Chapter 5

Human Life Value Approach to Optimality

"Whereas at one time the decisive factor of production was the land, and later capital, today the decisive factor is increasingly man himself, that is, his knowledge"

--- Pope John Paul II

"The proper study of mankind is man"

--- Alexander Pope

Although economists the world over have been quite aware that people are an important element of a nation's wealth, they have hardly stressed the simple truth that people invest in themselves, and that these investments could be substantial and meaningful. As Theodore W. Schultz observes, "since economists are much used to abstract analysis, they have proceeded cautiously in coming to grips with investment in human capital".¹ Besides, they have not realized that the ultimate purpose of any economic endeavour is to serve people without treating them as property or marketable assets. All the same, individuals have prospered in life from the acquisition of knowledge and skills that have economic value. Thus, it is apparent that "knowledge and skill are in great part the product of investment and, combined with other human investment, predominantly account for the productive superiority of the technically advanced countries."²

However, economists since Adam Smith, the celebrated Scottish political economist and philosopher, have rightly recognized that people are important elements of national wealth. As a result, economic research related to investment in human capital
has recently gained substantial recognition. For instance, the 1992 Nobel Prize for Economics was awarded to Professor Gary S. Becker for his pioneering research on human capital. It is now believed that "the value of an item must not be based on its price but rather on the utility that it yields." Today, the idea of human capital is construed as the sum of natural talent, education, training, and experience that comprise the 'wellspring of future earnings flows', and is viewed "as fundamental to the understanding of major shifts in the global economy." It is this significant point that has led an economist to label the United States a "knowledge society".

The chapter is divided into three parts. Part I deals with the concept of human life value, as emanating from human capital, in its historical perspective, pointing out its far-reaching significance in family and business relations. Part II discusses the qualitative and quantitative characteristics of human life value, showing, at the same time, how it is subject to loss through serious risks. Part III examines the economic theories of consumption, and consumption theories in relation to life insurance, reviewing recent literature pertaining to optimal multi-period investment theory, in an effort to shed further light on the concept of optimality.

I

(A) The Concept of Human Capital

The most distinctive feature of economic systems is the growth in human capital. Wealth is now defined as "anything that can contribute to adequate satisfaction of any sort of want... there is then nobody who can be said to possess nothing at all in this sense
unless he starves to death". Daniel Bernoulli, a Swiss mathematician, goes to the extent of saying that "tangible assets and financial claims are less valuable than productive capacity", pointing out that "human capital is still by far the largest income-producing asset for the great majority of people". The increased productivity arising from our investment in human capital is so significant that "human resource management has come to the fore as a major management responsibility in every type of institution in virtually every major society".

It is, however, useful to note the similarities between human capital and conventional forms of physical capital. As Philip Eden points out, "both are different forms of the same thing. The physical asset is the product of past labour: it is congealed labour. The human being is current labour". First, both the forms of capital have an original cost. The physical asset has a cost to produce a grown up human being capable of productive work. The human capital has the cost of his/her nurture, education and training. Second, the use of both capitals produces a stream of income. In the case of a physical asset, it takes the form of rent or profits from the sale of the output. In the case of a human being, the stream of income takes the form of earnings. Third, both the capitals need maintenance and repair in order to be productive. The depreciation and maintenance costs of a physical asset are similar to personal consumption expenses of the wage earner. Four, both have work-life expectancies. A physical asset as well as a person can be expected to be productive for certain period of time. Five, both he forms of capital are often interchangeable. For instance, a job can be performed by a man or by a machine, or some combination of the two. In the words of Peter L Bernstein:" human capital plays the same role for an employee as plant and equipment for the employer."
Hence the need for establishing a conceptual framework for estimating the value of assets in the form of human capital. The estimating process of current human-capital values and how values could be altered by health and education has been the subjects of intense research by economists like Burton. A. Weisbrod, Gary. S. Becker, and Mark Blaug with a view to establishing the magnitude of investment in human capital formation. It is obvious that human resources have both quantitative and qualitative dimensions. In the case of physical capital goods, the practice is to estimate the magnitude of physical capital formation by expenditure made to produce the capital goods. But, estimating the value of human capital is complicated by the necessity to distinguish between consumption expenditure and savings or investment. A part of consumption constitutes investment in human capital in the form of expenditure on education, health, and migration to take advantage of better job opportunities. In this way, the quality of human effort can be greatly improved and its productivity enhanced.

One prominent method for estimating human capital takes into account its yield rather than its cost. The marketplace tends to reflect investment in personal development through wages and salaries that a human agent earns. And the resulting increase in earnings can be viewed as yield on investment. Just as the value of physical capital goods can be determined by discounting its income stream, the value of the investment in human capital can be determined by taking the present value of the potential future earnings. For example, today in India individuals with university degrees in medicine or engineering earn much more in future than those without these degrees. And, "this earnings differential can be thought of as the return on an investment in education, net of opportunity costs."
(B) The Human Life Value (HLV): An Historical Perspective

The human life value (HLV) concept is an offshoot of the general theory of human capital. The idea of evaluating human life in cases of wrongful death goes back over a thousand years. According to a recent study conducted by Hofflander, a crude attempt to evaluate human life in terms of money was found in the old Anglo-Saxon law, and was variously called the 'wer', 'wergild', 'wite', or 'bode'\(^4\). Some semblance of the idea existed even in the Bible and the Koran where it was used to determine the compensation to be given to an individual's relatives in the event of his/her death. The value of the deceased was based upon the wealth he/she had accumulated during his/her lifetime.

This general area of inquiry has been under discussion by economists for over four centuries now. Attempts to evaluate a human being in terms of money, on some kind of rational basis, have been made since the 17\(^{th}\) century. The first attempt to estimate the money value of a human being was made around 1691 by Sir William Petty.\(^{15}\) Among the varied topics dealt with by Petty was the economic value of a human individual. This was based on a consideration of the total earnings of the population and the equivalent capital that would yield this income if invested at a given rate of interest. It was argued that dividing of the total capital so computed by the number of population would give the capital value per head of the population. Petty's method of indirectly estimating total earnings of labour, as the residue upon subtracting from the total national expenditure the profit from land and other resources, was, of course, extremely crude, and his estimate of the money value of a man was defective. Nevertheless, Petty's method and logic appealed
greatly to his followers and were used in most of calculations of national wealth for about one hundred years after his death.

