# FN241
# Risk Management and Insurance
# Buying Life Insurance

Sakkakom Maneenop

# Buying life insurance

- Premature death & financial impacts
- Amount of life insurance to own
- Determining the cost of life insurance
- Rate of return on saving component
- Shopping for life insurance

# Premature Death

- Premature death can be defined as the death of a family head with outstanding unfulfilled financial obligation
  - Can cause serious financial problems for the surviving family members
  - The deceased's future earnings are lost forever
  - Additional expenses are incurred
  - Some families will experience a reduction in their standard of living

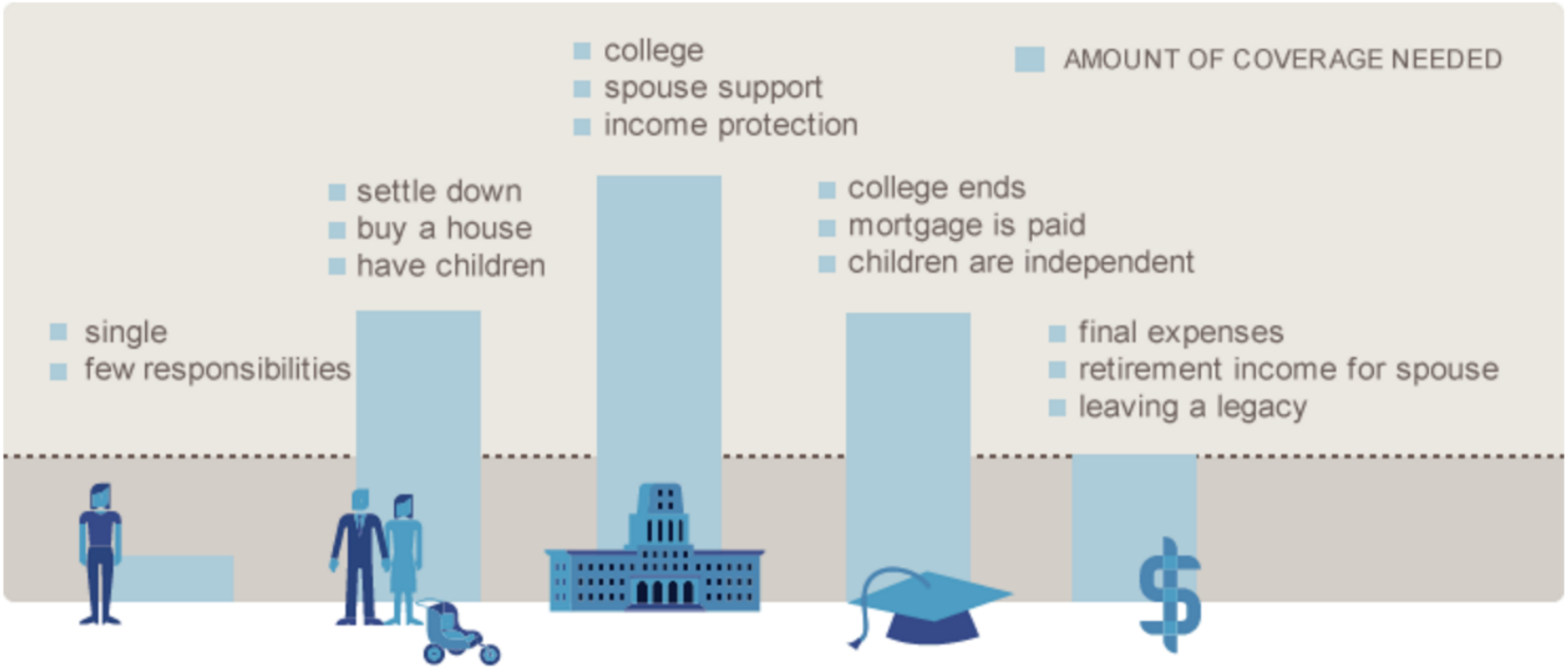
# Premature Death

- Life expectancy has increased significantly over the past century
  - Thus, the economic problem of premature death has declined
  - Millions of people still die annually from heart disease, cancer and strokes

- The purchase of life insurance is financially justified if the insured has earned income and others are dependent on those earnings for financial support

# Premature Death

**How Life Insurance Needs Can Change Over Time**




You need an approach that helps you avoid buying insurance that does not last long enough and buying permanent insurance for temporary needs.

Source: http://lifeinsurance.prudential.com/view/page/iliconsumer/30379

# Amount of Life Insurance to Own

- A few approaches can be used to estimate the amount of life insurance to own

1. **The human life value approach**
   - The amount needed depends on the insured's human life value, which is the present value of the family's share of the deceased breadwinner's future earnings

# Amount of Life Insurance to Own

- To calculate the amount needed under the human life value approach:
  - Estimate the individual's average annual earnings over his or her productive lifetime
  - Deduct taxes, insurance premiums and self-maintenance costs
  - Using a reasonable discount rate, determine the present value of the family's share of earnings for the number of years until retirement
  - **Same principle as calculating NPV or firm's value!**

# Amount of Life Insurance to Own

- Limitations that understate economic value:
  - Other sources of income are ignored e.g. social security, group insurance received from a company
  - Future uncertainty, e.g. birth of a child, death of a family member, etc.

