F1 – Project-Stage 9: Insuring your health

TCHE322

Lawrence et al (2011). Chapter Chapter 9
CFA Level III, Volume 4

Schedule of lectures

Project topic covered

- Risk management for individual
- Health insurance
- Benefits and costs

Groupwork project activities

- Estimating human capital and economic net worth
- Illustrating and analyzing health insurance packages
- Making decision

Human capital, Financial capital and Economic net worth

- Human capital
- Financial capital
- Economic net worth
- Traditional balance sheet versus Economic (Holistic) balance sheet

Human capital

- Future wages or earnings can be thought of as analogous (in a rough sense) to future interest or dividend payments that flow from an individual's work-related skills, knowledge, experience, and other productive attributes that can be converted into wage income—or human capital.
- Human capital provides a significant stream of income over decades, its present value is a significant part of most working households' total wealth portfolio.

⟹human capital is often the dominant asset on a household's economic balance sheet.

⟹From a risk management perspective, it is critical to understand the approximate total monetary value of an individual's human capital, the investment characteristics of the individual's human capital (i.e., whether the capital is more stock-like or bond-like), and how the approximate value of an individual's human capital relates to the value of the individual's financial capital.

Human capital – Estimating human capital

- Human capital is commonly defined as the mortality-weighted net present value of an individual's future expected labor income.
- Estimating human capital: by discounting the expected future cash flows generated from wages or other income sources.

Simple model:

$$HC_0 = \sum_{t=1}^{N} \frac{w_t}{(1+r)^t}$$

General model:

$$HC_0 = \sum_{t=1}^{N} \frac{p(s_t) w_{t-1} (1+g_t)}{(1+r_f+y)^t}$$

where

$p(s_t)$ = the probability of surviving to year (or age) t
w_t = the income from employment in period t
g_t = the annual wage growth rate
r_f = the nominal risk-free rate
y = risk premium associated with occupational income volatility
N = the length of working life in years

John Adam is 60 years old and plans on retiring in 5 years. Adam's annual wage is currently \$50,000 and is expected to grow 2% per year. The risk-free rate is 4%. Adam works in a job with a moderate degree of occupational risk; therefore, we assume a risk adjustment based on occupational income volatility of 3%.
There is a 99% probability that Adam survives the first year, a 98% probability that he survives the second year, and probabilities of 98%, 97%, and 96% for the following years, respectively. Given this information and using Equation 2, what is the present value of Adam's human capital?

$$HC_0 = \sum_{t=1}^{N} \frac{p(s_t) w_{t-1} (1 + g_t)}{(1 + r_f + y)^t}$$

Financial capital

- Financial capital includes the tangible and intangible assets (outside of human capital) owned by an individual or household.
- For example, a home, a car, stocks, bonds, a vested retirement portfolio, and money in the bank
    - Personal assets
    - Investment assets
        - Publicly traded marketable assets
        - Non-publicly traded marketable assets
        - Non-marketable assets
    - Mixed assets

Personal assets

- Personal assets are assets an individual consumes (or uses) in some form in the course of his or her life.
- For example: automobiles, clothes, furniture, or a personal residence.
- In many cases, personal assets are not expected to appreciate in value.
- They are often worth more to the individual than their current fair market value.

Investment assets

- Publicly traded marketable assets: money market instruments, bonds, and common and preferred equity.
  - Traditional balance sheets tend to emphasize publicly traded marketable assets because their value and risk characteristics are generally easier to estimate than those of non-publicly traded assets.
- Non-publicly traded marketable assets: real estate, some types of annuities, cash-value life insurance, business assets, and collectibles.
- Non-marketable assets: The most significant non-marketable financial assets are pensions.

Net worth versus Economic net worth

- An individual's *net worth* consists of the difference between traditional assets and liabilities that are reasonably simple to measure, such as investment assets, real estate, and mortgages.
- **Economic net worth** extends net worth to include claims to future assets that can be used for consumption, such as human capital and the present value of pension benefits.