About fifty years later, another economist, Philip Cantillon, made a significant contribution to the concept of human capital. This was in direct contrast to the contribution of Petty who capitalized the earnings of labour. Cantillon's evaluation of human capital was based on the cost of maintaining the slave and his offspring rather than on the earnings that the slave created. In attempting to arrive at price of anything in general, Cantillon devoted a short chapter in his book, *Essays on the Nature of Commerce in General*, to the equality between land and labour. He argued that the labour of a slave is worth at least as much as the value of the produce of the amount of land that was necessary to be cultivated for his support, plus half as much again for the bringing up of his child.¹⁶

Sir William Petty's crude conjectures regarding the economic value of an individual seemed to have received little attention for three quarters of a century until Adam Smith referred to the value of those skills that made for higher productivity of the worker in his famous book, *The Wealth of Nations* (1776). In the chapter dealing with the several kinds of capital, he enumerated four categories of fixed capital, the fourth consisting of "the acquired and useful abilities of all the inhabitants or members of society".¹⁷ It is however, to be noted that Adam Smith was discussing the value of skills and 'useful abilities', rather than the value of the individual.

John Stuart Mill made a similar distinction in his book, *Principles of Political Economy*, when he said: "the human being himself I do not class as wealth. He is the purpose for which wealth exists. But his acquired capacities, which exist only as means
and have been called into existence by labour fall rightly, as it seems to me within the
that designation". The two things -- values of skills or useful abilities, and value of an
individual possessing them -- are not the same. For, the addition of a skill or ability
necessarily increases production, whereas the addition of an individual increases not only
production but also consumption. And it is the excess of production over consumption
that determines the net benefit. As J.R. Walsh observes, a skill is an item on the credit
side only of the personal accounting, where as the person as a whole introduces debit
items as well as credits

Von Thunen, reflected upon the view of man as capital in his book, The Isolated
State. He derived an equation to measure the value of a human life. The origin of the
formula used is not given, and substitution of reasonable values in the equation does not
produce meaningful results. He stated that should man be considered capital, it would
be necessary for the state to compensate the family of every soldier killed for the cost of
his upbringing, to pay the disabled soldier the amount of his upbringing plus
maintenance, and to pay the soldier who returns healthy for the depletion of his
strength. The fact that a man had value as property when he was a slave, but not when
he was free, perplexed Von Thunen and he viewed it as a paradox without solution. So,
the real worth of his work appears to be in the stimulation it provided to those who
followed.

The first truly scientific procedure of estimating the economic value of a man
dates back to 1853 when William Farr, an eminent economist and statistician came
forward with his own concept of the economic value of an individual. As was the case
with Petty, Farr's interest in the subject arose from problems of taxation. However, he
was much more sophisticated in his approach in that he realized that the populace cannot be considered as a whole, but must be taken in small homogenous groups. He recognized certain inequalities in an uncritically applied income tax, and advocated a property tax that should include taxation of that property which consists of the capitalized value of a man's earning capacity. The scheme set up by Farr computes the value of a typical individual of given earning capacity as the present worth of his net future earnings minus his personal cost of living, allowing for deaths in accordance with a life table.\textsuperscript{22} Farr's method "remains to this day the fundamental standard on which any sound estimate of the value of a man to his dependents must be based."\textsuperscript{23}

Since William Farr's day, a multitude of other writers have dealt with the subject, presenting, in many cases, little more than repetitions of previously expressed ideas. To cite but a few examples, T. Wittstein proceeded from the fundamental postulate that the product of the activities of the population throughout their lives should just balance the expense of their maintenance.\textsuperscript{24} From this postulate he computed the value of a man at the several ages of life. Wittstein's computations were made on a very crude basis, assuming constant cost of living through life, and constant earnings throughout the productive period. R. Ludtge discussed the insurance value of a man computing it as the present worth of the average net future earnings, per head, of persons of a given age, in a life table population.\textsuperscript{25} He clearly realized the relative nature of the value concept and spoke of the pecuniary value of a person to his family or other interested persons. E. Engel gave a very thoughtful survey of the question regarding the economic value of a man in his extensive discussion of the "Value of a Man".\textsuperscript{26} He introduced an
improvement in Petty's procedure by modifying it so as to allow for the fact that a man's period of productivity was limited.

J.S Nicholson, in his article, "The Living Capital of the United Kingdom," reviewed the work that had been done till his time. He discussed the views of Adam Smith and J.S. Mill and then proceeded to determine the value of human capital. His whole article was based on his desire to see that the value of human capital was included in the tables of national wealth. Nicholson's estimate that the living capital of the United Kingdom exceeded the dead capital in the ratio of 5 to 1 overlooked the fact that it was just the opposite that gave richness of life. As he developed his views he also attempted to add some refinements to Petty's original model, but they did not contribute much to the basic theory.

Alfred Marshall, an eminent British economist, briefly referred to the subject of the economic value of man in his book, Principles of Economics (1890), citing his pioneers, Petty, Adam Smith, and Farr. According to him, we cannot treat the cost of production of efficient labour as an isolated problem but as "part of the broader problem of the cost of production of efficient men together with the women who are fitted to make their homes happy, to bring up their children vigorous in body and mind, truthful, cleanly gentle and brave." Marshall's method was almost identical to Farr's except that it treated the income and maintenance costs of an individual as a continuous rather than as a discrete variable.

One of the most voluminous discussions of the value of a man was contained in Lindheim's book, Gaveuti Senectutis. In the introduction to chapter 14, entitled "The Value of Human Life", he gave a brief critique of prior efforts made to evaluate human
life. He was of the view that the value of a man could not be computed from the costs alone since "the money expended does not always correspond to the result which necessarily depends more or less on the talents of the individual, his good will and his health." 29 Another publication, which deserves mention, is a paper by A. Barriol in which he defines the "social value" of an individual as the sum total of what the individual currently restores to the community out of his earnings.30 A notable contribution to the subject was H. Boag's article, "Human Capital and the Cost of the War", The author gave a good historical summary cautioning that the method by which any values of human capital were obtained should be clearly borne in mind when they were used in later calculations. The most historical survey on the subject of the value of man was found in a 75-page issue of a publication of German Actuarial Society (Berlin. 1930) by Ida Meyer.31 In an article, "Capital Concept Applied to Man", J.R. Walsh studied the economic value of education, particularly of a professional education. 32, establishing norms of income according to age and socio-economic level of different educational groups.