- Calculator:

Lifehappens.org/human-life-value-calculator/

# Amount of Life Insurance to Own

2 **the needs approach**, the amount needed depends on the financial needs that must be met if the family head should die

- The calculation should consider:
  - An estate clearance fund including funeral expenses, uninsured medical bills, installment debts
  - Income needed for a 1-2 year readjustment period
  - Income needed for the dependency period, until the youngest child reaches age 18 (or depending on each culture)

# Amount of Life Insurance to Own

- The calculation should consider:
  - Life income to the surviving spouse
    - Especially needed if he/she is out of the labor force for many years
    - If a surviving spouse has a career, the need for life income is greatly reduced or even eliminated
  - Special needs
    - Mortgage redemption fund or educational fund
    - Emergency fund – for unexpected events
  - Retirement needs

# How Much Life Insurance Do You Need?

| *What You Will Need* | *Jennifer Smith* | | *Your Needs* | |
|---|---|---|---|---|
| Cash needs | | | | |
| Funeral costs | $ 15,000 | | $_____ | |
| Uninsured medical bills | 5,000 | | $_____ | |
| Installment debts | 12,000 | | $_____ | |
| Probate costs | 3,000 | | $_____ | |
| Federal estate taxes | 0 | | $_____ | |
| State inheritance taxes | 0 | | $_____ | |
| Total estate clearance fund | | $ 35,000 | | $_____ |
| **Income needs** | | | | |
| Readjustment period | 24,000 | | _____ | |
| Dependency period | 180,000 | | _____ | |
| Life income to surviving spouse | 0 | | _____ | |
| Retirement income | 0 | | _____ | |
| Total income needs | | $ 204,000 | | $_____ |
| **Special needs** | | | | |
| Mortgage redemption fund | 200,000 | | _____ | |
| Emergency fund | 50,000 | | _____ | |
| College education fund | 150,000 | | _____ | |
| Total special needs | | $ 400,000 | | $_____ |
| Total needs | | $ 639,000 | | $_____ |

Source: RM Exhibit 11.1

# How Much Life Insurance Do You Need?

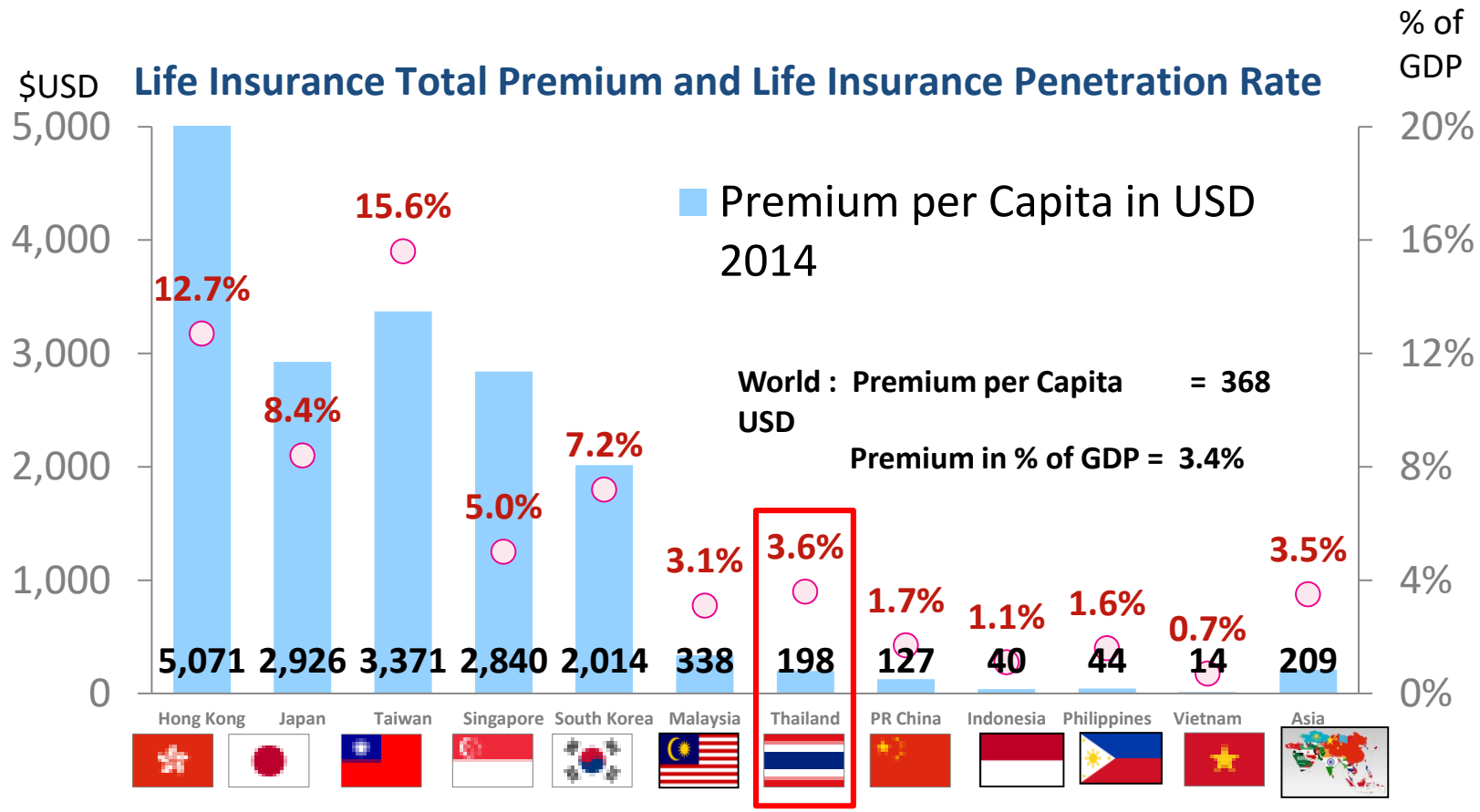
| *What You Have Today* | *Jennifer Smith* | | *Your Assets* | |
|---|---|---|---|---|
| Checking account and savings | $ 10,000 | | $_____ | |
| Mutual funds and securities | 35,000 | | $_____ | |
| IRAs and Keogh plan | 20,000 | | | |
| Section 401(k) plan and employer savings plan | 40,000 | | _____ | |
| Private pension death benefit | 0 | | _____ | |
| Current life insurance | 60,000 | | _____ | |
| Other financial assets | 0 | | _____ | |
| Total assets | | $ 165,000 | _____ | |
| **Additional life insurance needed** | | | | $_____ |
| Total needs | | $ 639,000 | | |
| Less total assets | | 165,000 | | $_____ |
| **Additional life insurance needed** | | $ 474,000 | | _____ |
| | | | | $_____ |