Traditional balance sheet versus Economic (Holistic) ***balance sheet***

Exhibit 1 Traditional Balance Sheet as of 31 December 2014

Assets		Liabilities	
Liquid Assets		**Short-Term Liabilities**	
Checking account	€35,000	Credit card debt	€25,000
Certificates of deposit	€100,000	Total short-term liabilities	€25,000
Total liquid assets	€135,000		
Investment Assets		**Long-Term Liabilities**	
Taxable account	€750,000	Car loan*	€25,000
Retirement plan	€600,000	Home mortgage	€500,000
Cash value of life insurance	€25,000	Home equity loan	€90,000
Total investment assets	€1,375,000	Total long-term liabilities	€615,000
Personal Property			
House	€2,200,000		
Cars	€160,000		
House contents	€150,000		
Total personal property	€2,510,000		
Total Assets	€4,020,000	Total Liabilities	€640,000
		Net Worth	€3,380,000

* *Note*: A portion of the car loan would likely be short term, but to simplify, we included the entire loan as a long-term liability.

Exhibit 2 Economic (Holistic) Balance Sheet as of 31 December 2014

Assets		Liabilities	
Financial capital	€4,020,000	Debts	€640,000
Liquid assets		Credit card debt	
Investment assets		Car loan	
Personal property		Home mortgage	
		Home equity loan	
Human capital	€1,400,000	Lifetime consumption needs (present value)	€4,200,000
Pension value	€500,000		
		Bequests	€400,000
Total Assets	€5,920,000	Total Liabilities	€5,240,000
		Economic Net Worth	€680,000

Traditional balance sheet versus Economic (Holistic) ***balance sheet***

Exhibit 2 Economic (Holistic) Balance Sheet as of 31 December 2014

Assets		**Liabilities**	
Financial capital	€4,020,000	Debts	€640,000
Liquid assets		Credit card debt	
Investment assets		Car loan	
Personal property		Home mortgage	
		Home equity loan	
Human capital	€1,400,000	Lifetime consumption needs (present value)	€4,200,000
Pension value	€500,000		
		Bequests	€400,000
Total Assets	€5,920,000	Total Liabilities	€5,240,000
		Economic Net Worth	€680,000

Economic balance sheet: accounting for the present value of all available marketable and non-marketable assets as well as all liabilities.

This view allows an individual to map out the optimal level of future consumption and non-consumption goals (such as bequests or other transfers) given the resources that exist today and those that are expected in the future.

Traditional balance sheet versus Economic (Holistic) ***balance sheet***

Exhibit 2 Economic (Holistic) Balance Sheet as of 31 December 2014

Assets		Liabilities	
Financial capital	€4,020,000	Debts	€640,000
Liquid assets		Credit card debt	
Investment assets		Car loan	
Personal property		Home mortgage	
		Home equity loan	
Human capital	€1,400,000	Lifetime consumption needs (present value)	€4,200,000
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Pension value: The mortality-weighted net present value at Time 0 (now)

$$mNPV_0 = \sum_{t=1}^{N} \frac{p(s_t)b_t}{(1+r)^t}$$

Where r: discount rate

the future expected vested benefit (b_t)

