F1 – Project-Stage 10: Insuring your life

TCHE322

Lawrence et al (2011). Chapter 8

George Rejda and Michael McNamara (2021). Principles of risk management and insurance. Chapter 11

CFA Level III, Volume 4

Tillery & Tillery (2017). Chapter 8

Schedule of lectures

Project topic covered

- Life insurance
- Benefits and costs

Groupwork project activities

- Illustrating and analyzing life insurance packages
- Making decision

Life insurance

- **Life insurance** protects against the loss of human capital for those who depend on an individual's future earnings.
- Benefits of life insurance:
  - Financial protection for dependents
  - Protection from creditors
  - Tax benefits
  - Vehicle for savings
- Do you need life insurance?
- If yes, consider a life insurance policy.

Basic elements of a life insurance policy

- the term and type of the policy (e.g., a 20-year temporary insurance policy)
- the amount of benefits (e.g., £100,000),
- limitations under which the death benefit could be withheld (e.g., if death is by suicide within two years of issuance),
- the contestability period (the period during which the insurance company can investigate and deny claims),
- the identity (name, age, gender) of the insured
- the policy owner,
- the beneficiary or beneficiaries,
- the premium schedule (the amount and frequency of premiums due), and
- modifications to coverage in any riders to the policy.

Recall the concept of risk and premature death risk

"Risk is a condition in which there is a possibility of an adverse deviation from a desired outcome that is expected or hoped for."

"At its most general level, risk is used to describe any situation where there is uncertainty about what outcome will occur. Life is obviously risky."

The degree of risk refers to the likelihood of occurrence of an event. It is a measure of accuracy with which the outcome of a chance event can be predicted.

- Financial and Non-Financial Risks
- Pure and Speculative Risks
- Fundamental (group/undiversifiable) and Particular (individual/diversifiable) Risks

Premature death risk

Certain costs are associated with premature death.

- The family's share of the deceased breadwinner's future earnings is lost forever.
- Death results in additional expenses such as funeral costs, uninsured medical bills, higher childcare expenses, estate settlement costs, and other final expenses.
- Because of insufficient income, some families will experience a substantial reduction in their standard of living.
- Survivors face certain noneconomic costs such as intense grief, loss of a parental role model, and counselling and guidance for the children.

Financial impact of premature death on different types of families

Single people

Single-parent families: cause great economic insecurity for the surviving children

The need for large amounts of life insurance on the family head is great.

Two-income earners with children: the death of one income earner can cause considerable economic insecurity for the surviving family members, because both incomes are necessary to maintain the family's standard of living.

Traditional families (one-income earner): only one parent in the labor force, other parent staying at home to take care of dependent children.

for the working parent

for the non-employed spouse: the cost of child-care services and a handful of other tasks

Blended families: a divorced spouse with children remarries, and the new spouse has children. Also, additional children may be born after the marriage.

Sandwiched families: a son or daughter with children provides financial support or other services to one or both parents. Thus, the son or daughter is "sandwiched" between the younger and older generation.

Case of Appropriateness of Life Insurance

Consider two potential life insurance candidates:

(1) a 40-year- Old doctor who is married with two young children, substantial student loans, and sizable earnings; and

(2) a 35-year- old single person with a moderate amount of financial wealth.

Based on the information presented, which person would be a more appropriate candidate for life insurance and why?

Human capital consideration

Beneficiary consideration

How much life insurance is right for you?

Two approaches can be used to estimate the amount of life insurance to own:

- Human life value approach: Human life value can be defined as the present value of the family's share of the deceased breadwinner's future earnings.

- Needs approach: analyses the various needs that must be met if the family head should die, and then determines the amount of money needed to meet these needs. The total amount of existing life insurance and financial assets is then subtracted from the total amount needed.

Human life value approach

Sometimes referring to multiple-of-earnings method.