Since the time of Marshal many economists, concerned with the economic and philosophical foundations of life insurance industry, have discussed the concept of human capital. And the concept was applied to life insurance for the first time in the early 1880s. And it would be possible to chronicle the development of the economic concept of human capital down to our own time. A great many philosophers and economists have contributed to the development of the human life value concept, and a scientific procedure for evaluation of the monetary worth of man.
Jacob I. Greene, an outstanding critic of unsound industry practices, was one of the first to apply the economic concept of human capital to life insurance. In his manual, *An Agent's work*, he unequivocally states: "the foundation of life insurance is the money value off human life. That which produces money is worth money, that which earns money is worth money and when that which produces or that which earns money is lost, destroyed, the money worth is lost, destroyed. Every man fulfilling the duties of life is a producer or an earner of money: his life, therefore is worth money to those who depend on his earnings in precisely in same sense that real estate, stocks, securities are worth money to those who receive rents, profits, or interest there from; and in its loss they suffer money loss just as truly and distinctly as if they had lost the real estate, or stock, or the securities" and succinctly concludes saying: "the money value of a man's life is the present value of what he may fairly be able to earn in future, and during his probable life."\(^{33}\)

John Marshal Holcombe discussed the application of human life value concept to life insurance in his lecture on insurance at Yale University. He went to the heart of the matter in his speech stating that "the life of every man who earns more than sufficient for his actual personal expenses is of primary value to someone besides himself.\(^{34}\) F.C. Oviatt also discussed the human life concept in his lecture at the Wharton School of Finance and Commerce. He emphasized that "The foundation of life insurance is the recognition of the value of a human life and the possibility of indemnification for the loss of that value."\(^{35}\) He was one of the first to stress the economic dependency of the family upon the head of the household and its relation to life insurance.
It was, however, not until the 1920s that a human life value became established as the economic foundation of life insurance. This came about chiefly through the laudable efforts of Dr. S. S. Huebner who is generally credited with being the catalyst behind the recognition of life and health insurance as necessary and essential elements in an individual's life, or a family's financial planning. He sincerely felt that it is the solemn 'duty' of family breadwinners to insure their lives for the benefit of those financially dependent upon them. He rightly argued that individuals' responsibility to themselves and their families include not only the years of survival, but also years after death. He came forward with his firm view that the human life value concept should be taken as the economic foundation of life insurance and, what is more, he established a measurable relationship between human value and a life insurance policy, which a person should take. He contended that human capital should receive the same scientific treatment as is given to conventional physical capital. He believed that the value of a man's future earnings could be estimated by means similar to those that are used to calculate the future earnings of a physical asset.

Huebner's first written discussion of the concept of human life value is found in his classic, *Life Insurance* (1915). He devotes a section to the 'Capitalization of the Value of a Human Life and Indemnification of that Value' in which he capitalizes the life expectancy of the individual. In his keynote address, "The Human Value in Business Compared with the Property Value", delivered at the 1924 meeting of the National Association of Life Underwriters, he presented the human life value from the economic point of view. He developed this further in 1927 with the publication of his magnum opus, *The Economics of Life Insurance*, in which he discusses the human life value
concept as the economic basis of life insurance, the monetary importance of human life values, the need for scientific treatment of the subject, and the methods of its appraisal. 38

Continuing the work of S.S. Huebner, Griffin M. Lovelace published a book, Life and Life Insurance in 1921, expounding a method of estimating the capital value of a worker's life. 39 He carefully documented the development of the labour theory of values, and emphasized the relation between the two concepts. In his words, "the economic theory of the general function of life insurance... stems from the principle in economics that .... there is value in the earning power of men and women who work for a living. Without human labour of brain and muscle there would be no economic values. This is the 'labour theory of value'." 40 But, as Hofflander rightly observes, "the human life value is not based upon the labour theory of value. While the two are not mutually exclusive, neither are they development upon each other". 41

Louis I. Dublin and Alfred J. Lotka made a significant contribution to the area through their brilliant book, The Money Value of a Man (1947). The purpose of this study was to develop a series of tables that would give the money value of persons at various stages. The authors believe that calculations of human values could be useful in ascertaining how much life insurance should an individual carry. The book represents a real contribution in that it was the first to be devoted entirely to an estimation of the human life values of the population though the statistical base of the work is not as broad as would be desired. This is essentially a reflection of the limited availability of usable data at the time of its publication. Nevertheless, their work is conceptually clear, and provides the starting point for any new study in this field.
There have been two more additions to the human life value literature since the work done by Dublin and Lotka. In his book, *Economics of Public Health* (1961) Burton A. Weisbrod, attempted to measure the economic impact of the shortening or termination of a working life on society. Towards this end, he developed two sets of data, one for males and the other for females in order to determine the 'average value lost due to death and disease'. However, the data were unsatisfactory for use in more specific cases.\(^42\) As in the case of Dublin and Lotka, the conceptual framework of Weisbrod was sound, but the limitations imposed by the scarcity of usable data are visible. Earl F. Cheit tackled the problem of loss to dependents due to death and disease in his article, "Injury and Recovery in the Course of Employment". His assumption was that the shape of the earnings curves was constant for all workers even if the level might vary. While it was true that the curve of median earnings for the male population as a whole remained fairly constant, no work had been done to prove that the same was true for diverse sub-groups, much less for individuals. Also, the good work done by Marples, Hoffman and Thompson on income salary scales could be of some immediate use in actually determining the human life values in insurance.\(^43\)

More recent in the historical sequence was the introduction of the foregoing economic concepts of human capital into court cases of wrongful death and injury. Philip Eden, an experienced economist and statistician who has served as an expert witness in more than two hundred court cases, has pioneered this process in the courts. Since the publication of his article, "Lost Earning Capacity and Future Expenses" in *American Jurisprudence Proof of Facts* in 1965 these procedures have become widely accepted.\(^44\) Since 1965, there has developed an extensive body of law and
literature on this work by economists in the courts. As a result of this development in the courts, United States Bureau of the Census has begun to provide statistics on age-earnings curves and estimates of lifetime earnings. The 1970 Census provided a wealth of information in its report entitled "Earnings by Occupation and Education". Therefore, as Philip Eden points out, "we can now be much more precise about age earnings curves than ever before".

Over the years Philip Eden has developed methods for objectively estimating future earnings. Working with a task force of the Million Dollar Round Table (MDRT), Eden refined his methods so as to enable the life insurance agent to estimate a client's human life value with a reasonable degree of accuracy. As a result, the Eden Method is the most scientific approach to estimating economic human life value. It is generally agreed that the Eden Method gives an independent and objective estimate of economic loss, enabling the client to measure his/her need in a new way.