Source: RM Exhibit 11.1

# Amount of Life Insurance to Own

- Internet-based life insurance calculators produce widely-varying results, but may be a good starting point
  - http://www.lifehappens.org/insurance-overview/life-insurance/calculate-your-needs/
- Most families own an insufficient amount of life insurance
  - In 2010, only 44% of the households in the U.S. owned any individual life insurance
  - Consumers procrastinate, and have difficulty in making correct decisions about the purchase of life insurance

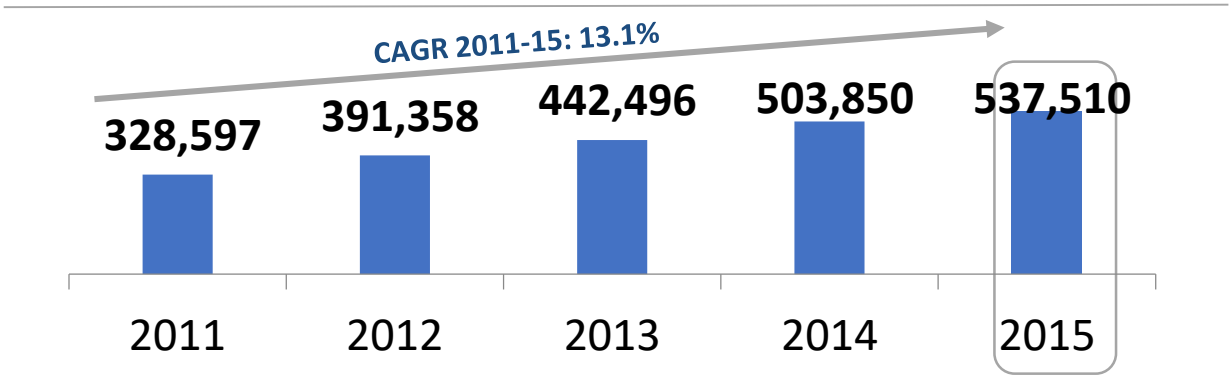
# Thailand has lower life insurance penetration rate compared to peer countries




Source: SwissRe Sigma No.4 / 2015

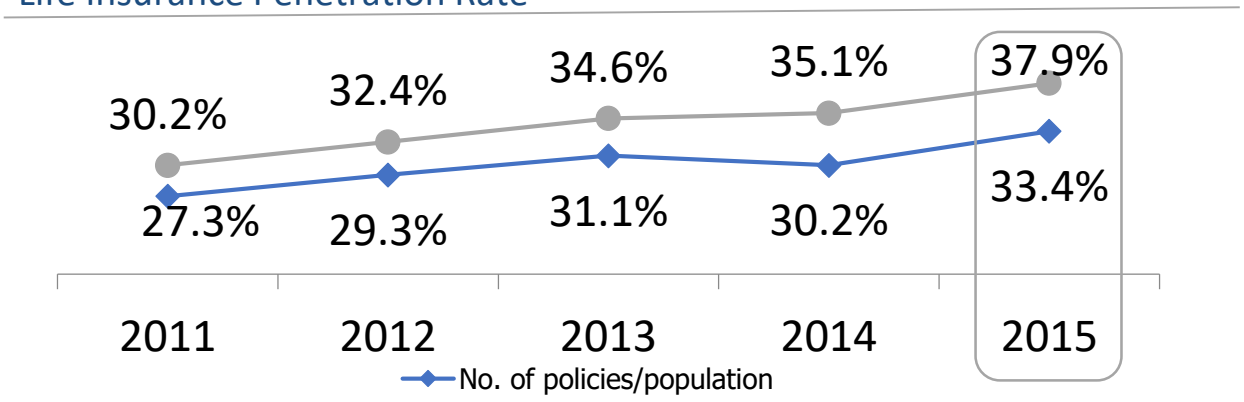
# Life insurance in Thailand: Low penetration rate with high growth potential

**Total** Premium
Unit: MB




- Total written premium grew continuously during the last 5 years at 13.1% CAGR

Life Insurance Penetration Rate




- Life insurance industry is expected to grow continuously due to currently low penetration rate

Source: Thai Life Assurance Association

# Amount of Life Insurance to Own

- Many families have only a limited amount of discretionary income
  - They don’t even have enough money for basic needs
  - Many families are in debt and have little savings
  - After payment of high priority expenses, such as a mortgage, food and utilities, many families have only a limited amount of income to purchase life insurance

# Determining the Cost of Life Insurance

- The cost of a life insurance policy is the difference between what you pay and what you get back

- When determining the cost of life insurance, four major factors must be considered:
    1. Annual premiums
    2. Cash values
    3. Dividends (if any)
    4. Time value of money