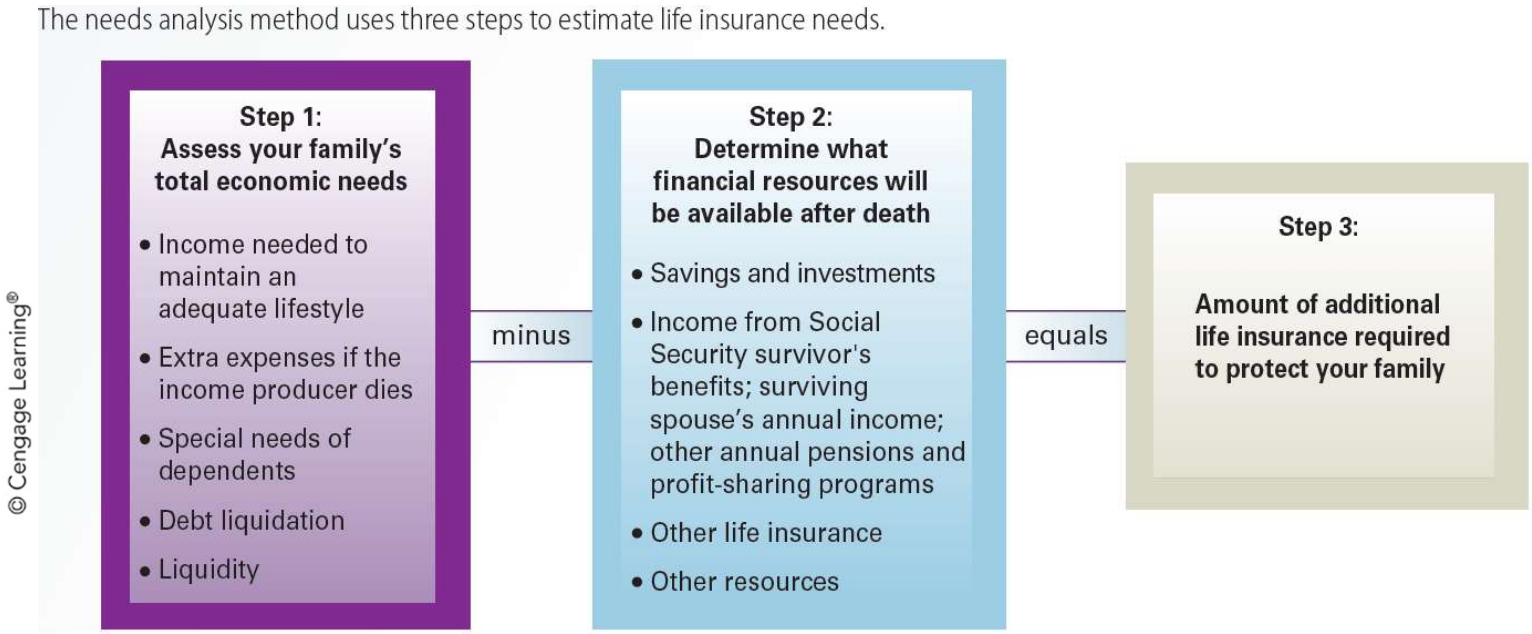
For example:

Richard, age 27, is married and has two children. He earns $50,000 annually and plans to retire at age 67. (For the sake of simplicity, assume that his earnings remain constant.) Of this amount, $20,000 is used for federal and state taxes, life and health insurance, and Richard's personal needs. The remaining $30,000 is used to support his family. This stream of future income is then discounted back to the present to determine Richard's human life value.

Using a reasonable discount rate of 5 percent, Richard has a human life value of $514,800

Needs approach

Exhibit 8.1 How Much Life Insurance Do You Need?



Types of life insurance

- Temporary life insurance or “term” life insurance
  - Straight term
  - Decreasing term
  - Renewable term
  - Convertible term
- Whole life insurance and its variations