The first step in the Eden Method is to identify the statistical group, to which one belongs, taking into consideration one's age, education, sex, colour, occupation and earnings, and relating these to various tables based on statistics from the U.S. Census Bureau. This data are converted into the estimated present value of one's anticipated earnings to age 65. From this, the probable personal consumption expenditure is deducted. The resulting figure is the net loss to one's family should one die.

It may be noted that no claim is made that the Eden Method is perfect, or will produce the results desired by the insurance agent in all sales situations. For, it is not free from certain limitations. For instance, when applied to prospects with a high level of earnings, the Eden Methods produces extremely large figures for younger men and lesser
amount at older ages. This is so because the Eden Method considers earnings to age 65 only. Most men will live beyond 65 and will still need insurance. However in the hands of a knowledgeable agent who takes the time to master the Eden Method there is every reason to expect a significant impact on his sales volume.

Following the footsteps of S.S. Huebner, who is known as the father of insurance education in the United States, Kenneth Black Jr. and Harold D. Skipper Jr. of Georgia State University have made a significant contribution to the cause of human life value in insurance through their notable publications - Life Insurance (1994) and Life and Health Insurance (2000) which provide comprehensive and unbiased treatises on individual and group life, health and retirement products. The authors have been praised for their presentation of the institution of life insurance as a vehicle through which individuals can secure their human life values while seeking their risk-taking goals. The far-reaching significance of the human life value concept as a philosophical framework for the analysis of basic economic risks faced by individuals is brought out, unfolding its quantitative and qualitative characteristics. While reviewing the economic theories of consumption and consumption theories of life insurance, it is shown how the human life value concept provides the philosophical basis for operationalizing the insurance purchase decision.

In the context of Indian life insurance industry, B.S.R. Rao and Appa Rao Machiraju made a pioneering contribution to the field of human life values and life insurance. Greatly influenced by S.S. Huebner, they are attempting to do in India what Kenneth Black Jr. and Harold D. Skipper Jr. have done in America, in an effort to establish the monetary worth of human life as the basis of life insurance. While
advocating life insurance as a unique financial instrument, the two committed academics have been pleading for adequately recognizing the economic importance of human life values and extending to them, through life insurance, the same scientific treatment that we have for so many years applied to the organization, management and liquidation of property values. As regards the adequate life insurance an individual household should own, they suggested that "it may choose life insurance policy for risk protection, that is, protecting the premature termination of the earning capacity of the bread-winner of the family, making use of the concept of Human Life Value and one or more instruments from the given list for the purpose of wealth accumulation and for getting income or return on the funds thus invested."  

(C) The Significance of Human Life Value Concept

Properly approached, then, the human life value is a measure of the actual future earnings or service of an individual. In other words, it is the capitalized value of an individual's net future earnings after subtracting self-maintenance costs. From the standpoint of dependents, an individual's human life value is the measure of the value of benefits that the dependents can expect from their breadwinner or supporter. Similarly, from the viewpoint of an organization, the human life value of a key employee is a measure of the value of his or her services to the firm. So, it is not correct to say that there is necessarily only a single human life value. A given human life value is at once a function of its purpose and a value to others.

The human life value is so vast in its monetary sense and is so significant to the national economy that its proper protection and servicing "requires professional
training, skill, and attitude of a high order comparable to such professions as medicine, law and accounting." It is also essential to note that the monetary worth of human life values is capable of scientific treatment by means of life insurance in the same way that the organisation, management and liquidation of property values are regarded as branches of the science of applied economics. Life insurance is a practical way of the application of the fundamental ideas of appraisal, capitalization, indemnity, depreciation, liquidation, and wills and trusts to the human life value. If adequately and properly used, life insurance would afford to the insured the same satisfaction that he/she derives from successful organization of his/her material positions.

It is important to note that in Huebner’s view the HLV concept means more than just a statement that a human life has an economic value. For, it involves five important notions: (1) appraisal and capitalization of human life value, (2) recognition of human life value as the creator of property values, (3) family vis-à-vis human life value, (4) economic link between generations, and (5) application of business management principles to human life value.

(1) Appraisal and Capitalization of Human Life Value

The human life value is based on the fact that persons who earn more than is necessary for their self-maintenance have a monetary value to those who are dependent upon them. Thus, the human life value is "the present value of that part of the earnings of individuals devoted to family dependents and others who benefit from these individuals' economic earning capacity". By examining the economic value of a human life from either a family or a business standpoint, we realize that life and health insurance make the
capitalization of that value possible. By guaranteeing this capitalized value, in the event of death or disability, life and health insurance perpetuate the earning capacity of the breadwinner for the benefit of his or her dependents. Individuals who have assumed family obligations should capitalize their potential earnings to such an extent that the proceeds and benefits will yield an income equivalent to at least one-third to one-half of their earning capacity during the remainder of their working life time. So, the capitalized value should be maintained not only with respect to the physical "premature death", but also for protection against "retirement death." by providing an annuity for the insured and his dependents.

In this way, once a human life has been appraised, it can be capitalized and managed through the initiation of a permanent life insurance contract. The level-premium method of financing life insurance contracts provides, in the early policy years, for a premium in excess of the estimated death cost. This concept of increasing investment can be illustrated best with an endowment policy of an individual aged 65 years. The face amount of the policy is approximately equal to the insured's human life value, although it applies to any permanent life insurance policy as well. Thus, the insured makes provision for the declining economic value of his or her life, and provides a fund for meeting his or her future obligations, including his or her own self-maintenance.

(2) Recognition of Human Life Value as the Creator of Property Values

Just as the human life value should be properly appraised and capitalized, it should be recognized as the creator of property values for, the human life value is the key
to turning property into productive force. In other words, the human life value is the
cause and the property values are the effect. Were it not for human life values there
would be no property values at all. Therefore, property values already in existence may
be greatly enhanced by the human life value. For example, the nation's income from rent,
interest and business after payment of taxes could be doubled because of the intelligent
direction given by the life value of the owners of the property involved.

(3) Family vis-à-vis Human Life Values

From an economic standpoint, the family must be regarded as man's first and
foremost important business. It must be viewed as an economic institution since it is
commonly regarded as "the very cornerstone of the nation". Therefore, as an economic
unit, the family must be organized around the human life value of its members. It needs
to be organized, subsequently managed, and finally liquidated along scientific lines, just
as any other business enterprise is expected to be scientifically organized, managed and
liquidated. Furthermore, it should be regarded as a business partnership between a man
and a woman with the hope of adding children as additional partners. So a proper sense
of responsibility on the part of the head of the family to his family ought to be enforced,
if not assumed voluntarily. There should be recognition of responsibility far beyond the
present viewpoint of a wife's ethical right and the child's fair claim to adequate economic
protection.
(4) Economic Link between Generations

The human life value and its protection should be regarded as constituting the principal economic link between the present and the succeeding generations. The realization of the potential net earnings of the breadwinner constitutes the economic foundation for proper education and development of children in the event of breadwinner's premature death or disability and the protection of the children against the burden of parental financial support.