# Determining the Cost of Life Insurance

1. Traditional net cost method - the cash value and expected dividends are subtracted from annual premiums to obtain a net cost per year figure
   - Does **not consider** the time value of money
   - Insurance illustration often showed the insurance to be free (to have a negative cost)

# Traditional Net Cost Method

- Assume that the annual premium for a $10,000 ordinary life insurance policy issued to a female, age 20, is $132.10
- Estimated dividends over a 20-year period are $599, and
- The cash surrender value at the end of the twentieth year is $2,294

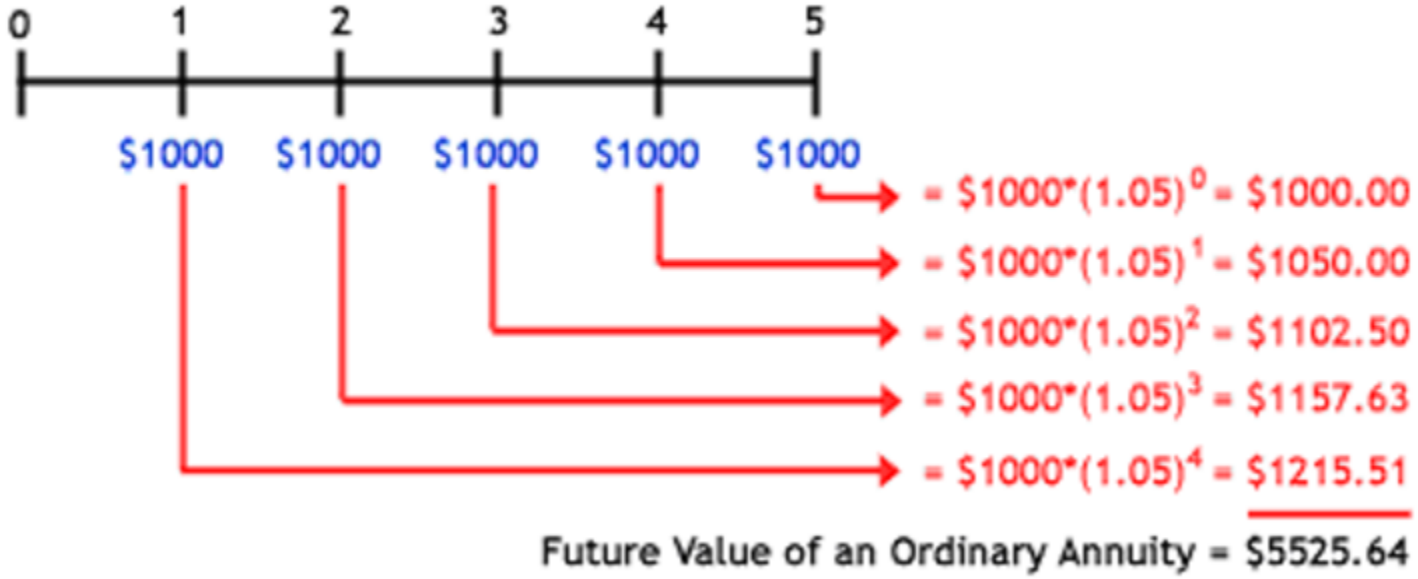
| | |
|---|---|
| Total premiums for 20 years | $2642 |
| Subtract dividends for 20 years | –599 |
| Net premiums for 20 years | $2043 |
| Subtract the cash value at the end of 20 years | –2294 |
| Insurance cost for 20 years | –$251 |
| Net cost per year (–$251 ÷ 20) | –$12.55 |
| Net cost per $1000 per year (–$12.55 ÷ 10) | –$1.26 |

Source: RM Exhibit 13.1

# Calculating the PV and FV of Annuities

**Future value of an ordinary annuity**

- Assume that you are receiving $1,000 every year for the next 5 years, and you invested each payment at 5%.




Source: http://www.investopedia.com/articles/03/101503.asp

# Calculating the PV and FV of Annuities

**Future value of an ordinary annuity**

- Assume that you are receiving $1,000 every year for the next 5 years, and you invested each payment at 5%.

