamic optimization framework.

Samuelson (1994) discusses the need to account for human capital wealth when assessing the allocation of total wealth, wherein age variation of the optimal financial

wealth allocation depends crucially on the variation of labour market earnings with financial market returns. Bodie, Merton, and Samuelson (1992) argue that younger investors have greater flexibility in their subsequent labour supply decisions, and that they should consequently be more tolerant of risk. They suggest that younger investors may rationally choose to hold a higher fraction of their portfolio in stock than older investors. The possibility for a labour supply response to financial market realizations as a form of hedging offers a clearer justification for a lifecycle investment strategy. Standard investment advice tends to ignore these aspects of prospective labour market earnings, focusing instead on risk tolerance, investment horizon, and the extent of background risks such as labour income risk (Dominitz and Hung, 2006).

Gollier (2001) and Gollier and Zeckhauser (2002) derive the conditions under which the option to rebalance a portfolio in the future affects portfolio choice. They suggest that under specific assumptions about the structure of utility functions, the optimal portfolio share devoted to equity will decline with age. Campbell *et al.* (2001), and Campbell and Viceira (2002) develop numerical solutions to dynamic models which can be used to study optimal portfolio structure over lifecycle if shocks to labour income follow specific stochastic processes and investors have power utility. Cocco, Gomes, and Maenhout (2005) find that a lifecycle investment strategy that reduces the household's equity exposure as it ages may be optimal depending on the shape of the labour income profile.

The empirical evidence on age-specific patterns in household asset allocation suggests weak reductions in equity exposure as households age. Poterba and Samwick (1997)

and Ameriks and Zeldes (2004) present empirical evidence on how portfolio shares for stocks, bonds, and other assets vary over the lifecycle. The general conclusion is that equity shares decline very little at older ages, although Ameriks and Zeldes (2004) find some evidence that some households cash out their equity holdings when they reach retirement or annuitize their accumulated holdings in defined contribution accounts. If investors become more risk averse with age, then the optimal portfolio allocation will become more conservative as the investor ages (Dominitz and Hung, 2006). Recent studies on behavioural finance suggests that, whatever their preferences, expectations, and background risks, investors do not make optimal portfolio allocation decisions. Investors tend to use heuristics or simple decision rules to make their initial allocation decisions (Dominitz and Hung, 2006). Madrian and Shea (2001) examined 401(k) allocation behaviour find that an individual's allocation of regular contributions to a 401(k) plan is sensitive to enrolment default options. Benartzi and Thaler (2001) find that investor allocation decisions are dependent upon the choices offered to them; they tend to allocate  $1/n$  of their investment to each of the choices offered, independently of the risk characteristics of the investment opportunities.

In the US, financial institutions have created lifecycle funds to cater to the perceived desire of investors who have a target retirement date to reduce their equity exposure as they age (Poterba *et al.*, 2006). Hewitt Associates (as cited in Marquez, 2005) estimates that 30 percent of all 401(k) plans in the US offer lifecycle funds. Lifecycle funds offer a way to combine both stock and fixed income options into a single fund, and to offer investors a time-varying asset allocation mix. These funds offer investors a higher portfolio allocation to stocks at the beginning of a working career than as they

approach retirement (Porterba *et al.*, 2006). Conventional financial planning has young and middle-aged households setting retirement spending targets, which are then used to make both saving and portfolio recommendations. However, once the household retires, conventional financial planning drops its prior target and recommends a new one that the household spend 4 percent each year the amount of assets it has at the initiation of retirement.

