

4

Insurance underwriting

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Learning objectives

After studying this chapter, you should be able to:

- explain the process of underwriting;
- explain the various sources from where information is collected for underwriting;
- analyse moral and physical hazards;
- explain the difference between financial, medical and non-medical underwriting;
- explain the concept of Human Life Value (HLV) and its role in underwriting;
- describe the process of pricing a policy;
- determine the process of calculating premiums;
- describe the process of calculating bonuses;
- explain the concept of liens;
- describe the role of the agent in underwriting.

Introduction

Underwriting is the name given to the procedure of:

- assessing the risk which people bring to the pool;
- deciding whether or not to accept the risk, or how much to accept;
- determining the terms, conditions and scope of the cover to be offered; and
- calculating a suitable premium.

For life insurance, underwriters are responsible for selecting the individuals the insurance company can insure from among those submitting proposals, and also the price it can insure them for, based on their risk profile.

As we have seen, the business of insurance is based on the principle of risk sharing. The insurance company carries the risks of the person insured in accordance with the policy terms and conditions. Hence the underwriters have to be extra careful in choosing the individuals to be insured from the group of proposers and in setting a fair price in line with the risk that each individual presents to the pool. An underwriter who fails to do this can affect the stability of an insurance company's business.

In this chapter we will look at the information the underwriter must have to be able to assess accurately the risk presented by a proposer. Their assessment of the risk will influence the premium to be charged, and later we will look at how pricing is carried out and how the premium is calculated. First, however, we will start by taking a brief overall look at the process of insurance underwriting.



Key terms

This chapter features explanations of the following terms and concepts:

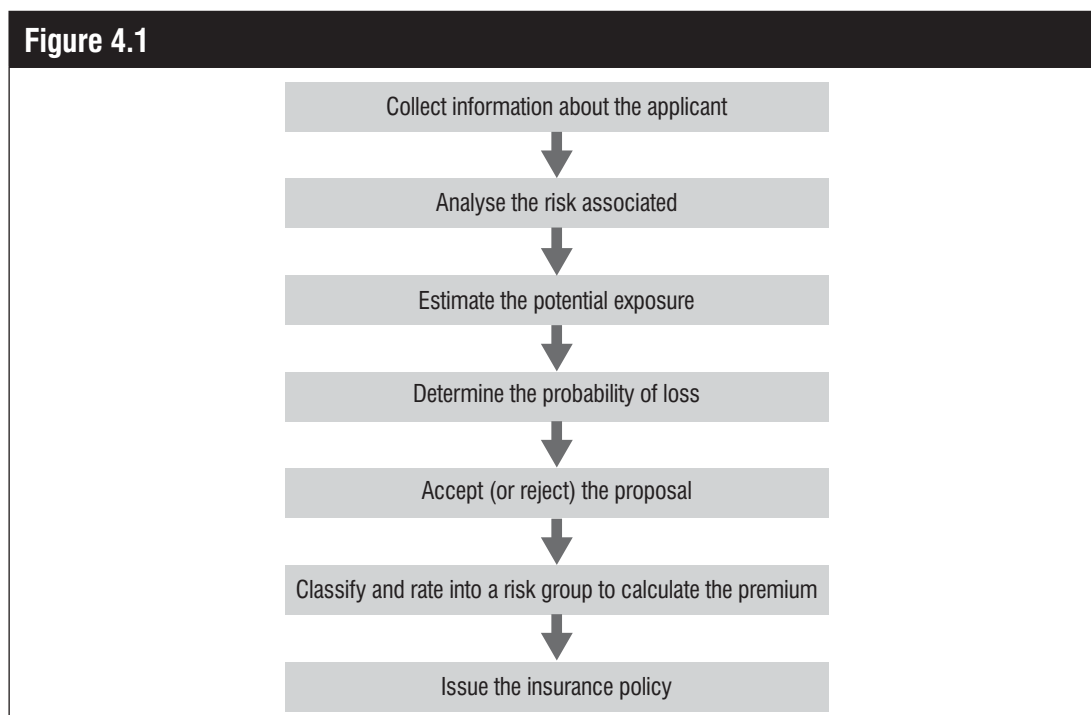
Underwriter	Gross premium	Moral hazards	Non-medical underwriting
Human life value (HLV)	Loading	Physical hazards	Risk premium
Bonuses	Financial underwriting	Medical underwriting	Liens
Adverse selection	Risk groups	Level premium	Time value of money

A The process of insurance underwriting

An underwriter is responsible for the classification, analysis and selection of the risks presented to them. Different companies have different guidelines as to how risks are classified and priced. Each company develops its own criteria and guidelines for the selection of risk, and the underwriter works within these with the aim of ensuring that the company continues to operate efficiently.