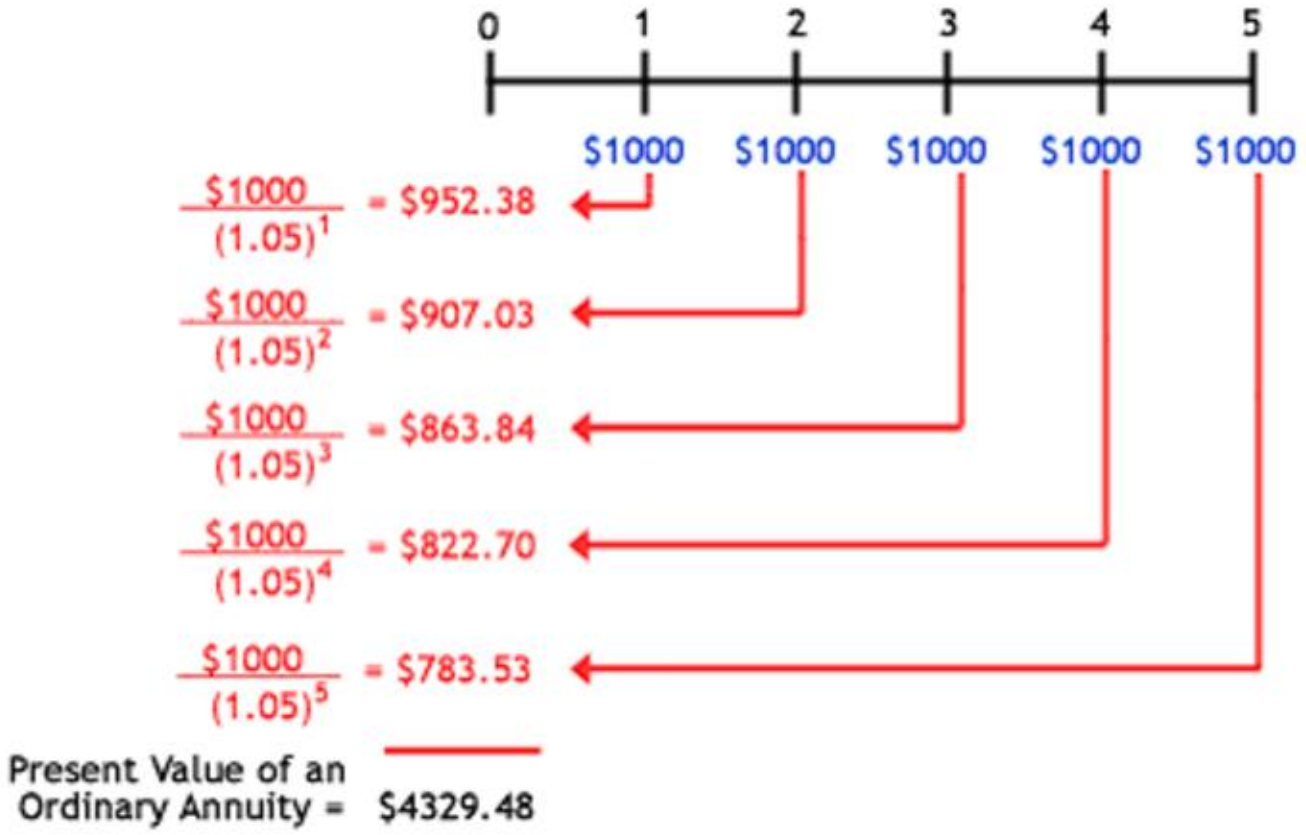
$$FV_{\text{Ordinary Annuity}} = C * \left[ \frac{(1+i)^n - 1}{i} \right]$$

$$FV_{\text{Ordinary Annuity}} = \$1000 * \left[ \frac{(1+0.05)^5 - 1}{0.05} \right] = \$1000 * [5.53] = \mathbf{\$5525.63}$$

Source: http://www.investopedia.com/articles/03/101503.asp

# Calculating the PV and FV of Annuities

**Present value of an ordinary annuity**




Source: http://www.investopedia.com/articles/03/101503.asp

# Calculating the PV and FV of Annuities

**Present value of an ordinary annuity**

$$PV_{\text{Ordinary Annuity}} = C * \left[ \frac{1 - (1 + i)^{-n}}{i} \right]$$

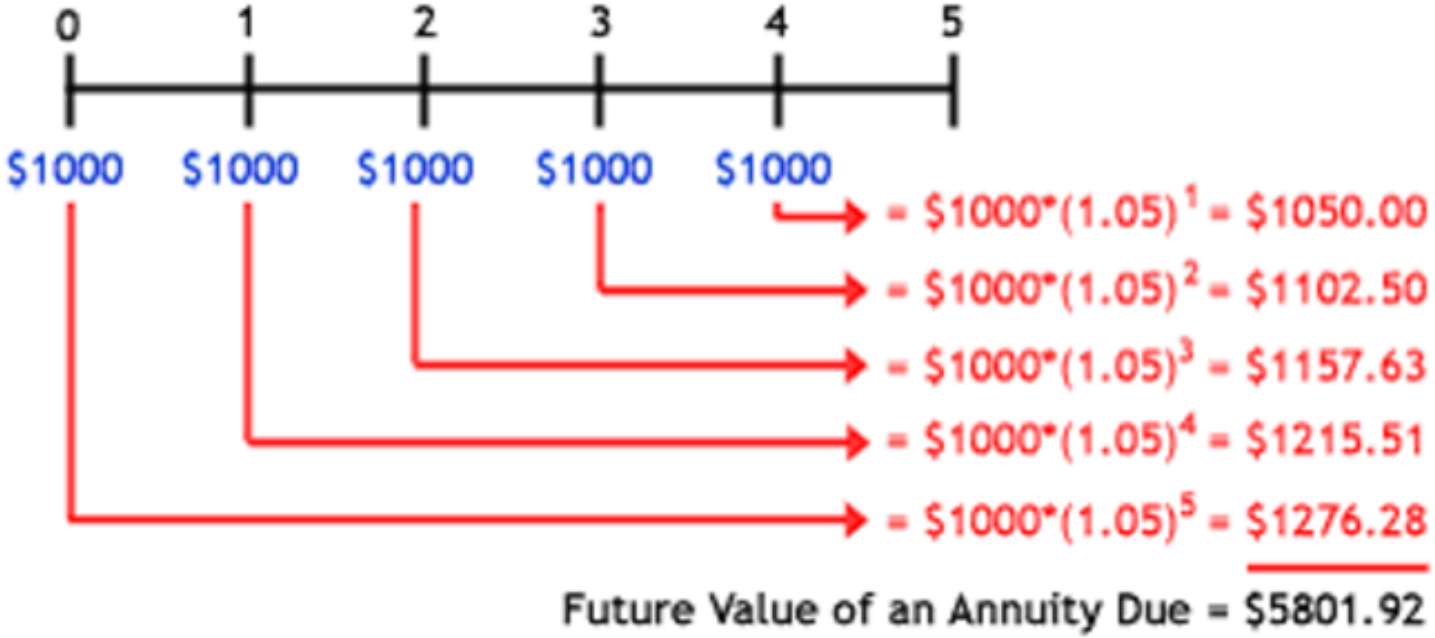
$$PV_{\text{Ordinary Annuity}} = \$1000 * \left[ \frac{1 - (1 + 0.05)^{-5}}{0.05} \right] = \$1000 * [4.33] = \mathbf{\$4329.48}$$

Source: http://www.investopedia.com/articles/03/101503.asp

# Calculating the PV and FV of Annuities

**Future value of an annuity due**

- Each $1,000 payment is made at the beginning of the period rather than at the end (interest rate is still 5%).