(5) Application of Management Principles to Human Life Values

As the human life value is a predominant element in our national economic growth, we should apply to human life values the same scientific business management principles applied to our property values. For, in spite of the fact that there are obvious differences between life values and property values, the principles of their economic valuation are the same. Besides, the work life expectancy of a man or woman is equivalent to the productive life of a physical asset. Also, the projected earnings of a person are equivalent to the future returns expected from employment of a physical asset. On top of that, the projected personal expenditures of an individual are equivalent to the projected depreciation and maintenance costs of a physical asset. Thus, when costs and revenues have been appropriately discounted, a comparison of value can be made between a person and a physical asset. Therefore, the scientific principles such as appraisal, conservation, indemnity and depreciation could be applied to the organization, management and liquidation of human life values.
Although human life value, as conceived by Huebner, and advocated by his followers like Kenneth Black Jr. and Harold Skipper Jr., has been widely accepted as a novel concept that revolutionized the institution of life insurance, its way of capitalization of human worth has come in for criticism from some quarters. Some persons and cultures are uneasy about human life valuation. They contend that it is unethical to try to ascribe an economic value to a human life. They maintain that it is relatively easy to determine the price of goods and commodities as the market for property is well developed. But, human life is unique so much so that placing a value on it is difficult and not proper since society is not ready to condone the sale of persons. However, we need not fall in line with this view. Society may not approve of sale of persons, but it does permit sale of a person's services. It is the value of a person's services that the human life value concept actually seeks to measure, and not certainly the sale of persons. Placing an economic value on a person's services is not immoral. What is immoral is the concept of ownership of another person. Perhaps, a day is not far off when the capitalization of human life values will be accepted everywhere.

II

(A) Qualitative Characteristics of HLV

From the viewpoint of HLV concept, a person possesses two estates -- an acquired estate and a potential estate. The acquired estate refers to what one has acquired in the form of physical property, "existing in reality." The potential estate refers to one's monetary worth as an economic force, "existing in possibility." In other words, human
life value resides in one's capability of earning for others beyond the limits of one's own self-maintenance and also if possible the ability to accumulate surplus earnings into an acquired estate. The insurable value of an individual's economic possibilities may be defined as "the monetary worth of the income forces that are incorporated within one's being -- namely, (1) ethical behaviour; (2) good health; (3) industry or willingness to work; (4) willingness to make a proper investment in the mind by way of education, training, and experience; (5) creative ability and judgment; and (6) the patience and ambition to translate the economic dreams of the mind into tangible realities for the benefit of the self, family, and mankind in general." 54

(1) Ethical Behaviour

Almost everybody will agree that good character or ethical behaviour is "the main pedestal upon which all else in our economic career is essentially dependent." 55 For a lazy person is disregarded in many lines of economic endeavour. Furthermore, good character is central to human personality so much so that it is held in high esteem by poets, psychologists and philosophers. "Above all, be true to thy own self," says Shakespeare through Polonius in *Hamlet*. 56 Maslow is of the view that a person needs a framework of values in the same sense that he needs sunlight, calcium or love. 57 It is not for nothing it is said that if wealth is lost nothing is lost, if health is lost something is lost, and if character is lost everything is lost.
(2) **Good Health**

The saying, "health is wealth", speaks volumes of the importance of good health in the overall development of an individual. Good health is absolutely vital and health awareness is increasingly gaining importance in the corporate life too. The far-reaching significance of health in one's life can hardly be exaggerated. One may in possession of all materialistic goods, but one cannot enjoy life unless one is healthy. Today many wealthy people who are victims of chronic diseases are not able to enjoy life. They have to spend heavy amounts on medicines and hospitals. Healthy persons save a lot of money indirectly as they need not spend much on medical treatment. So, one's wealth is determined in spirit, not by one's material property but by one's soundness of health.

(3) **Willingness to Work**

Willingness on the part of a human being to work is a sign of healthy personality. One may work to eke out one's living or just to enjoy the very process of work, but working for something in life willingly and enthusiastically is good not only for the individual but also for society at large. Many are not able to work willingly in a capitalist society because they consciously or unconsciously feel that they are exploited by others for their selfish ends. Perhaps, only in a socialist country can one work willingly as one can hope for economic justice. Some may work hard, but unwillingly and mechanically, just for the sake of a material gain. But, if a person can work wholeheartedly, finding pleasure in his/her work, thereby converting his/her profession into vocation, it speaks volumes of his human quality. Above all, if one can work willingly
and selflessly with a sense of dedication, one will be contributing to human life values richly.

(4) Investment in the Mind

Long back, Benjamin Franklin extolled the far-reaching significance of the "investment above the years", thereby driving home to humanity the vitality of investment in mind by way of education and training. As our economic system has become more complex and technically advanced, growth in knowledge and skills has become an essential component of earning capacity.\(^5\)

(5) Creative Ability and Judgment

Since sound decision-making is the essence of the manager's function, creative ability and judgment are substantial sources of high earnings. Hence the enormous significance of investing in the mind in the form of education and training. The properly educated and well-trained persons develop the necessary ability to detect the spurious, the fake and dishonest in human personality, and to judge people more correctly and efficiently than the uneducated and the untrained. Also, they are able to see concealed or confused realities in economic and political affairs better than the uneducated. Their decisions in the present and their predictions of the future are more likely to be correct because they are less based upon mere wish, desire, anxiety, fear or optimism or pessimism.
(6) Patience and Ambition

The economic success of an individual depends to a large extent not only on his/her capacity for hard work, but also on his/her patience and ambition. To make progress in life one should be ambitious, to start with and endeavour to achieve the goal. The process, however, calls for a good deal of patience. For, more often than not, success eludes. One should have the necessary patience to bear the brunt of frustration and despair. These qualitative characteristics of human life value lie beneath an individual's earning capacity. Above all, they form the basis of economic life itself.

(B) Quantitative Characteristics of the Human Life Value

Quantitatively, the human life value may be defined as "the capitalized value of the expected net earnings of an individual". The same economic and statistic principles that are applied for appraisal of the value of property are applicable to the appraisal of earning capacity of human beings. The appraisal of an individual's potential earnings involves taking the potential value of future projected earnings.