The process of insurance underwriting is as follows:

Figure 4.1



Be aware

The word 'risk' in life insurance is mainly used with reference to the life insured or the insured person.



The first step in insurance underwriting involves reviewing the information about the proposer from all the possible sources. For life insurance, significant information includes a person's age, occupation, income, personal habits, own health and family health history, in addition to the report of the agent on all these aspects.

The underwriter analyses this information and makes a decision on whether to accept or reject the proposal. This is a specialised process: the insurance underwriter has to examine all the facts available to them and analyse a proposer's real intentions for taking insurance. We will look at how this information is collected and used later in this chapter.

Fraudulent intentions: insurance underwriters have to be careful to determine the intentions of the proposers: not all will be honest or genuine. The intention of the proposer has to be analysed carefully before deciding on whether to accept the proposal or not.

The insurance underwriter then examines the information to determine the probability that the company might have to pay a claim based on the circumstances. In this step, the underwriter determines **maximum possible loss (MPL)**. MPL refers to the maximum amount of loss that can occur, if a certain event occurs.

The underwriter will then decide whether to accept the risk at ordinary rates, accept the risk with modified or special terms (e.g. charge a higher premium), accept with a lien, postpone or reject the risk as falling outside those that the company considers acceptable.

The underwriter must also protect the company from **adverse selection**. This is a term used to describe the situation where an insurance company accepts too many proposers who bring a higher than average risk to the pool. The concept of adverse selection is based on the view that people who fear that they are prone to risk are more likely to want to take out life insurance as opposed to people who feel that they are prone to low risk. If a company does find itself exposed to adverse selection it may find that it pays out more claims than anticipated. This obviously has a bad effect on the success of the company.

Example

Rakesh Sharma has recently being diagnosed with diabetes. He is only 38 years old. Rakesh is very keen to get insurance cover and is willing pay a high premium. Rakesh Sharma's main intention in taking out an insurance plan is to transfer the cost of the medical expenses that are likely to occur in the near future to the insurance company. Also, in case he dies, the claim from the life insurance company should be sufficient for his family to maintain a decent lifestyle.

If people like Rakesh Sharma are selected by the insurance company in large numbers, this could lead to adverse selection. The potentially huge medical expenses that may arise will have to be borne by the insurance company.



The underwriter may choose to reject Rakesh Sharma's proposal on the basis that he brings too high a risk to the pool. However, rejection is not the only solution available to the underwriter. The underwriter can choose to:

- accept the proposal at ordinary rates;
- accept the proposal with extra premium;
- accept the proposal with a lien;
- accept the proposal with modified terms;
- accept the proposal with a specific/modified clause;
- postpone the decision for a certain period; or
- reject the proposal.

Example

Hiten Patel applies for an insurance policy from an insurance company. In his proposal form, he declares that he is undergoing treatment for a heart-related problem. He also states that he has been operated on for the same problem before.

The insurance underwriter in this case will have to collect the information about the nature of the illness, treatment available, operation and recovery procedure. Based on the information, the underwriter will decide about the risk associated with Hiten. The underwriter may charge him a higher premium or exclude health issues related to his heart from the cover provided.





Be aware

Different insurance companies use different criteria for deciding whether a proposal is acceptable. If an existing disease is not considered suitable for cover by a certain company, another company might cover it to some extent with the payment of extra premium.

Once the decision has been taken to accept a risk, the underwriter will classify it into a **risk group**. Each risk group has a rating based on company guidelines, with those risks presenting a higher risk being classified in a high risk group and being charged a higher rate. The risk group is very important as this is used to decide what premium the proposer will have to pay. The underwriter can change/modify the rating before arriving at the final premium.

If the premium and terms offered by the underwriter are accepted by the proposer, the policy can now be issued to the proposer, customised if necessary to take account of the risk presented by that proposer.



Be aware

The regulations issued by the IRDA, require that the decision on the proposal must be conveyed to the proposer within 15 days of receiving the proposal.