Dominitz and Hung (2006) consider three types of investment strategies for retirement: life-cycle investing; lifestyle investing, and simple heuristics. The lifecycle strategy mirrors the lifecycle fund in the investment choice set. The lifestyle strategies follow the findings on optimal portfolio choice by Samuelson (1969) and simply keep a fixed portfolio allocation across periods until retirement. The literature on behavioural finance introduces the  $1/n$  decision rule which is a simple heuristics to implement allocation for retirement contributions Dominitz and Hung (2006) find that a lifecycle investing strategy to be relatively conservative when taken from a lifetime perspective: that is, aggressive investing early in life when retirement assets are relatively small, and investing gets progressively conservative as assets build up. They also find that this lifecycle investment may be outperformed by a simple  $1/n$  rule. However, Dominitz and Hung (2006) find that lifecycle investing which tend to be conservative, may induce some investors to take on more risk than they would otherwise and to invest more efficiently than when left to their naïve strategies.

Notwithstanding Samuelson (1969), the life-cycle advice of financial planners is: older people should invest less in stocks than younger people do. Most financial planners

advise their clients to shift their investments away from stocks to bonds as they age. In the classic book, “A Random Walk Down Wall Street”, Burton Malkiel (1996 as cited by Jagannathan and Kocherlakota, 1996) advises “more common stocks for individuals early in the life cycle and more bonds for those nearer to retirement”; i.e. “the longer the time period over which you can hold on to your investments, the greater should be the share of common stocks in your portfolio”.

Financial planners give three common reasons. First, a substantial part of the risk of common-stock investment can be eliminated by adopting a program of long-term ownership and since older people don’t have as many years ahead of them as younger people. Second, some financial planners emphasize that asset allocation is often shaped by the necessity of meeting relatively large obligations in midlife, such as college education for children; to meet these financial targets, investing a lot in stocks may be necessary for a while, but not after enough resources have been accumulated. Finally, some financial planners point out that a younger person “can use wages to cover any losses from increased risk” while an older person cannot (Jaganathan and Kocherlakota, 1996). They show that if investors can rebalance their portfolios over time, a long horizon is basically the same as short horizon; what matters for investment decision is the length of time between rebalancing, not the investment horizon itself. In asset allocation, whether investors actually switch towards bonds or away from bonds as they age (in midlife) depends crucially on the size of their financial targets, their initial wealth, and the loss associated with failing to hit the targets. This again does not justify financial planners generally recommending risk reduction as investors age. Finally, in explaining the effect of life-cycle behaviour of labour income on investor



behaviour, Jaganathan and Kocherlakota (1996) suggest that investors shift the risk composition of their financial wealth in order to substitute for lost labour income (i.e. to offset the decline in the value of human capital). When investors are young, they have a long stream of future income. As they age, this stream shortens, so the value of their human capital falls.

According to Merton and Samuelson (1974 as cited in Bodie, 2002), risk-averse people should choose to invest in such a way as to minimise the volatility of their lifetime consumption flow. If a risk-free lifetime annuity is available, then they should purchase it. The general principles offered by the financial services industry for investing money earmarked for retirement are:

1. Investors should diversify their total portfolio across asset classes;
2. Equity portion should be diversified across industries and companies; and
3. The longer your time horizon, the more one should invest in equities.

A popular rule of thumb says that the fraction of one's portfolio to invest in stocks should be 100 minus one's age. Using this rule, 70 percent of one's investments should be in stocks if one is 30 years old; 50 percent in stocks if one is 50 years old, and 30 percent in stocks if one is 70 years old. The implication is that equities are a better choice the longer one's time horizon. Conventional portfolio advice suggests that working households invest in life-cycle funds, whose allocation changes gradually through time from mostly stocks to mostly bonds. In 1969, two economic Nobel Laureates, Paul Samuelson and Robert Merton independently showed that stocks do not, on balance, offer a better risk-return deal the longer one holds them. Nor do they

offer a worse deal. Consequently, economists prescribe the same split between risky and safe assets for long-term (young) as well as short-term (old) investors (Kotlikoff, 2007).