the probability of surviving until year t $[p(s_t)]$

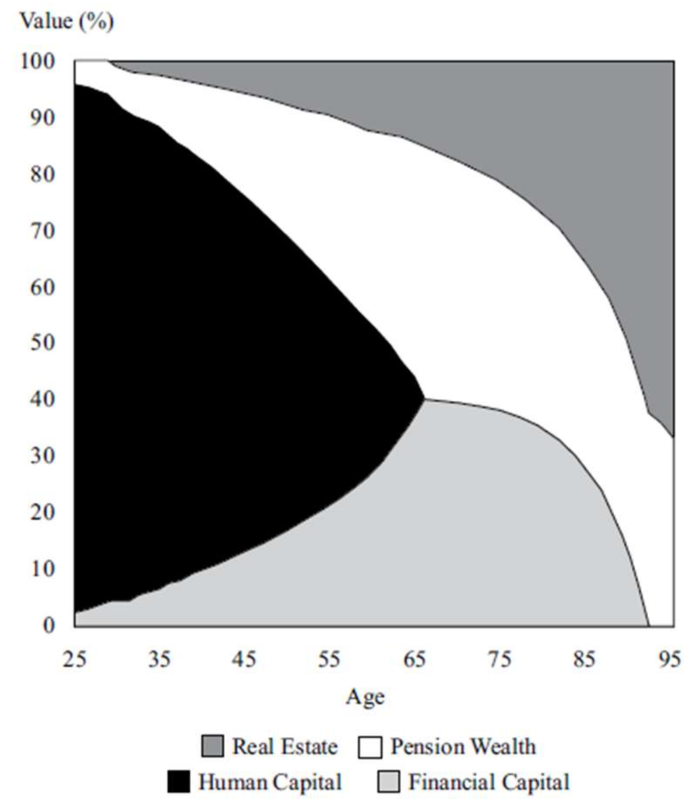
Changes in Economic net worth

- A 25-year-old individual is assumed to make $40,000 a year in after-tax income. Over his or her lifetime, real wages are expected to grow at a constant rate of 1% per year, the annual savings rate is 10%, the nominal discount rate is 8%, and the rate of expected inflation is 3%. The value of human capital is estimated using Equation 2. Financial capital at age 25 is assumed to be $10,000, and it is expected to grow at an annual real rate of return of 3% per year. The assumed need from the portfolio is $20,000 for the first year of retirement (age 65) and is increased annually by inflation throughout retirement.
- We further assume that at age 30 the individual purchases a home that costs $100,000 in today's currency. The home is purchased with a 10% down payment (which comes from financial capital), with the remainder financed by a 30-year mortgage at a fixed nominal interest rate of 5%. The real growth rate of the value of the home is assumed to be 1%. Total pension benefits of $20,000 per year (in today's currency, at age 25) are assumed to commence at age 65, and the real discount rate for pension retirement benefits is 5%. We assume the benefits are accrued throughout the employment of the individual.

Changes in Economic net worth

Exhibit 3 Life-Cycle Economic Balance Sheet Allocation

Exhibit 4 Relative Weights of Economic Balance Sheet Allocation



A framework for individual risk management

- *Risk management* for individuals is the process of identifying threats to the value of household assets and developing an appropriate strategy for dealing with these risks.
- The risk management strategy provides a framework that allows a household to decide when to avoid, reduce, transfer, or self-insure those risks. There are typically four key steps in the risk management process:

  1 Specify the objective.

  2 Identify risks.

  3 Evaluate risks and select appropriate methods to manage the risks.

  4 Monitor outcomes and risk exposures and make appropriate adjustments in methods.

1 Specify the objective

- The overarching objective of individual risk management is to maximize household welfare through an appropriate balance of risk and safety.
- Risk represents a possible decrease in future spending caused by unexpected events, such as a market crash, a physical disability, the premature death of a primary earner, or health care expenses.
- As with investments, this objective is achieved by deciding how much risk a household is willing to bear in order to achieve its long-run spending goals.

2 Identify risks

- Households face a significant number of risks, including:

    Earnings risk

    Premature death risk

    Longevity risk

    Property risk

    Liability risk

    Health risk

- Each of these risks is associated with a potential loss of financial and/or human capital

- Individuals should address each of them to determine how best to address the possibility of loss.

2 Identify risks - Earnings risk

- Within the context of personal risk management, refers to *the risks associated with the earning potential of an individual*
- Relevant issues:
  - health issues can affect earnings, and some health risks are a function of the occupation itself. For example, a construction worker is likely to face higher health-related earnings risk than the average worker.
  - Unemployment: major factors in earnings risk.
- Negatively affect the individual's human and financial capital.
- What if individuals who work in dangerous occupations or in jobs that have a high likelihood of variability or disruption in earnings?

⇒Human capital: Either lower future expected earnings or a higher discount rate or both.

⇒Financial capital: assets will be needed to make up for any loss of income.

2 Identify risks - Premature death risk

- Sometimes referred to as mortality risk, relates to *the death of an individual earlier than anticipated whose future earnings*, or human capital, were expected to help pay for financial needs and aspirations of the individual's family.
- These needs include funding day-to-day living expenses, such as food, housing, and transportation, as well as paying off debts, saving for a child's education, and providing for a comfortable retirement for the surviving spouse.