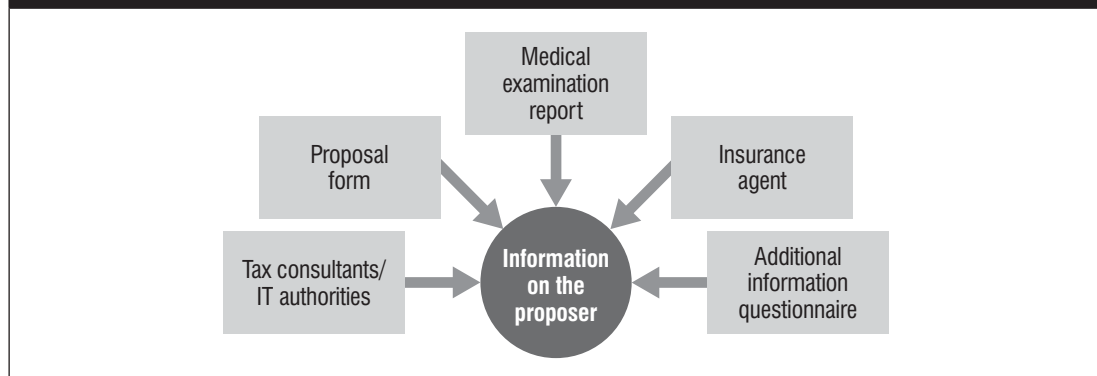
Question 4.1

When the underwriter receives a proposal for insurance, what are the various decisions that they can take in respect to that proposal?

B Obtaining the required information

The underwriter can collect the information about the proposer from several sources. Much of this is obtainable from the specific documentation that the underwriter requires, for example, the proposal form.

Figure 4.2: Sources of information about the proposer



B1 Proposal

The proposal form, filled in and signed by the proposer, is the most important source of preliminary information to the insurance underwriter. The proposal contains the following information:

Personal information:	<ul style="list-style-type: none"> This part of the form contains information such as the name of the proposer, their address, age, annual income, an estimate of monthly expenditure, occupation, marital status, any other insurance policies taken out by them etc. In cases where the proposer and the life insured are different individuals, then the proposer's name and address also needs to be entered on the form.
Medical information:	<ul style="list-style-type: none"> This part of the form contains information on the proposer's past medical history and present medical condition. Also, information on the proposer's weight, height and other specifications, their medical history and that of their family etc. is collected. A doctor's report on the medical condition of the proposer can also be taken at this stage, if the underwriter or the type of policy makes one necessary. If the policy is being taken out on a non-medical basis (see section D), then the proposer may be asked to provide information on their past illnesses, injuries and surgical operations, along with information about their doctor.
Agent's remarks:	<ul style="list-style-type: none"> The form also contains remarks made by the agent about the proposer. The agent will give their analysis on the proposer with regard to their lifestyle, habits and hobbies. They should also mention the proposer's financial status and any other information that they think could be useful to the underwriter when ascertaining the risk.

B2 Medical examination report

A complete medical check-up on the proposer can be carried out by the insurance company or by a certified doctor. This is done to reduce the chances of adverse selection by the company, i.e. the selection of a large number of unhealthy individuals as against healthy individuals. The examination may be carried out because the sum insured, or the proposer's answers to the health questions, mean that the underwriter wants more information on the risk before agreeing to accept it.

It may be the policy of the insurer to ask for a medical examination report on all proposed risks of a certain type.

Some insurers classify proposers according to their age. The number of medical examinations requested for those in the lowest age bracket will be low, steadily increasing until those in the highest age bracket are required to have a comprehensive medical check-up. We will look at medical and non-medical underwriting further in section D.

B3 Insurance agent

The insurance agent interacts directly with the proposer and so is in a good position to judge their risk profile. The agent has the opportunity to assess the answers of the proposer and determine their truthfulness, and the underwriter can seek the help of the insurance agent regarding the proposer at any time.

B3A Agent's Confidential Report

An 'Agent's Confidential Report' needs to be prepared by the insurance agent. If the amount of insurance cover required is standard, then the agent prepares a report based on the proposer's financial position, number of dependants, lifestyle, habits and hobbies. If the amount of insurance cover required is larger than usual, then the agent needs to prepare a more detailed report. The information for this report is collected through the family, friends and neighbours of the proposer.

Sometimes, these reports are required to be prepared by senior employees of the insurance company (such as the Unit Manager or the Sales Manager) and can be referred to as a 'Moral Hazard Report'.

These days there are some specialised inspection agencies that can carry out the inspection for the insurer. These companies prepare and present a report on the proposer's employment history, financial position and creditworthiness.

B4 Additional information

The underwriter seeks additional information when the amount of the insurance cover required is larger than average or the risk profile of the proposer is high.

Where the amount of insurance cover sought by the proposer is relatively high, then additional information on the proposer's medical report can be requested. Special reports from senior officials and the insurance agent on the proposer's income, occupation, lifestyle, habits etc. will also be required to evaluate the risk involved in the proposal.

B5 Report from tax authorities

The underwriter can refer to information from the income tax authorities and tax consultants regarding a proposer's income tax records, tax deduction report etc. This will enable the underwriter to determine whether the proposer has any outstanding tax commitments or has defaulted on them in the past.