Merton (1969) modified this prescription to account for the fact that most young and middle-aged households hold most of their economic resources in the form of non-tradable current and future labour earnings. Gomes, Kotlikoff, and Viceira (2007) included other salient factors such as borrowing constraints. Young households should invest a small to moderate share of their financial assets in stock; they should increase this share dramatically in their middle ages; and then reduce this share as they approach retirement. Next, they should increase the equity share initially in early retirement, and reduce this share dramatically in late retirement. However, at any age, they should set their equity share based on their own risk aversion (Kotlikoff, 2008). Apart from the EPF scheme for workers in the private sector, there is a dearth of financial products offered to retirees in Malaysia to help them convert their accumulated assets into a stream of retirement income without exhausting their funds too soon. Retirees will need advice on how to optimally convert accumulated assets into a stream of retirement income so as not to exhaust their funds too soon.

Insurers in the US offer life annuities as the preferred distribution; while mutual fund providers propose phased withdrawal plans as the better alternative. Horneff *et al* (2006) advocates a combined portfolio consisting of both annuities and mutual fund investments. Using a lifetime utility framework, they compare the value of purchasing a stand-alone life annuity versus a phased withdrawal strategy backed by a properly

diversified investment portfolio, as well as combinations of these two products. The simplest form of life annuity is a bond-like investment with longevity insurance protecting the retiree from outliving her resources, guaranteeing lifetime level payments to the annuitants (Horneff *et al.*, 2006). In terms of payout structure, the life annuities are similar to the public defined benefit pensions. Insurers hedge these contracts by pooling the longevity risks across a group of annuity purchasers.

Yaari (1965) showed that the retiree maximizing a time separable utility function without a bequest motive would buy annuities with all his wealth, given a single risk-free asset and facing actuarially fair annuities. This approach has been extended by Davidoff *et al.* (2005) who predicts full annuitization. However, available evidence from most countries indicates that very few retirees actually purchase annuities with their disposable wealth. In the UK previously, accumulated pension assets had to be annuitized mandatorily by age 75 (this rule expired in 2006). Germany's "Riester" plans provide a tax inducement if life annuity payments begin to pay out at age 85 (withdrawn amounts must either be constant or rising, prior to annuitization). In the US, annuitization is not compulsory for 401(k) plans; as a result, most retirees roll them over to an Individual Retirement Account and manage the funds themselves, subject to the tax laws requiring minimum distributions to begin at age 70 ½ (Horneff *et al.*, 2006). Some disadvantages of annuitization highlighted include:

1. buyers lose liquidity because the assets cannot be recovered even to meet special needs such as poor health (Brugiavini, 1993);
2. the presence of bequest motive (Bernheim, 1991; Hurd and Smith, 1999);

3. the high loadings by the insurance industry, the ability to pool longevity risk within families, asymmetric mortality expectations between annuity buyers and sellers (Horneff *et al.*, 2006); and
4. people believe that they can do better by continuing to invest their retirement assets, making withdrawals periodically over their remaining lifetimes.

Horneff *et al.* (2006) report that the appropriate asset mix depends on the retiree's attitude toward risk as well as the key assumptions regarding the capital market and actuarial table:

1. annuities are attractive as stand-alone product when the retiree has sufficiently high risk aversion and lacks a bequest motive;
2. equity-linked phased withdrawal plans dominate annuities for low/moderate risk preferences, because retiree can gain by investing in the capital market and from "betting on death";
3. annuities become appealing for retirees with moderate risk aversion, when retirees can hold both annuities and phased withdrawal plans as a mixed strategy;
4. Less risk-averse retirees will wait longer until they switch to an annuity; and
5. While risk-averse individuals will be willing to annuitize in a low interest rate environment, but higher interest rates are required to induce annuitization among risk preferers.

From an asset allocation perspective, annuities first crowd out bonds when risk aversion rises. As risk aversion increases further, annuities replace equities in the overall portfolio (Horneff *et al.*, 2006).