Source: http://www.investopedia.com/articles/03/101503.asp

# Calculating the PV and FV of Annuities

**Future value of an annuity due**

- Each $1,000 payment is made at the beginning of the period rather than at the end (interest rate is still 5%).

$$FV_{\text{Annuity Due}} = C * \left[ \frac{(1+i)^n - 1}{i} \right] * (1+i)$$

$$FV_{\text{Annuity Due}} = \$1000 * \left[ \frac{(1+0.05)^5 - 1}{0.05} \right] * (1+0.05)$$

$$= \$1000 * 5.53 * 1.05 = \mathbf{\$5801.91}$$

Source: http://www.investopedia.com/articles/03/101503.asp

# Calculating the PV and FV of Annuities

**Present value of an annuity due**

$$PV_{\text{Annuity Due}} = C * \left[ \frac{1 - (1+i)^{-n}}{i} \right] * (1+i)$$

$$PV_{\text{Annuity Due}} = \$1000 * \left[ \frac{1 - (1+0.05)^{-5}}{0.05} \right] * (1+0.05)$$

$$= \$1000 * 4.33 * 1.05 = \mathbf{\$4545.95}$$

Source: http://www.investopedia.com/articles/03/101503.asp

# Determining the Cost of Life Insurance

2 Interest-adjusted cost method is more accurate because it considers the time value of money

- Interest-adjusted cost indices come in two forms:

2.1 Surrender cost index is useful if the owner expects to surrender the policy after some time period

2.2 Net payment cost index is useful if the owner expects to keep the policy in force

# Surrender Cost Index

| | |
|---|---|
| Total premiums for 20 years, each accumulated at 5% | $4586 |
| Subtract dividends for 20 years, each accumulated at 5% | −824 |
| Net premiums for 20 years | $3762 |
| Subtract the cash value at the end of 20 years | −2294 |
| Insurance cost for 20 years | $1468 |
| Amount to which $1 deposited annually at the beginning of each year will accumulate to in 20 years at 5% | $34.719 |
| Interest-adjusted cost per year ($1468 ÷ $34.719) | $42.28 |
| Cost per $1000 per year ($42.28 ÷ 10) | $4.23 |

Source: RM Exhibit 13.2

# Net Payment Cost Index

| | |
|---|---|
| Total premiums for 20 years, each accumulated at 5% | $4586 |
| Subtract dividends for 20 years, each accumulated at 5% | –824 |
| Insurance cost for 20 years | $3762 |
| Amount to which $1 deposited annually at the beginning of each year will accumulate to in 20 years at 5% | $34.719 |
| Interest-adjusted cost per year ($3762 ÷ $34.719) | $108.36 |
| Cost per $1000 per year ($108.36 ÷ 10) | $10.84 |

Source: RM Exhibit 13.3

# Determining the Cost of Life Insurance

- Interest-adjusted cost indices can be used to compare policies across insurers
  - There is a wide variation in costs indices across insurers – it pays to shop around! (see next slide)
  - Most consumers use premiums as a basis for comparison, but agents can supply cost indices (in developed markets)
  - Unfortunately, such comparison cannot be found in Thailand (Open for disruption!)

# Whole Life Actual Historical Performance $250,000 Male Nonsmoker Preferred Class, Age 45

| ***20-Year Historical Performance*** *(Policy Issued 12/31/1990. Last Day 12/31/2010)* | | | *Year 20 Cash Dividends** | | | |
|---|---|---|---|---|---|---|
| | | | *Surrender Cost Index* | | *Net Payment Index* | |
| *Company* | *Leading Policy (12/31/90)* | *Annual Premium* | *Illustrated* | *Actual* | *Illustrated* | *Actual* |
| Country Financial Life | Executive Whole Life | 4,850 | –0.99 | 2.57 | 9.78 | 13.34 |
| Guardian Life | Whole Life 100(89-Form) | 5,211 | –0.82 | 3.72 | 10.46 | 15.00 |
| Massachusetts Mutual Life | Whole Life-MM Block | 4,730 | 0.27 | 2.95 | 10.46 | 13.72 |
| Met Life | Whole Life | 4,820 | –1.73 | 2.99 | 9.10 | 13.82 |
| Mutual Trust Life | Econolife | 4,745 | –1.27 | 4.14 | 9.36 | 14.77 |
| New York Life | Whole Life | 4,710 | –2.28 | 2.02 | 8.20 | 12.50 |
| Northwestern Mutual Life | 90 Life | 5,815 | –0.24 | 1.59 | 11.26 | 13.09 |
| Penn Mutual Life | Traditional Life | 5,088 | –1.25 | 3.33 | 9.35 | 13.93 |
| Savings Bank Life of MA | Straight Life | 4,388 | –1.60 | –0.24 | 8.72 | 10.08 |
| Security Mutual Life of NY | Customizer | 4,358 | –0.76 | 3.97 | 9.36 | 14.09 |
| State Farm Life | Estate Protector | 4,708 | –0.14 | 3.69 | 9.97 | 13.81 |
| Thrivent Financial for Lutherans | Life Paid-Up at 65 (L65) | 7,235 | –3.92 | 2.42 | 13.65 | 19.99 |
| Thrivent Financial for Lutherans | Life Paid-Up at 96 (L96) | 5,103 | –1.17 | 2.82 | 10.29 | 14.29 |

*Best class at least 15% of this policy issued

SOURCE: Adapted from Roger L. Blease, "Full Disclosure Whole Report," *National Underwriter*, Life & Health Magazine, May 17, 2010.