Suggested activity

Collect a proposal form from any life insurance company. Prepare a list of the details/information that the form asks for. What kind of information is the proposal form asking for?

C Moral and physical hazard

We looked at hazard in chapter 2, where we saw that it is divided into two types:

- physical hazard; and
- moral hazard.

In this section we will return to this topic to consider in more detail how moral and physical hazard apply to life and health insurance.

C1 Physical hazard

Physical hazards refer to the physical characteristics of the risk associated with the life insured. We looked briefly at some of these in chapter 2.

Some of the physical hazards that relate to life insurance are as follows:

Age

The age of an individual is an important hazard when determining the risk associated with the life insured. The higher the age of the proposer, the higher will be the probability of their natural death.

Occupation

The proposer's occupation can increase the chance of their death. Certain jobs carry more risk to health, of death or of injury, than others and would be considered less attractive by the insurance company than less risky occupations. The hazards of different occupations can be considered on the following criteria:

Environmental:	<ul style="list-style-type: none"> • Exposure to danger or violence etc. can result in dangerous living conditions of the person, which increases the chances of early death.
Physical conditions:	<ul style="list-style-type: none"> • The proposer works in poor physical conditions, such as a dusty and poorly ventilated factory. The chances of illness increases for the proposer.
Risk from accident:	<ul style="list-style-type: none"> • The proposer works as a driver or with machinery, which increases the risk of accidents.



Example

The proposer's occupation may be classified as hazardous if they work in any of these: coal mines, ferrous metallurgical industries, chemical industries, explosives factories, or if their work involves: climbing poles, working at heights, working with high voltage electricity etc.

Gender

Some companies charge a differential rate for females based on their profile, background etc.

Residence

The security of a proposer's home is an important physical hazard. If the neighbourhood where the individual lives is considered to be an unsafe, violent and dangerous area, then the risk to individual life increases.

Habits

Habits such as drinking, smoking and the use of tobacco are considered to be hazardous to health. They can increase the risk that a proposer will die early or suffer a serious illness.

Hobbies

If the individual indulges in dangerous hobbies, such as bungee jumping, car racing, mountain climbing, sky diving, scuba diving etc. then the risk to the individual's life increases. These kinds of adventurous sports are less attractive to the insurance company.

Physical characteristics

The physical characteristics of a person are used to determine the health of the proposer. Data regarding their height, weight, size etc. can determine how healthy the individual is.

Example

Ravi's height is 153 cm and his weight is nearly 80 kg. This shows that he could be overweight. This increases the chance of him developing heart disease and other ailments, such as diabetes and high blood pressure.

**Medical condition**

When carried out, a complete health check-up of the proposer will check their blood pressure and pulse to determine their medical fitness. A blood and urine sample is also taken to check if the proposer has developed certain diseases.

Physical handicap

Physically handicapped persons are also considered to present an increased physical hazard as their disability may increase their risk of an early death.

Medical history of the family

Certain illnesses, such as diabetes, a tendency to suffer from heart disease and some cancers are hereditary in nature. If a family member suffers from such an illness, then the chances that the proposer may also suffer from it increases.

Personal history

The personal history of the individual with respect to their health records, habits, lifestyle, credit history etc. are also important criteria.

C2 Moral hazard

Moral hazard is more difficult to define than physical hazard because it relates to the **conduct, attitude and/or intentions** of the proposer. It is also hard to minimise or correct poor moral hazard.

The following examples illustrate the nature of moral hazard in relation to life insurance:

- reckless or careless attitude to health and personal safety;
- previous history of dishonesty (perhaps criminal activity that is revealed by checking court records); and
- previous claims history if it reveals a history of fraudulent/frequent claims, bankruptcy or other financial difficulty.

Fraud and moral hazard

Intention to commit fraud is an aspect of moral hazard that life insurance underwriters need to pay particular attention to.

Underwriters will be alert to proposals for life insurance which display certain characteristics which, based on their knowledge and experience, are possible indicators of fraudulent intentions. The following are some examples:

- The proposer is requesting insurance for a fairly large amount at a later stage of their lifecycle.
- The insurance is being taken out by an individual with no dependants.
- The insurance policy is insuring a non-earning family member (because the death of a non-earning member does not affect the livelihood of the dependants).
- When the nominee of the policy is not among the dependants of the insured.
- When the proposer is seeking insurance for an amount which is much higher than their income.
- If the past premium payments of the individual are much higher than they are capable of paying based on their income.
- When the medical check-up is carried out at a different place from the place of residence.
- If any aspect of the relationship between the agent and proposer causes the underwriter concern.

Underwriters use the information described in section B to help them assess the circumstances presented by the proposer.