## **2.11 Managing Risks for Retirees**

In discussing sources of risk to consider in designing pension systems, Mitchell and Fields (1996) have identified five types of risks confronting retired workers: individual risk, employer risk, investment risk, country risk, and international risk. Individual risk arises for a variety of reasons. People are uncertain about their own earning capacity during their working years, because of such factors as unemployment, skill obsolescence, poor health, family disruption and premature death of family breadwinner(s). They also face uncertainties in regard to their consumption needs when they are old, not knowing what they will need because of the risks of poor health and disability or how they will live. While people may seek to follow the accumulation pattern prescribed by the life-cycle model, that is they try to save enough when they are young and working, so as to be able to maintain consumption when retired (Hurd, 1990), but the uncertainties in earning capacity can result in under saving relative to the no-certainty idea (Mitchell and Fields, 1996). In addition, even well-intentioned people have been found to lack self-control, resulting in inadequate saving for retirement (Thaler, 1994).

Employer risk arises if the firm fails and any employer pension promise becomes valueless. Witness the widespread corporate collapses in the US in recent years: Enron, Lehman Brothers, and many others. It has been estimated that in 2002, of the companies that make up the Standard & Poors 500 index and have DB pension plans, the companies had pension plan liabilities exceeding US\$1 trillion, which are only covered by assets of US\$900 billion creating a deficit exceeding US\$200 billion (Wills

and Ross, 2002). Such unfunded liabilities cause severe doubts as to whether or not employers will be able to afford to provide and honour their retirement and pension obligations to their employees when they retire. However, any risk of such phenomenon has not arisen in Malaysia as private retirement industry is still in its infancy stage; the government has just approved the establishment of private retirement schemes in 2012 (Lim, 2012).

Investment risk identified by Mitchell and Fields (1996) refers to the case of funded pension. The monies contributed during peoples' working years are invested by a pension fund in the hopes of earning a positive rate of return. In the event the investments do not work out, all the people who invested with a particular pension fund lose out. Country or national risk is a matter of concern because retirees desire and need some insulation against economic and other financial shocks affecting the economy as a whole. For example, inflation in Eastern Europe has greatly eroded the value of retirees' real pensions (Diamond, 1992); similarly in Argentina, inflation eroded retirement benefits resulting in social unrest. Other political risks can also pose a serious threat to retirees' economic security. As an example, China had dramatically reduced support for state-owned enterprises without having a coherent replacement for the previous cradle-to-grave system of social support which these outmoded economic institutions provided. Consequently, China's old-age protection system is failing without a resolution of the old-age security problem (Hussain, 1994).

To better protect against these country-specific macroeconomic and political risks, experts suggest that investing in an internationally diversified portfolio of assets,

independent of the country's economic and political state (Bodie and Merton, 1992; Davanzo and Kautz, 1992). International risk or risk due to catastrophic global events can similarly affect retirees. These essentially undiversifiable shocks can arise from worldwide or regional depression, global weather shifts or environmental pollution or international epidemics (Mitchell and Fields, 1996). When such an event occurs, no one is unaffected and thus not all risks can be insured against. In Malaysia, Husniyah (2010) found that families who are financially risk adverse were more likely to engage in financial planning, cash-flow activities, good credit practices, savings, and risk management. If the families are more risk tolerant then they were more likely to participate in diversified investments.

### **2.11.1 Investment Risk**

Retirees who have saved and invested for their retirement expect to receive a certain level of income in retirement. Bodie (1990) outlines a number of risks that expected retirement income is subject to:

1. Adverse political change – the possibility that the rules of the game will change in such a way that income in retirement turns out to be much less than was anticipated;
2. Poor investment returns – the possibility that retirement income will be inadequate because of low return and contributions;
3. Volatile investment returns – the possibility that retirement income, while adequate on average, will be very low for extended periods of time;
4. Longevity – the risk that the retiree will outlive his or her savings; and

5. Inflation – the risk that inflation will erode the purchasing power of a pension.

No investment plan can eliminate all of these risks. Higher returns normally come at the expense of greater volatility. Protection of the purchasing power may come at the expense of income, at least in the early years of retirement (Willmore 1999). Merton (2003) outlines the three main approaches to investment risks: hedging, diversification, and insuring. Most financial advisory focuses only on diversification. Hedging is essentially getting rid of the risk by exchanging risky assets for a risk-free asset. While insuring for financial risks involves typically option-like instruments that, for a price, protect against losses on risky assets, while retaining the upside benefits of those assets.