Source: RM Exhibit 13.4

# Rate of Return on Saving Component

1. The IRR method is based on a formula:

- This method is simple but does not take into account of protection element, implying that the IRR we receive from this method is too low
- We can adjust by adding protection element using the benchmark price table or mortality table

# Rate of Return on Saving Component

2. The yearly rate of return method is based on a formula:

$$\frac{\left(\begin{array}{c}\text{amount available in the policy}\\ \text{at the end of the policy year}\end{array}\right)+\left(\begin{array}{c}\text{assumed price of the}\\ \text{protection component}\end{array}\right)}{\left(\begin{array}{c}\text{amount available in the policy}\\ \text{at the beginning of the policy year}\end{array}\right)}-1$$

- The information needed for the calculation is readily available to consumers incl. premium, expected dividends, cash surrender value, and cost of insurance

# Benchmark Prices

| Age | Benchmark Price |
|---|---|
| Under 30 | $ 1.50 |
| 30–34 | 2.00 |
| 35–39 | 3.00 |
| 40–44 | 4.00 |
| 45–49 | 6.50 |
| 50–54 | 10.00 |
| 55–59 | 15.00 |
| 60–64 | 25.00 |
| 65–69 | 35.00 |
| 70–74 | 50.00 |
| 75–79 | 80.00 |
| 80–84 | 125.00 |

NOTE: The benchmark prices are derived from certain U.S. population death rates. The benchmark figure for each five-year age bracket is close to the death rate per $1000 at the highest age in that bracket.

SOURCE: Adapted from Joseph M. Belth, *Life Insurance: A Consumer's Handbook,* 2nd ed. (Bloomington, IN: Indiana University Press, 1985), table 9, p. 84. Reprinted by permission of the author.

Source: RM Exhibit 13.5

# Example

- Mark purchased a $100,000 participating ordinary life policy at age 35
- Now he is 42 at the beginning of the $8^{th}$ policy year
- The annual premium is $1,500
- The cash value is $7,800 at the end of $7^{th}$ policy year and $9,200 at the end of $8^{th}$ policy year
- The $8^{th}$ year dividend is $400

Calculate the yearly rate of return for the $8^{th}$ policy year

# Example

$$i = \frac{(CV + D) + (YPT/1{,}000)(DB - CV)}{(P + CVP)} - 1$$

$$= \frac{(9{,}200 + 400) + (4/1{,}000)(100{,}000 - 9{,}200)}{1{,}500 + 7{,}800} - 1$$

$$= 7.1\%$$

# Taxation of Life Insurance - Thailand

(6) **ค่าเบี้ยประกันสุขภาพบิดามารดาของผู้มีเงินได้และคู่สมรส สามารถหักลดหย่อนได้ตามที่จ่ายจริง แต่ไม่เกิน 15,000 บาท** บิดามารดาต้องไม่มีเงินได้พึงประเมินในปีภาษีที่ขอหักลดหย่อนเกิน 30,000 บาทขึ้นไป