Question 4.2

Can the area where the proposer lives be considered a physical hazard? Give reasons to support your answer.

D Financial, medical and non-medical underwriting

D1 Financial underwriting

Underwriters will pay careful attention to the financial aspects of a proposed risk for reasons other than to identify any fraudulent intentions. As we shall see, financial underwriting works to cap the amount of life insurance an individual can get. The amount of life insurance that an individual is eligible for can be arrived at through the 'Human Life Value' (HLV) concept. The HLV concept tries to measure the economic value of a person in monetary terms. More details on HLV are covered in section E of this chapter.

Financial underwriting is used to make sure that the person who is being insured qualifies for an amount of insurance that does not exceed their insurable interest. An individual's personal and family income is considered for financial underwriting.

If an individual is seeking a sum insured which is way beyond their income, then an underwriter needs to evaluate whether the amount of insurance cover being asked for exceeds the insurable interest. As we know from chapter 3 part 1, section B, insurable interest must exist for a life insurance contract to be valid. Insurable interest means that there is a firm reason behind the amount of life insurance that is being applied for. The higher the sum insured, the more justification will be required by an underwriter. Typically this means that the amount of insurance that is available to any proposer is capped at a certain point, over which they have no real justification for coverage.

Factors analysed under financial underwriting include the individual's income, age and net worth etc.

Insurance companies offer two kinds of insurance policies: one which requires medical underwriting and one where no medical underwriting is required.

D2 Medical underwriting

Medical underwriting is where the underwriter actually researches the health and medical history of the individual in a detailed and accurate way by checking the medical records of the proposer for the past few years and insisting on a medical check-up. This medical check-up can be either general or more comprehensive depending upon the age of the proposer, their medical history and the amount of insurance cover they are asking for.

If the proposer is found to be in perfect health, then they would be considered as low risk by the underwriter.



Be aware

Insurance companies maintain a schedule that determines the degree of medical tests required depending upon the proposer's age, medical history and the amount of insurance cover they are requesting.

D3 Non-medical underwriting

As the name suggests, under this category no medical examination is required for insurance to be agreed. The medical assessment of the proposer can be both a time consuming and expensive exercise. Also, in many cases (mostly with proposers living in rural areas), specialised medical services would not be available so it can be difficult for a proposer to obtain a medical report from a qualified doctor.

In non-medical underwriting, instead of a medical report the insurance is based on the physical characteristics of the individual, such as age, height, weight etc. as revealed by the proposal form. The proposal form is usually more detailed for this kind of insurance.

All proposals are checked by agents, field officers and branch officials. In addition, a high ranking official may be called upon to submit a special report.

If the proposer is in regular employment, then the leave records of the employee can be assessed for insurance. If a personal statement or the family history reveals the existence of a medical condition(s), then a medical examination may be requested.

Non-medical insurance underwriting carries more risk to the insurer as proposers may have a medical condition that would have been revealed by a medical examination, but which does not come to light in the proposer's answers on the proposal form. The chances of adverse selection may be greater with this method of underwriting and, as a consequence, these policies may be priced at a higher rate.

Safeguards adopted in non-medical business

Because the chances of adverse selection are greater with medical underwriting, insurance companies practice the following safeguards:

- a restriction on selection (female lives);
- putting limits on the sum insured;
- a restriction on maximum entry age;
- a restriction on the maximum term for which the policy can be issued;
- a restriction on the maximum age at maturity;
- a restriction on the types of insurance plans allowed;
- restrictions on high risk plans;
- limiting cover to certain categories of lives (based on education, social and economic background);
- restricting the class of lives eligible (to individuals employed in reputable organisations, who have undergone a medical exam at the time of recruitment, for whom leave records are maintained, and they have completed at least one year of service etc.); and
- requiring a moral hazard report from an officer of the insurer.

Suggested activity

Visit an insurance company and collect a proposal form for medical insurance and non-medical insurance. What sort of additional information is asked for by the non-medical form compared to the medical form? Prepare a summary report to help you to understand the difference in the two approaches.



E Human life value (HLV)

The key role of life insurance is to provide protection for the family of the insured, should the insured die unexpectedly. It does this by paying out the sum insured under the policy, should the worst happen. But how much should this sum insured be? How much is the insured's life worth?

E1 What is human life value?

Ask a person how much their life is worth and without a second thought they will say that human life is priceless and no amount of money can compensate for the value of a human being. But insurance companies and their agents will differ. To arrive at the amount of insurance cover that a person should take out they need to assign a monetary value to human life. This is called human life value (HLV). Like real estate, equities/shares or commodities, a human being is also an asset and has the potential to generate income. Through **human life value (HLV)** the insurance company tries to measure the economic value of a person or how much the person is worth in monetary terms.