⇒Human capital: lower future expected earnings.

⇒Financial capital: possibly, a reduction in the income of the surviving spouse;

a risk to consumption, assets will be needed to make up for an increase in expenses

2 Identify risks - Longevity risk

- **Longevity risk** within the context of financial planning relates to the uncertainty surrounding how long retirement will last and specifically the risks associated with living to an advanced age in retirement (e.g., age 100)

⇒deplete the retiree’s resources to the point at which income and financial assets are insufficient to meet post-retirement consumption needs.

- How could longevity risk affect human capital and financial capital?

“How much money do I need to have when I retire?”

2 Identify risks - Property risk

- **Property risk** relates to the possibility that a person's property may be damaged, destroyed, stolen, or lost.
- In the context of property risk, *direct loss* refers to the monetary value of the loss associated with the property itself, while *indirect loss* does not.
  - For example, a house fire may cause €50,000 of damage. If the repair process requires that the family live elsewhere while the damage is repaired, the expenses incurred are considered an *indirect loss*. If the family is renting a room to a boarder, the income lost during construction would also be considered an indirect loss.
- How could longevity risk affect human capital and financial capital?

2 Identify risks - Liability risk

- **Liability risk** refers to the possibility that an individual or household may be held *legally liable for the financial costs associated with property damage or physical injury.* In general, one may be *liable* if because of one's action—or inaction when one is legally responsible for taking action—bodily injury, property damage, or other loss is incurred by another person or entity.
  - For example: automobile accident may cause bodily injury leading to medical costs, lost income, and even the necessity for long-term care
- How could liability risk affect human capital and financial capital?

2 Identify risks - Health risk

- **Health risk** refers to the risks and implications associated with illness or injury.
- Health insurance
- Even that, direct costs associated with illness or injury may include coinsurance, copayments, and deductibles associated with diagnostics, treatments, and procedures.
- How could health risk affect human capital and financial capital?

3 Evaluate Risks and Select Appropriate Methods to Manage the Risks

- *Risk avoidance:* avoiding a risk altogether.
  - For example, one way to avoid the risk to human and financial capital from riding a motorcycle is to simply not own or ride one.
- *Risk reduction/risk control* involves mitigating a risk by reducing its impact on an individual's welfare, either by lowering the likelihood that it will occur or by decreasing the magnitude of loss
  - For example, by wearing a helmet when riding a motorcycle.
- *Risk transfer* involves transferring the risk: The use of insurance and annuities to transfer risk to insurers will be discussed later in the reading.
- *Risk retention (risk assumption)* involves retaining a risk and thus maintaining the ability to finance the cost of losses; when funds are set aside to meet potential losses, the individual is said to *self-insure*.

3 Evaluate Risks and Select Appropriate Methods to Manage the Risks

Exhibit 10 Risk Management Techniques

Loss characteristics	High frequency	Low frequency
High severity	Risk avoidance	Risk transfer
Low severity	Risk reduction	Risk retention

4 Monitor outcomes and risk exposures and make appropriate adjustments in methods

- Once the appropriate risk management method has been selected, risks must be monitored and updated as the household moves through its life cycle.
- It is advisable to annually review an insurance/risk management program, including all the ongoing risk exposures and risk management methods.
- As an individual's goals and personal and financial situation change, these changes will affect risk exposures and optimal risk management strategies.
- In addition to an annual review, ***every life change***—such as a birth, marriage, inheritance, job change, relocation, divorce, or death—should trigger a review of the risk management plan.

Insuring your health

- **A consideration of health insurance** is highly dependent on the country of residence.
- In certain countries, health care is governmentally funded and there is no private health insurance. In others, there is a two-tiered system, with governmental coverage for everyone and upgraded coverage for additional payments. In others, highly rely on private payment.
- **Considerations Before Choosing the Particular Plan**
  - Importance of cost as compared with having freedom of choice
  - Scope of reimbursement
  - Required types of coverage
  - Credentials of the participating doctors
  - Own age and health conditions

Considerations Before Choosing the Particular Plan

Exhibit 9.2 **How the Most Common Types of Health Plans Compare**

This table highlights some of the key differences among the three most common types of health plans.