Temporary life insurance or “term” life insurance

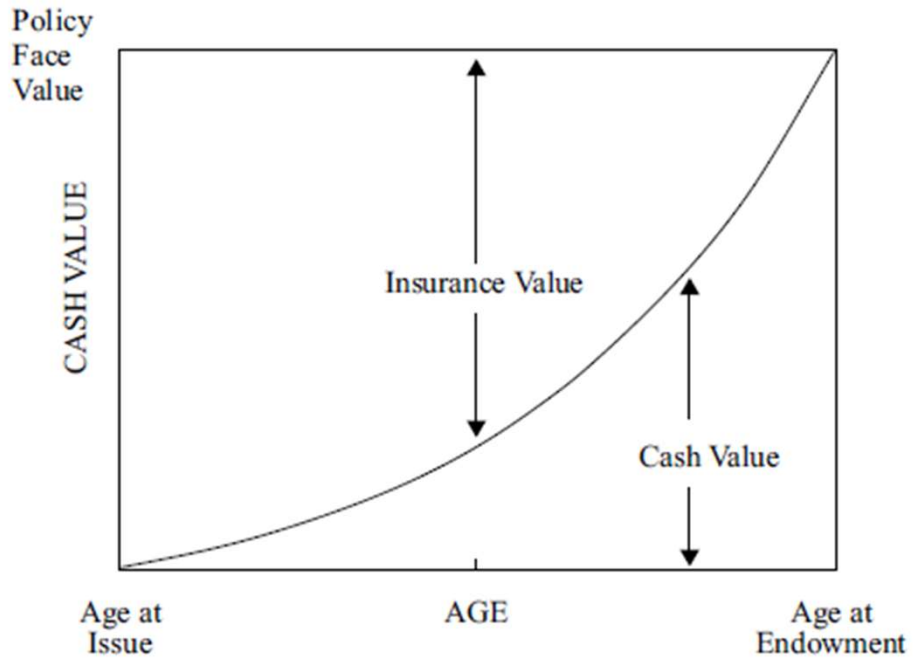
- Provides death benefits for a specified period
- Does not provide for the accumulation of cash value
- Types
  - *Straight term policy: Coverage remains unchanged throughout the effective period*
  - *Decreasing term policy: Premium remains unchanged while coverage decreases*
  - *Renewable term policy*
  - *Convertible term policy*

Whole Life Insurance

- Provides permanent insurance coverage during an individual's entire life
- Cash value: Accumulated refundable value of an insurance policy
  - *Results from the investment earnings on paid-in insurance premiums*
- Nonforfeiture right: Provides policyholder the assets allotted for future death claim, upon policy cancellation
- Types of Whole Life Policies
  - Continuous premium
    - *Premiums should be paid until death or policy cancellation*
  - Limited payment
    - *Premiums should be paid for specified number of years*
    - *Insurance is effective until death*
  - Single premium
    - *Lifetime coverage purchased with a single premium*

Whole Life Insurance

Exhibit 6 Build-up of Cash Value in a Whole Life Insurance Policy



Nonforfeiture options

- *Nonforfeiture options* are used in the event that a life insurance contract is surrendered or placed on other than a premium-paying basis.
- There are three common nonforfeiture options available:
  - ✓*cash surrender option:* Allows the policy owner to request an immediate cash disbursement, less any policy indebtedness plus accumulated dividends, when the contract is surrendered.
  - ✓*reduced paid-up insurance option:* Reduces the life insurance contract's death benefit. The amount of the new death benefit is equal to the death benefit that the old contract's cash surrender value could purchase as a single-premium whole life insurance contract. The reduced death benefit is permanent, and no additional premium payments are permitted.
  - ✓*extended term insurance option*. Uses the life insurance contract's cash value to maintain the policy's death benefit for a period of time, typically stated in months. At the end of the period, when the term insurance expires, there is no longer any coverage. No additional premium payments are allowed.

Nonforfeiture options - Example

Edwin purchased a $100,000 whole life policy four years ago. He no longer wants to make premium payments.

Using table 8-1, what are his nonforfeiture options?