In life insurance, HLV is used as a yardstick to determine how much life insurance cover a person should have. The correct cover will ensure that if the person dies today, there will be no economic loss to their family. Of course, emotional loss cannot be compensated for. The lump sum amount that the person's family will get from the insurance company will compensate for the future income of the life insured; the income they would have earned had they survived.

E2 How much life insurance should one have?

What many people often do not realise is that, in spite of having a number of insurance policies, if the amount of cover provided by the individual policies is small they can be grossly underinsured. So what then is the correct amount of life insurance cover that a person should have? We can answer this by looking at the different ways of arriving at human life value (HLV). The amount of life insurance cover that a person should have should be equal to their HLV.

E2A Income replacement method

This method takes into consideration the future income earning potential of a person during the remaining years of their working life, so that in the event of their untimely death their family will not suffer financial loss.

This is a two-step process:

Step 1:	<ul style="list-style-type: none"> Calculate the total future income the person will be able to earn during their remaining working years.
Step 2:	<ul style="list-style-type: none"> Calculate the present value of this amount (arrived at in step 1) as at today. This is the person's human life value. The life insurance cover that the person should take out should be equal to this HLV figure. In the event of their untimely death, this method captures the future income potential of the person, which they would have earned had they survived until retirement. In summary, this method equates human life value to the present value of future earnings.



Example

Rajesh is a 35-year-old man earning Rs. 4,00,000 per annum. Rajesh's family consists of his wife (housewife), 4-year-old daughter and his retired parents who are now dependent on him. The net contribution made by Rajesh to the family is Rs. 25,000 per month (Rs. 3,00,000 per annum) after deducting taxes and personal expenses.

Let's assume that Rajesh's salary will increase by 5% every year and his family contribution (Rs. 3,00,000) will also increase by 5% every year.

Annual income	Rs. 4,00,000 per annum
Expected rise in salary	5% p.a.
Net income after taxes and personal expenses	Rs. 3,00,000 per annum
Current age	35 years
Remaining working years	25 years
Future value of earning potential	Rs. 1,43,18,129
Discount rate (PPF Rate)	8%
Present value of future earnings	Rs. 20,90,703

Rajesh's worth to his family is Rs. 1.43 crore over his remaining working life if he survives until he is 60 years old. But if something happens to Rajesh today, his family stands to lose this money.

We need to find the value of this Rs. 1.43 crore as at today. So if we take the discount rate as 8% (risk-free PPF rate) then the value of Rs. 1.43 crore as at today equals Rs. 20,90,703 (Rs. 20.90 lakhs).

This effectively means that a one-time amount of Rs. 20.90 lakhs invested at 8% interest rate for 25 years will yield Rs. 1.43 crore on maturity.

Therefore the figure of Rs. 20.90 lakhs is Rajesh's human life value (HLV) and he should take out life insurance cover of Rs 20.90 lakhs to protect his future income.

E2B Simple method

Alternatively, there is a simpler method to calculate HLV than using the income replacement method.

Example

Let's take the same example of Rajesh again. Let's assume that the current Bank Fixed Deposit (FD) rates in the market are 8%. So if someone invests Rs. 37,50,000 (Rs. 37.5 lakhs) in a Bank FD at 8% per annum interest rate, the yearly interest earned will be Rs. 3,00,000 (3 lakhs).

So Rajesh's HLV is Rs. 37.5 lakhs and he should take out life insurance of Rs. 37.5 lakhs so that in the event of his untimely death, his family will receive a payment of Rs. 37.5 lakhs. If they invest this in a Bank FD at 8% interest rate, it will give them Rs. 3,00,000 yearly income. This Rs. 3 lakhs per annum will substitute Rajesh's yearly contribution of Rs. 3 lakhs and take care of the family's expenses in his absence.

The table below explains the calculation of human life value for Rajesh:

Annual income	Rs. 4,00,000 per annum.
Taxes & personal expenses	Rs. 8,000 per month
Net monthly contribution to family	Rs. 25,000 per month
Net annual contribution to family	Rs. 3,00,000 per annum
Bank FD rate	8%
Human life value calculation	$3,00,000 / 8\%$ $= 3,00,000 / 0.08$ $= 37,50,000$
Insurance amount required (HLV)	Rs. 37,50,000

Rs 37,50,000 invested in Bank FD at 8% interest rate will give annual return of $37,50,000 \times 0.08 =$ Rs. 3 lakhs per annum.

This method will ensure that the family will continue to receive Rs. 3 lakhs per annum as long as Bank FD rates stay at 8%. This method assumes that the annual salary will remain constant at Rs. 4,00,000 throughout, and does not take into consideration any expected increases in salary. It also assumes that Bank FD rates will remain constant at 8% throughout, and does not take into consideration the increase or decrease in interest rates.