The general elements of appraising potential earnings of an individual, over his/her expected work life, require a projection of such items as basic earnings, incentive earnings, and fringe benefits. These elements generally vary with such criteria as, age, sex, race, residence, education, occupation and industry, mobility, marital status, and number of dependents. The process is still further complicated by the necessity to project change in each of these aspects. However, it should be noted that considerable research and development, currently in progress, is most likely to lead to more sophisticated approaches to the appraisal of human life values.
(C) Human Life Value Subject to Loss

Despite the far-reaching significance of human life value concept as a segment of the general theory of human capital as illustrated above, it is subject to loss through a number of serious risks. (a) premature death, (b) temporary disability, (c) total and permanent disability, (d) retirement, and (e) unemployment. It should be noted that any event affecting an individual's earning capacity has a corresponding impact on his/her human life value, that is, potential estate. The probability of losing one's potential estate by death or disability cannot be ruled out. It is estimated that about one out of every three who start the working period of life fails to survive to the normal retirement age of 60 or 65 as the case may be. Although female mortality is a little lower than male mortality, a substantial part of the potential estates is lost to about a one third of the working male population.\(^{61}\)

The human life value is also subject to the loss of personal earning power owing to temporary or permanent disability. Experience has shown that both temporary disability and permanent disability have adverse effect on the personal earning power of individuals. Especially, extended total disability has proved itself to be a major peril. According to recent studies, in any given year, four out of every five persons are disabled for at least one day on account of sickness or indisposition, and one out of every eighteen persons on account of accidental injury. And the probability of long-term disability for insured person's ranges from about seven and a half times the probability of death at age twenty two to two times at age of sixty-two.\(^{62}\)
The probability of loss from death and disability is significantly greater than from the other commonly injured perils like fire. Only about one building out of hundred is ever subjected to loss owing to fire accident or other loss throughout its entire history whereas one out of every six physically fit workers dies before the age of sixty five. Moreover, the average property loss in well-protected cities does not exceed ten to fifteen percent of the property value involved. In other words, it is only a partial loss. On the contrary, the death peril always strikes a blow hundred percent, and the loss to the human life value is total. The same is also probably true in many total disability cases. From this comparative estimate of loss from death or disability and from accidents like fire, it is clear that the death peril to human life value is at least one hundred times as serious as the fire peril to acquired property. Thus, disability or death is a much more serious peril to the human life value than the fire peril is to acquired property. All the same, ironically enough, people routinely purchase property insurance while they often avoid or purchase insufficient amounts of disability and death insurance. Fire insurance is almost universally taken as a protective measure even by the ignorant, whereas death and disability insurance protection is generally taken only on persistent persuasion. Even then, only a limited percentage of coverage of human life values prevails today. Therefore, Huebner feels that "solemn funerals and speeding ambulances ought to be as effective a spur to insurance action as are the sirens and all the other noises of firefighting equipment". From this it is clear that life and health insurance alone makes the preservation of an individual's human capital possible in the face of many uncertainties in life. Hence the need to purchase life and health insurance.
(A) Economic Theories of Consumption and Life Insurance

The human life value (HLV) concept provides an economic rationale for the purchase of optimal life insurance. Economics as a discipline is concerned with both positive and normative issues. If positive issues are concerned with the question of "what is", the normative issues are concerned with the question of "what ought to be". And the HLV concept provides a normative economic approach to life and health insurance planning. It suggests how one ought to replace oneself meaningfully as a wage earner in the event of one's premature death or disability. In other words, the HLV concept provides an economic rationale for life and health insurance purchase from replacement cost perspective.

However, as a normative economic concept, human life value can lead to results that are inconsistent with the actual consumer behaviour because of the dichotomy between the positive and the normative issues of economics. The HLV concept provides only an economic rationale for the purchase of life and health insurance, but not an economic explanation. When one purchases life insurance it automatically reduces the current consumption of one's dependents in order to protect their consumption ability in the future. It is, therefore, necessary to examine the economic theories that provide an economic explanation for the purchase of life and health insurance.

Economic theories of consumption can be traced back to the noted economist, John Maynard Keynes. So far, we have four economic theories of consumption -- (1) the
absolute income hypothesis, (2) the relative income hypothesis, (3) the life-cycle hypothesis, and (4) the permanent income hypothesis.

(1) The Absolute Income Hypothesis

Propounded by John Maynard Keynes in 1938, the absolute income hypothesis holds that "on average, the larger a person's income, the smaller the proportion devoted to consumption (and the larger the proportion devoted to savings)." In effect, the theory suggests that as average household income increases, the proportion consumed (saved) should decrease (increase) to that observed for other households within the new, higher-income bracket. Although the absolute income hypothesis was widely accepted initially, its popularity declined with the passage of time as other theories cropped up.

(2) The Relative Income Hypothesis

The relative income hypothesis came into being as a variation of Keynes's view by James S. Duesenberry. It holds that consumption depends on the household's income relative to the income of neighbouring households and households with which it identifies, rather than the absolute level of income. This theory propounds that "if a household's income were to rise, but its relative income position remained unchanged, its division between consumption and savings would remain unchanged. Similarly, if a household's income were to remain unchanged but the income of others with whom it identified rose, the greater would be current consumption." However, a recent extension of Duesenberry's work argues that certain consumption items cannot be observed and that consumption expenditures thereby vary, depending on the observability of goods and
services. Thus, both the absolute and relative income hypotheses suggest current consumption is the function of a household's current level of income.

(3) The Life-Cycle Hypothesis

Posed by Ando and Modigliani, the life-cycle hypothesis takes an altogether different view of income. It holds that an individual's income will be low in the beginning and the end stages of life, and high during the middle of life. However, despite these life-cycle changes the individual can be expected to maintain a roughly constant or modestly increasing level of consumption. The life-cycle hypothesis holds that average wealth of elderly people declines with age. Another dimension of this hypothesis relates to the use of life annuities. Researchers have established that the purchase of actuarially fair annuities is welfare enhancing for risk-averse individuals. And for individuals with high mortality risk-aversion, even high-priced annuities may be attractive.

(4) The Permanent Income Hypothesis

Like the life-cycle hypothesis, the permanent income hypothesis, propounded by Friedman, assumes that individuals wish to smooth their level of lifetime consumption, but do so through an assessment of their permanent level of income. Permanent income is stable, reflecting some type of weighted average of the consumer's expected future income. In other words, it is an annualized measure of the individual's human capital. Variations of actual from permanent income are due to chance or accident and they do not affect consumption. Similarly consumption has its own permanent and transitory components. The yearly difference between total income and
total consumption is saving. And the saving can fluctuate greatly from year to year because the transitory income and consumption components fluctuate independently of each other.