TABLE 8-1 NONFORFEITURE TABLE

END OF POLICY YEAR	CASH OR LOAN VALUE	PAID-UP INSURANCE	EXTENDED TERM INSURANCE
	(Dollar values per $1,000 of Face Amount)		
1	$ 0	$ 0	0 years
2	10	50	3 years
3	20	100	6 years
4	35	175	10 years

Variations of whole life insurance

- To remain competitive and to overcome the criticisms of traditional cash-value policies, insurers have developed a wide variety of whole life products that combine insurance protection with an investment component. Important variations of whole life insurance include the following:
    - *Variable life insurance*
    - *Universal life insurance*
    - *Indexed universal life insurance*
    - *Variable universal life insurance*

Other types of Life Insurance

- Group life insurance: Provides a master policy for a group
  - *Each eligible group member receives a certificate of insurance*
- Other Special-Purpose Life Policies
  - Credit life insurance
  - Mortgage life insurance
  - Industrial life insurance

Types of life insurance

Exhibit 8.8 Advantages and Disadvantages of the Most Popular Types of Life Insurance

Type of Policy	Advantages	Disadvantages
Term	Low initial premiums Simple, easy to buy	Provides only temporary coverage for a set period. May have to pay higher premiums when policy is renewed.
Whole life	Permanent coverage Savings vehicle: cash value builds as premiums are paid Some tax advantages on accumulated earnings	Cost: provides less death protection per premium dollar than term. Often provides lower yields than other investment vehicles. Sales commissions and marketing expenses can increase costs of fully loaded policy.
Universal life	Permanent coverage Flexible: lets insured adapt level of protection and cost of premiums Savings vehicle: cash value builds at current rate of interest Savings and death protection identified separately	Can be difficult to evaluate true cost at time of purchase; insurance carrier may levy costly fees and charges
Variable life	Investment vehicle: insured decides how cash value will be invested	Higher risk

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Types of life insurance

EXHIBIT 11.6

Comparison of Individual Life Insurance Policies

	Term Insurance	*Ordinary Life Insurance*	*Variable Life Insurance*	*Universal Life Insurance*	*Variable Universal Life Insurance*
Death benefit paid	Level or decreasing death benefit	Level death benefit	Guaranteed minimum death benefit plus increased amount from favorable investment returns	Either level (Option A) or variable based on contributions or investment returns (Option B)	Either level (Option A) or variable based on investment returns (Option B)
Cash value	No cash value	Guaranteed cash values	Cash value depends on investment performance (not guaranteed)	Guaranteed minimum interest rate plus excess interest credited to the account	Cash value depends on investment performance (not guaranteed)
Premiums paid	Premiums increase at each renewal	Level premiums	Fixed-level premiums	Flexible premiums	Flexible premiums
Policy loans	No	Yes	Yes	Yes	Yes
Partial withdrawal of cash value	No	No	Permitted in some policies	Yes	Yes
Surrender charge	No	No explicit charge stated (reflected in cash values)	Yes	Yes	Yes

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Insurance pricing

- The *net premium or pure price of the insurance* represents the discounted value of the future death benefit.
- ***Gross premium***
- The three most relevant elements of life insurance pricing
  - Mortality expectations
  - A discount rate: an assumption of the insurance company's return on its portfolio, is applied to the expected outflow.
  - Loading: After calculating the net premium for a policy, the insurance company adjusts the premium upward to allow for expenses and profit. This adjustment is the load, and the process is called loading.

Mortality expectations

- One of the most important factors in determining the price for life insurance is the expected mortality of the insured individual (i.e., how long the person is expected to live).
- Actuaries at insurance companies estimate mortality based on both historical data and future mortality expectations.
- Life insurance company actuaries typically make adjustments to consider additional factors, such as age and gender, the longevity of parents, blood pressure, cholesterol, whether the insured is a smoker, and whether the insured has had any diseases or injuries that are likely to lead to death during the policy term.
- The underwriting process serves to categorize applicants according to their perceived riskiness, consistent with the actuaries' specifications.

The cost of life insurance is based on the probability that the insured will die during the duration of the policy

From Exhibit 5:
If a given male and female are the same age and have equivalent health profiles, females should expect to pay less than males for the equivalent life insurance.