Be aware

Human life value is not a one-time calculation. It is an ongoing process which needs to be revisited from time to time. As age increases human life value diminishes.

F Liens

There are certain cases where the underwriter will feel that the risk associated with a person might decrease over time. In such cases, the underwriter can accept the proposal with a lien. As the risk is assumed to diminish over a period of time, the lien is operable for that period on a diminishing basis. A lien is generally used as a substitute to charging a high premium for a high risk.

In simple words, if the insurance company categorises the proposer as high risk because their physical characteristics do not satisfy the standard ones as determined by the insurance company, then it will charge the proposer a high premium. However, the proposer has an option to request a lien. If the lien is granted, then for a certain period, if something were to happen to the proposer, the insurance company would be liable to pay only a restricted amount of the sum insured.

Example

In the case of a diminishing lien of 20% for the next five years, the lien will cease to exist after the completion of the five years. In other words, from the sixth year onwards the insurance company will pay out the full sum insured in the event of a claim.

If the insured dies within the lien period, then the insurance company will not have to pay the full sum insured.



The guidelines for liens which are normally followed by insurance companies are:

- the lien should diminish by an equal amount over a specific period of time; and
- if the term of the policy is a multiple of three, then the lien operable is one third of the term of the policy.

The conditions under which a lien can be applied differ amongst insurance companies. Generally a company imposes a lien if it considers the applicant to present an extra risk because their physical characteristics do not match the standard ones as determined by the company.

The following case study will help to explain the concept of liens:



Case study

Mukesh Gupta is 31 years old and wants to take out a life insurance plan from IGP insurance company. The company in their initial enquiry finds out that Mukesh is underweight. IGP insurance company categorises Mukesh as falling into the high risk category. The company agrees to provide insurance to Mukesh, in spite of his risk profile, if he agrees to pay a higher premium.

Mukesh instead asks for a lien to be imposed, and so IGP life insurance company imposes a decreasing lien of 15% for three years.

Analysis

1st year: If Mukesh dies within the first year of taking out insurance, then only 85% of the sum insured will be payable by the insurance company.

2nd year: If Mukesh dies in the second year of taking out insurance, then only 90% of the sum insured will be payable by the insurance company.

3rd year: If Mukesh dies in the third year of taking out insurance, then only 95% of the sum insured will be payable by the insurance company.

4th year: No lien is operative. If Mukesh now dies, the insurance company will pay the full sum insured.

G Pricing and calculating the premium

Pricing refers to the calculation of the premium that will be charged on the insurance policy.

The pricing of the insurance policy is an important decision for the insurance company and it will have a number of prime objectives in mind in this respect.

In addition to being concerned about charging premiums that are sufficient to meet claims, expenses and produce profits at the desired level, the company will also be keen to ensure that premiums are **competitive** so that it does not lose business to other insurance companies.

It will also consider the **process** of calculating the premium to be charged with the aim of keeping it simple, easily understood and not needing to be changed too frequently.

For life insurance the premium charged is based on the mortality rate as revealed in the mortality tables (you will remember that we introduced these in chapter 2, section B2), and we will look at how insurers use these tables and rates and how the premium to be charged is actually calculated later in this section. First, however, we will discuss how insurance companies decide what the price of their policies will be.

G1 Pricing elements

Bearing in mind the main objectives of the company, various other factors will affect the price the insurance company will charge for its cover. These are the pricing elements and we will look at these briefly now. Later we will see how these relate to how the premium is calculated.

Mortality rates

We have already mentioned that insurers use mortality tables to help calculate the premium. These tables also contain mortality rates, which in simple words can be defined as the probability that a certain individual will die before their next birthday. We will look at how mortality tables and rates are used to calculate the premium in section G2A.

Loading

All companies incur expenses in going about their business and insurance companies are no different. The premium is the key source of income for an insurance company and so the premium needs to cover the cost of meeting these expenses. The addition of these expenses to the premium is called loading.

Income from investment of premium

The premiums that are collected by insurance companies for traditional plans are invested as mandated in the **Insurance Act 1938**. The profits they earn from their investment can help to cover the insurance company's expenses and so can be taken into account when considering the price.

Benefits promised

The pricing will depend upon the benefits promised by the company. The larger the benefits offered by the insurance company, the higher the premium will need to be to cover the cost of providing that benefit.

With-profit policyholders pay a slightly higher premium for the benefit of sharing in the bonuses and are generally rewarded well by bonus declarations.