It is important to note the close relationship between the life cycle and the permanent income hypotheses. For instance, households with large, positive transitory incomes in Friedman's model could be in the middle years of the Ando-Modigliani's life cycle, and households with large, negative transitory incomes could be in the early or later life-cycle states. As a result the hypotheses are often viewed together, or as different conceptualizations of the same issue. Anyway, at present these two economic theories of consumption are widely accepted explanations of the consumer problem dividing consumption and saving between the present and the future.

The above analysis of the economic theories of consumption vis-à-vis life insurance reveals that each of them begins with the assumption that rational consumers seek to maximize their lifetime utility. Introduced by Jeremy Bentham, a British philosopher, the concept of utility implies the "principle, which approves or disapproves of every action whatsoever, according to the tendency which it appears to have to augment or diminish the happiness of the party whose interest is in question."70

Thus, utility is a measure of consumer satisfaction derived from economic goods. Individuals seek to maximize their utility and minimize their disutility over their life times. Therefore, the maximization of lifetime utility involves attempts by consumers to allocate their lifetime incomes in such a way as to achieve an optimum lifetime pattern of consumption. This means planning for the future and not necessarily living only for today. Nevertheless, the concept of utility is considered by most
(B) Consumption Theories and Life Insurance

The consumption theories in relation to life insurance have been developed mostly by Mehanem Yaari, C. A. Pissarides and F.D. Lewis, who made a deep study of economic consumption in relation to life insurance. Examining the role of life insurance within the context of the life cycle model by including the risk of dying, Mehanem Yaarri showed conceptually that an individual increases expected lifetime utility by purchasing fair life insurance and fair annuities. Extending Yaari's work, C.A. Pissarides examined the joint motivation of saving for retirement and for bequests via life insurance. He proved that life insurance is theoretically capable of absorbing all fluctuations in lifetime income, thereby enabling consumption and bequests to be independent of the timing of income. As a result, the same effective consumption pattern could be achieved by the appropriate use of life insurance as could be achieved if the time of death were known with certainty. Pissarides also proved that without life insurance, the lifetime consumption pattern would be different and involves less enjoyment. Through his empirical estimates based on US households, F. D. Lewis found that life insurance ownership was positively related to household income as well as to the number of dependent children. An important conclusion of his research was that social security substituted for privately purchased life insurance.

Furthermore, research on consumption theories related to life insurance has established, that highly risk-averse individuals will guard against a failure to have
sufficient income later in life. The degree of individual's risk-aversion is an important determinant of individual's consumption patterns, as well as of aggregate national savings and insurance consumption. Interest in mortality risk-aversion has increased because some empirical research suggests that the elderly do not seem to dissave as the life cycle hypothesis would predict.\textsuperscript{75} Such findings have lead to further interest in the nature of bequests. However, some other researchers like L. Kotlikoff and L. Summers have suggested that the magnitude of inherited wealth is too large to be explained solely by accidental bequests.\textsuperscript{76} Other research, based on extensive survey data on retirees, suggests that mortality risk-aversion is not as large as previous researchers had assumed and, therefore, most bequests are accidental.\textsuperscript{77}

After examining the economic theories of consumption, and consumption theories related to life insurance, it would be useful to review the recent literature on optimal multiperiod investment theory. The term, optimum, connotes the idea of making the most of a given situation. To achieve an optimum is to 'optimise', and a situation which is an optimum is said to be optimal. Much of economics is concerned with analyzing how individuals or groups may achieve optimal arrangements in order to obtain the optimal pattern of consumption.

Definition of what is optimal involves judgements concerning what is or should be desirable. Generally it is assumed that the satisfaction of individual desires is the objective of the economic system. In attempting to attain an optimum, individuals are constrained by their income, just as the community is constrained by the fundamental scarcity of goods and resources. This is known as 'constrained optimum'-- the best that can be achieved in view of existing circumstances and limits. Where one is faced with
more than one objective, it is known as an 'optimum optimum' -- the best of the best situations.

(C) Optimal Multiperiod Investment Theory

Among the important studies in recent years, in estimating the extent to which an individual should capitalize his/her earnings for life and health insurance purposes, is the development of optimal multiperiod investment theory by Hakansson, Leland, Mossin, Ross, Samuelson, and Babbel and Ohtsuka. A multiperiod model is used in analyzing aspects of term and whole life insurance contracts within the context of the lifetime consumption-investment problem. In examining optimal insurance purchases, not only the life status, but also the state of health of consumer is considered. Special attention is given to the policy loan and guaranteed reinsurability options of the whole life insurance contract. Viewed in this context, whole life insurance, term insurance, and savings are shown to coexist likely in an optimal consumption-investment plan rather than act as substitutes for each other. It is further shown how the bounds of the insurance pricing parameters can be derived to ensure that both term and whole life insurance policies will continue to be sought by rational consumers, while avoiding adverse selection and lapsation.

The optimal multiperiod life insurance policy has also been a subject of theoretical enquiry. Attempts have been made to posit the life insurance policy as a series of contracts of the single period or instantaneous term variety by Yaari, Hakansson and Richard. This approach to life insurance has obviously affected some of the complexities associated with the popular whole life policy. By freeing them from formal analysis within the context of multiperiod consumption-investment models. This has
rendered the whole life policy indistinguishable from a constructible linear combination of single period term insurance and a savings programme as observed by Richard. In other words, term insurance and savings are put forth as complements, not as replacements or substitutes, to the purchase of whole life insurance.

Furthermore, it was found that the saving programme was adjudged superior to the term insurance as observed by Fisher, Moffitt and Winter. Fisher explicitly considers a multiperiod term insurance contract and concludes that it either presents the individual with 'arbitrage possibilities' or makes no difference to his welfare. Moffitt extends the analysis of multiperiod term insurance contract to whole life policy and reaches a similar conclusion, under well-specified conditions. Winter, who takes into account the auction of withdrawal, also concludes that the fair cash value whole life policy will not be purchased in equilibrium. Fortune introduces a policy of a two-period, three time point model, featuring some aspects — maturity or surrender cash value, level premiums and guaranteed reinsuranceability — usually associated with a whole life policy in his monumental paper, "A theory of Optimal life Insurance: developments and Tests". But, he is criticized by Klein and others on the grounds that his concept of whole life policy is little more than a combination of pure insurance and savings, thereby being dominated by a strategy of purchasing single-period term insurance and investing the difference.