Exhibit 5 Mortality of Males and Females at Certain Ages

	Male			Female		
Age	Composite	Non-Smoker	Smoker	Composite	Non-Smoker	Smoker
35	0.14%	0.09%	0.14%	0.08%	0.07%	0.10%
40	0.21%	0.15%	0.24%	0.12%	0.10%	0.17%
45	0.26%	0.19%	0.35%	0.14%	0.11%	0.23%
50	0.30%	0.23%	0.48%	0.21%	0.15%	0.37%
55	0.42%	0.35%	0.74%	0.32%	0.25%	0.60%
60	0.67%	0.50%	1.21%	0.52%	0.37%	1.00%
65	1.12%	0.84%	2.08%	0.88%	0.59%	1.66%
70	1.81%	1.40%	3.35%	1.48%	0.95%	2.61%
75	3.18%	2.58%	5.34%	2.45%	1.71%	3.93%
80	5.38%	4.65%	7.56%	4.23%	3.33%	6.27%
85	9.71%	8.80%	11.75%	7.77%	6.54%	10.74%
90	17.41%	16.55%	19.04%	13.79%	12.27%	17.34%
95	25.49%	25.16%	26.09%	21.96%	20.82%	24.65%

2 Data are based on the American Academy of Actuaries' 2017 Commissioners Standard Ordinary (CSO) Tables. https://www.soa.org/experience-studies/2015/2017-cso-tables/ accessed 21 November 2018

Ramon, a 40-year-old non-smoking male.
Maria, a 40-year-old non-smoking female.
Both are considering a one-year, non-renewable term life insurance policy with a death benefit of US$100,000

Calculating the net premium for both

Exhibit 5 Mortality of Males and Females at Certain Ages

	Male			Female		
Age	Composite	Non-Smoker	Smoker	Composite	Non-Smoker	Smoker
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40	0.21%	0.15%	0.24%	0.12%	0.10%	0.17%
45	0.26%	0.19%	0.35%	0.14%	0.11%	0.23%
50	0.30%	0.23%	0.48%	0.21%	0.15%	0.37%
55	0.42%	0.35%	0.74%	0.32%	0.25%	0.60%
60	0.67%	0.50%	1.21%	0.52%	0.37%	1.00%
65	1.12%	0.84%	2.08%	0.88%	0.59%	1.66%
70	1.81%	1.40%	3.35%	1.48%	0.95%	2.61%
75	3.18%	2.58%	5.34%	2.45%	1.71%	3.93%
80	5.38%	4.65%	7.56%	4.23%	3.33%	6.27%
85	9.71%	8.80%	11.75%	7.77%	6.54%	10.74%
90	17.41%	16.55%	19.04%	13.79%	12.27%	17.34%
95	25.49%	25.16%	26.09%	21.96%	20.82%	24.65%

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Consumer Comparisons of Life Insurance Costs

- Consumer and/or governmental organizations may provide comparisons of policies from various life insurance companies based on projected data, including assumptions about future dividends and cash values.
- The two most popular indexes for comparison:
  - the *net payment cost index* and
  - the *surrender cost index*,

  both of which calculate a cost per year per thousand dollars of life insurance coverage under different sets of assumptions.

a US$100,000 face value whole life policy has an annual premium of US$2,000, paid at the beginning of the year. Policy dividends of US$500 per year are anticipated, payable at year-end. A cash value of US$22,500 is projected for the end of Year 20.

Net Payment Cost Index Calculation	
Future value of premiums (annuity due): US$2,000 annual payment, 20 years, 5%	US$69,439
Future value of dividends (ordinary annuity): US$500 annual payment, 20 years, 5%	−16,533
20-year insurance cost	US$52,906
Annual payments for 20-year insurance cost (annuity due): 20 years, 5%	1,524
Divide by US$ thousands of face value	÷ 100
Net Payment Cost Index, cost per US$ thousand per year	US$15.24

Surrender Cost Index Calculation	
Future value of premiums (annuity due): US$2,000 annual payment, 20 years, 5%	US$69,439
Future value of dividends (ordinary annuity): US$500 annual payment, 20 years, 5%	−16,533
20-year cash value (given above)	−22,500
20-year insurance cost	US$30,406
Annual payments for 20-year insurance cost (annuity due): 20 years, 5%	876
Divide by US$ thousands of face value	÷ 100
Surrender Cost Index, cost per US$ thousand per year	US$8.76