(7) **ค่าเบี้ยประกันชีวิต**

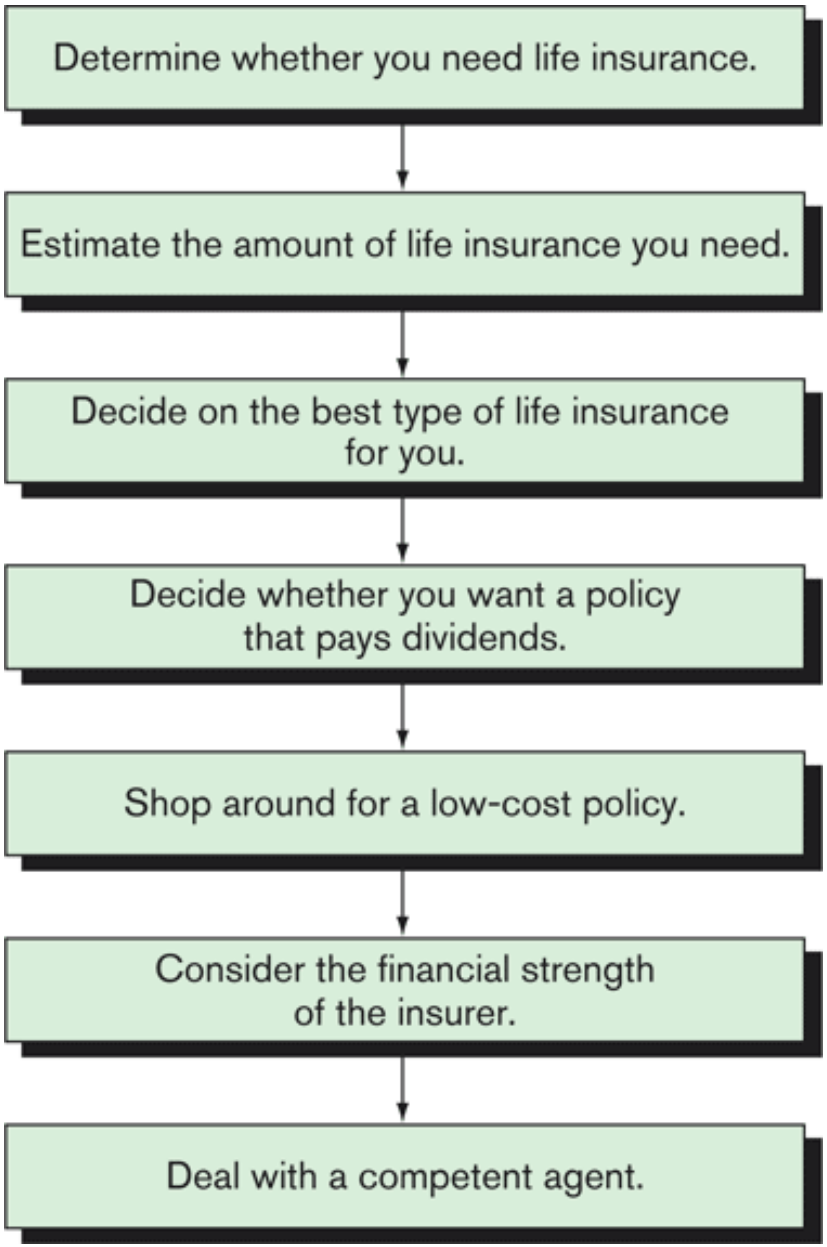
(7.1) ค่าเบี้ยประกันชีวิต สามารถหักลดหย่อนและยกเว้นได้ตามที่จ่ายจริง แต่ไม่เกิน 100,000 บาท และของคู่สมรสที่ไม่มีเงินได้ สามารถหักลดหย่อนได้ตามที่จ่ายจริง แต่ไม่เกิน 10,000 บาท (ค่าเบี้ยประกันชีวิตต้องมีความคุ้มครองตั้งแต่ 10 ปีขึ้นไป และผลประโยชน์ตอบแทนคืนไม่เกินร้อยละ 20 ของเบี้ยประกันชีวิตรายปี แต่ค่าเบี้ยประกันความคุ้มครองอื่น เช่น คุ้มครองสุขภาพ หรือคุ้มครองอุบัติเหตุไม่สามารถหักลดหย่อนได้)

(7.2) ค่าเบี้ยประกันชีวิตแบบบำนาญของผู้มีเงินได้หักลดหย่อนได้ในอัตราร้อยละ 15 ของเงินได้ที่นำมาเสียภาษีเงินได้ในแต่ละปี แต่ไม่เกิน 200,000 บาท (เป็นค่าเบี้ยประกันชีวิตแบบบำนาญ ความคุ้มครองตั้งแต่ 10 ปีขึ้นไป และจ่ายผลประโยชน์เงินบำนาญเมื่อผู้มีเงินได้อายุตั้งแต่ 55 ปีขึ้นไปถึงอายุ 85 ปีหรือกว่านั้น และเมื่อรวมกับเงินสะสมเข้ากองทุนสำรองเลี้ยงชีพ + เงินสะสมเข้ากองทุนบำเหน็จบำนาญข้าราชการ + เงินสะสมเข้ากองทุนสงเคราะห์ตามกฎหมายว่าด้วยโรงเรียนเอกชน + เงินที่ซื้อหน่วยลงทุนในกองทุนรวมเพื่อการเลี้ยงชีพ + เงินสะสมเข้ากองทุนการออมแห่งชาติ ต้องไม่เกิน 500,000 บาท)

(13) **เงินสมทบกองทุนประกันสังคม** หักลดหย่อนได้ตามที่จ่ายจริง ตามกฎหมายว่าด้วยการประกันสังคม

Source: http://www.rd.go.th/publish/557.0.html

# Shopping For Life Insurance




Source: RM Exhibit 13.7

# Rating Categories for Major Rating Agencies

| Rank Number | Ratings | | | |
|---|---|---|---|---|
| | Best | Fitch | Moody's | S&P |
| 1 | A++ | AAA | AAA | AAA |
| 2 | A+ | AA+ | AA1 | AA+ |
| 3 | A | AA | AA2 | AA |
| 4 | A− | AA− | AA3 | AA− |
| 5 | B++ | A+ | A1 | A+ |
| 6 | B+ | A | A2 | A |
| 7 | B | A− | A3 | A− |
| 8 | B− | BBB+ | BAA1 | BBB+ |
| 9 | C++ | BBB | BAA2 | BBB |
| 10 | C+ | BBB− | BAA3 | BBB− |
| 11 | C | BB+ | BA1 | BB+ |
| 12 | C− | BBBB− | BA2 | BBBB− |
| 13 | D | B+ | BA3 | B+ |
| 14 | E | B | B1 | B |
| 15 | F | B− | B2 | B− |
| 16 | S | CCC+ | B3 | CCC+ |
| 17 | | CCC | CAA1 | CCC |
| 18 | | CCC− | CAA2 | CCC− |
| 19 | | CC | CAA3 | CC |
| 20 | | C | CA | C |
| 21 | | | C | R |

NOTE: The ratings in a given rank are not necessarily equivalent to one another.

SOURCE: Joseph M. Belth, ed., "Financial Strength of Insurance Companies," *The Insurance Forum*, vol. 39, no. 9 (September 2012), p. 83. Used by permission of *The Insurance Forum*, Author: Joseph M. Belth.

Source: RM Exhibit 13.8