However, more recently, it has been stressed in the academic literature by Smith, Walden and Outreville that the whole life policy is really a package of options, and not simply a linear combination of single-period term and a savings programme. That is why the notion that single-term and whole life forms of insurance are substitute goods...
has been called into question. It should, therefore be emphasized that the analyses of single-period term insurance whole life policy, and savings programme made above by different academicians are correct within the frameworks they propose. It is only by adding new dimensions to their frame works that the optimal multiperiod life insurance policy can be more fully analyzed as done by Babbel and Ohtsuka. The model set forth by them extends the work of Peter Fortune and Stanley Fischer by allowing for an analysis of the two most important options of a whole life contract -- the policy loan option and guaranteed reinsurability option. -- within the context of a multiperiod consumption-investment framework, incorporating, at the same time, the basic features of the whole life policy such as level premiums and surrender cash values.

Criticism of HLV Approach

Although human life value, as conceived by Huebner, and advocated by his followers like Kenneth Black Jr. and Harold Skipper Jr., has been widely accepted as a novel concept that revolutionized the institution of life insurance, it has come in for a good deal of criticism from some quarters. The human life value approach is alleged to have several defects that limit its usefulness in trying to measure accurately the correct amount of life insurance to own. As it has already been pointed out, in calculating the human life value, other sources of income such as Social Security survivor benefits, interest amounts accruing from bank deposits, and unusual earnings are not taken into account. A gross limitation of HLV approach is that the future earnings are only assumed since it is difficult to estimate accurately the future increase in earnings. Also, the validity of allocation of the amount of income to the family, which is a crucial factor in
determining the human life value, is also questionable inasmuch as the required amount of money can quickly change because of several unexpected events such as divorce, birth, or death in the family. Moreover, the human life value can be substantially increased or decreased since it is merely based on the assumed rates of interest and inflation that are most likely to change suddenly. Above all, insuring the human life value to its full amount is said to be neither necessary nor affordable for most individuals. For, the amount of income that a person can afford to spend on life insurance depends on several factors such as the level of income, spending priorities of the person concerned, and his or family obligations.

While subscribing to the view that HLV approach has its own lapses and limitations, we need not fall in line with the entire criticism. The assumption of constant future income and self-maintenance costs in the simplified model employed may sound unrealistic. But, it must be noted, complex economic analysis would be involved in projecting future net earnings for specific purposes. This simplified example is intended to communicate the concept of the human life value and the significant magnitude of the values at stake.

Second, the human life value approach to optimal life insurance protection is said to be too idealistic and altruistic to be of real use in practical life. The human life value approach requires of the productive head of each family to be insured for an amount equal to his/her full economic value. It lays emphasis on the monetary importance of human life value and its great significance economically and socially to our national welfare. This ideal, however much it may be desirable, is said to be difficult to attain as a practical matter, since the problem is fraught with a paradox. The paradox is that when
the economic value of an individual at the younger age is greater, the income and the funds available for the premium payments tend to be lower. And when the economic value of an individual at the older age is lower, the income and the funds available for the premium payments are relatively greater. Moreover, as per the human life value approach the entire group of family needs for all of life has to be met. Besides, it includes in advance the retirement needs of the breadwinner. Much as it may sound laudable, it is felt that this is not feasible in all cases.

Third, capitalization of the monetary worth of the human life value has raised some eyebrows on ethical grounds. Some persons and cultures are uneasy about human life valuation. They contend that it is unethical to try to ascribe an economic value to a human life. They maintain that it is relatively easy to determine the price of goods and commodities as the market for property is well developed. But, human life is unique so much so that placing a value on it is difficult and not proper since society is not ready to condone the sale of persons. However, we need not fall in line with this view. Society may not approve of sale of persons, but it does permit sale of a person's services. It is the value of a person's services that the human life value concept actually seeks to measure, and not certainly the sale of persons. Placing an economic value on a person's services is not immoral. What is immoral is the concept of ownership of another person. Perhaps, a day is not far off when the capitalization of human life values will be accepted everywhere.

The above examination of the theoretical framework of human life value approach to optimality naturally leads us to an analysis of a case study of Indian life
insurance policyholders. This would mean the practical application of the principles and
techniques of human life value approach to optimal life insurance examined in the
present and foregoing chapters. And that will be the prime concern of the following
chapter.
Notes and References


8. Ibid., 110


15. Sir William Petty, "Political Arithmetick, or a Discourse Concerning the Extent and Value of Lands, People, Buildings, etc." (Printed for Robert Clavel, London, 1699), 192


21. Ibid.


23. Ibid. 359

24. T. Wittstein, "Mathematical Statistics and its Application to Political Economy and Insurance Science", Hanover, 1867,


34. Lester W. Zartman and William H. Price, *Yale Insurance Lectures*, (New Haven, Conn: Yale University, 1905)


44. Philip Eden, Econometric Appraisal of Future Expectancies, ATL leading Cases, 1967

45. Kelner," Successful Litigation Techniques," Matthew Bender, 7100
Schreiber, "Damages in Wrongful Death and Personal Injury Cases, PLI 1965


47. The methods developed by Eden are based on data of the U.s. Bureau of Censes, Labour Department and other Government agencies.


55. Ibid.

56. Shakespeare, Hamlet , III , i


61. According to the Commissioners 1958 Standard Ordinary (CSO) Mortality Table, over 28 per cent of males die before they reach their retirement age of 65.


63. The economists generally want to know why this postulate is true and they raise a number of questions --- do they underestimate the likelihood death of their own death? Are their incomes too low? Is life insurance perceived as offering poor value?

65. In economic terms, the smaller the propensity of a person to consume, the larger is his or her marginal propensity to save. See John Maynard Keynes, *The General Theory of Employment, Interest, and Money* (New York: Harcourt, Brace and World Inc., 1935) Chap. 8


74. F.D. Lewis, "Dependents and the Demand for Life Insurance", *The American Economic Review*, (June 1989), 452-467


86. The value of a policy loan option has been studied independent of such a framework by Bykerk and Thompson. ("Economic Analysis of the Policy Loan privilege", *Transactions of the society of Actuaries*, 1979, Vol. 31, 261-281).

Additionally, the notion of guaranteed reinsurability without incurring a changing premium is present in the work by Venezia and Levy ("Optimal Multiperiod Insurance Contracts", *Insurance: Mathematics and Economics* 1982, Vol. 2, 199-208), although there the focus is on the optimal timing of claims.