Type	Choice of Service Providers	Premium Cost	Out-of-Pocket Costs	Annual Deductible
Indemnity	Yes	Low if high-deductible plan, high if low-deductible plan	Usually 20% of medical expenses plus deductible	Yes
HMO	No	Low	Low co-pay	No
PPO	Some	Higher than HMO	Low if using network providers, higher if provider is outside the network	No

Some of the key terms of most health (medical) insurance

- *Coverage:* **What types of coverage do you need?** Everyone has different needs; one person may want a plan with good maternity and pediatric care whereas another may want outpatient mental health benefits. Make sure the plans you consider offer what you want.
  - Hospitalization
  - Surgical expenses
  - Physician expenses
  - Dental services
- **Major medical plan**
  - *Supplements the basic coverage of hospitalization, surgical, and physicians expenses*
- Comprehensive major medical insurance
  - *Coverage for basic hospitalization, surgical, and physician expense and major medical protection is combined into a single policy*

Terms of Payment

Deductible

- Initial amount is not covered by an insurance policy

Participation (co-insurance) clause

- Stipulates that the insurer will pay some portion of the amount of the covered loss in excess of the deductible

Internal limits

- Limits the amounts that will be paid for certain specified expenses

Coordination of benefits provision

- Prevents the insured from collecting more than 100 percent of covered charges
- Requires that benefit payments be coordinated if the insured is eligible for benefits under more than one policy

Terms of Coverage

- Persons and places covered
- Cancellation
- Pre-existing condition
- Pregnancy and abortion
- Mental illness
- Rehabilitation coverage
- Continuation of group coverage

Preexisting Condition

Preexisting condition clause

- Permits permanent or temporary exclusion of coverage for any physical or mental problems the insured had at the time the policy was purchased

Health Insurance Probability and Accountability Act (HIPAA)

- Protects people’s ability to obtain continued health insurance after they leave a job or retire

Cost Containment Provisions for Medical Expense Plans

- Preadmission certification
- Continued stay review
- Second surgical opinions
- Waiver of co-insurance
- Limitation of insurer's responsibility

Some of the key terms of most health (medical) insurance

- *Deductibles* refer to the amount of health care expenses that the insured person must pay in a year before any expense reimbursement is paid by the insurance company.

- *Coinsurance* specifies the percentage of any expense that the insurance company will pay, often 80%, with the insured person responsible for the remainder.

- *Copayments* are fixed payments that the insured must make for a particular service, such as a doctor's office visit.

Some of the key terms of most health (medical) insurance

- *Maximum out-of-pocket expense* refers to the total amount of expenses incurred within a year beyond which the insurance company pays 100%. It is often expressed in terms of an individual maximum and a family maximum. This concept is often referred to as a stop-loss limit.
- *Maximum yearly benefit* refers to the maximum amount that the insurance company will pay in a year.
- *Maximum lifetime benefit* refers to the maximum amount that the insurance company will pay over an individual's lifetime.

Some of the key terms of most health (medical) insurance

- *Preexisting conditions* refer to health conditions that the insured had when applying for insurance. They may or may not be covered by the insurance company, depending on the policy, laws, and regulations.

- *Preadmission certification* refers to a requirement that the insured receive approval from the insurer before a scheduled (non-emergency) hospital stay or treatment.

Other insurance (excepting life insurance)

- **Property insurance** is used by individuals to manage property risk, which was discussed earlier in the reading. Although property insurance coverage applies to a multitude of situations, for most individuals, the primary areas to cover are the home/ residence and the automobile.
- Liability insurance or a *personal umbrella liability insurance*
  - For example, consider an individual whose automobile policy specifies a property damage liability limit of US$100,000 and who has an umbrella policy with a liability limit of US$1 million.
  - ➢ If that individual is responsible for an automobile accident that causes US$300,000 of damage,
  - ➢ the automobile policy would pay the first US$100,000 and
  - ➢ the umbrella policy would pay the remaining US$200,000.