### **2.11.2 Risk in Human Capital**

Most financial advice given to households is explicitly geared to financial assets; it does not explicitly consider human capital – either in its value or risk characteristics. But human capital is the largest single asset most people have throughout a good part of their lives, prior to retirement. To incorporate human capital in total wealth, there is a need to capture these important individual risk characteristics. For example, people from different professions have very different risk profiles in their human capital. Another important element of human capital that warrants incorporation for decision making is flexibility. Together with the size of human capital, its volatility, and its correlation with other assets, flexibility of labour should be considered (Merton, 2003).



For example, how long should one continue to work? Can he extend his work career if necessary?

### **2.11.3 Risk in future Reinvestment Rates**

The issue of uncertainty about future reinvestment rates is crucial; as powerful as the financial models are, end-of-period wealth, or wealth in general, is not sufficient statistic for financial welfare. Wealth, or income, should be translated into an implied stream of sustainable consumption – unless, we are in a one-period world in which the two match up (Merton, 2003).

### **2.11.4 Risk of Volatility**

Is risk better measured as volatility (riskiness) of wealth or as volatility (riskiness) of the flow of income and consumption? For a household to have the same real level of consumption stream every year, what is needed is an asset that produces more wealth when interest rates go down (when the household needs more wealth) and generates less wealth when rates go up. This approach can be extended beyond the uncertainty about future interest rates to uncertainty about the risk-reward opportunities captured by say, the Sharpe ratio (portfolio excess return divided by the standard deviation of the return) (Merton, 2003).

In focusing on the probability of meeting the target as opposed to the level to which one's living will fall if their assets perform poorly, conventional planning may be

inducing excessively risk-taking. This method entails calculating the probability of being able to spend the targeted amount throughout retirement. Households who are given inappropriately high saving targets may be induced to invest in more riskier securities in attempting to achieve a higher yield, thus increasing their investment risk.

This problem is compounded by two other flawed assumptions. Bodie (2007 as cited in Kotlikoff, 2008) identified that holding cash is not necessarily safe since its real return varies with inflation. It can have a negative real yield. Thus, comparing investing in this “safe” asset with investing in stocks biased the analysis dramatically in favour of stocks. In the US, investment in TIPS, rather than cash, is the appropriate asset for analysing safe investments, but it seems rarely to be so used. The second assumption is that households whose assets perform poorly will make no adjustment whatsoever in their retirement spending target. This is obviously unrealistic; a household that shows up at retirement with half of the resources it expected to have accumulated should, according to economics, spend half the amount it would otherwise have spent (Kotlikoff, 2008).

In contrast, the economics approach is to use dynamic programming to understand how a household will adjust its spending each and every year in light of realised market returns. The dynamic programming used to smooth (to the extent possible) a household’s living standard delivers a lifetime spending plan. These recommended spending amounts constitute the right household spending targets not just for retirement, but also for each year prior to retirement. Associated with this life-cycle spending plan is a life-cycle saving plan. Rather than focusing on the probability of

making an inappropriate and inflexible target, the economics approach stresses the real issue at hand, which is the likely level and variability of the household's living standard (Kotlikoff, 2008).

## **2.12 Summary**

This chapter reviews definitions of retirement and how previous studies defined and measured retirement. A review of the research and literature on the concepts and ideas of life-cycle theories relating to consumption, saving and investing pertaining to financial planning for retirement was presented. The following Chapter 3 will detail the formulation of the conceptual framework for the study.