Premium plan being taken

The policyholder can pay the premium in a number of ways:

Single premium plan:	<ul style="list-style-type: none"> In this plan, the policyholder pays a single lump sum payment at the inception of the policy. The premium amount should be sufficient to meet the administrative and other expenses during the entire term of the policy.
Level premium plan:	<ul style="list-style-type: none"> In this type of plan, the policyholder pays the same amount of premium for the entire duration of the policy. When pricing this sort of policy the insurance company will need to allow for the time value of money, in other words it must be sufficient to meet future claims, future administration and the effects of inflation. Many life insurance policies are on a level premium basis and we will look at how the level premium is calculated in more detail in section G2B.
Flexible premium plan:	<ul style="list-style-type: none"> Insurance companies also allow the policyholder to choose a flexible premium payment plan, where the policyholder can pay the premium amount at their convenience. They can choose whether they wish the premium to remain the same over the term or to change the amount of premium paid based on affordability. The premium amount can generally increase by 5% annually, but the exact terms and conditions for flexibility depend upon the insurance company.

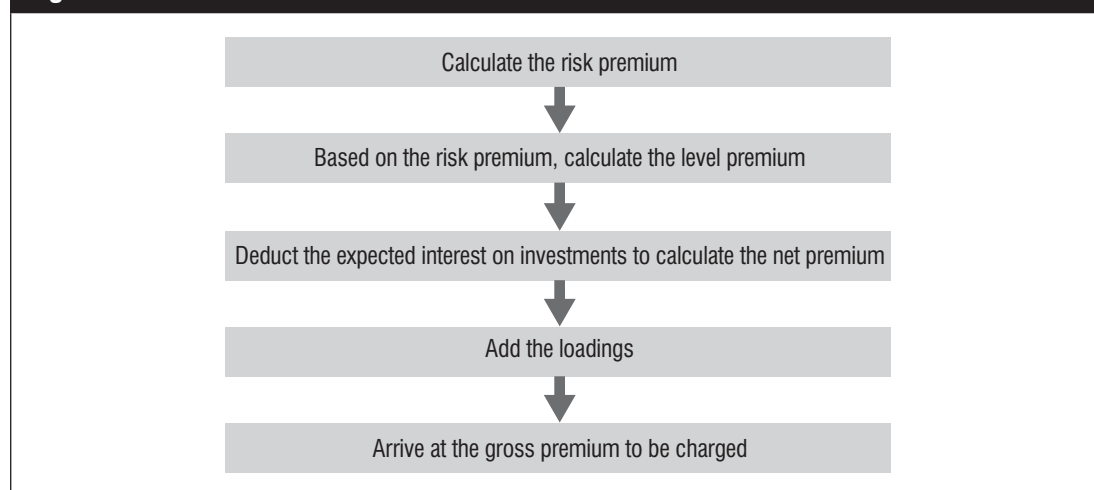
All of these will influence the premium that is finally charged to the policyholder.

Question 4.3

What is a lien in insurance?

**G2 Calculating premiums**

The process of calculating the premium is as follows:

Figure 4.3**G2A Calculate the risk premium**

The life insurance premiums collected by the insurance company are kept in a single pool, known as the common fund or life fund. All the future claims on the company are settled using this common fund. Therefore, the insurance company has to make sure that there is enough in the common fund to meet those claims.

Determining the correct amount for the common fund is a difficult task, as no one can accurately predict the future. However, as we have seen, using the statistics on death rates from previous years, insurance companies can now estimate fairly accurately the probability of an individual dying before their next birthday. This probability – known as the mortality rate – is used to calculate the risk premium.



Be aware

A mortality table shows for each age the number of persons living at that age and the number of people dying at that age. It is based on death statistics collected over the past 100 years or more.

Mortality tables differ among insurance companies.

The mortality rate is the probability that a certain person will die before their next birthday.

Mortality tables are prepared by mathematicians, known as actuaries, who determine the premium to be charged, based on mortality rates.

The risk premium is calculated using the mortality rates in the mortality table of the respective insurance company. The formula is:

Figure 4.4

$$\text{Risk premium} = \text{Mortality rate} \times \text{Sum insured}$$

The risk premium is the premium that has to be charged just to meet the claims of those who die during the year.

To see how this works, let's look at a case study.



Case study

Ajay Gupta, an insurance agent, has sold three life insurance policies.

The **first** insurance policy has been sold to a 25-year-old single man who has recently started to work for a reputable IT firm after completing his engineering degree. He has taken a sum insured of Rs. 5,00,000.

The **second** policy has been sold to a 36-year-old man. He is married and has two children. The individual has been insured for Rs. 8,00,000.

The **third** policy has been sold to a 48-year-old businessman who has insured his life for a substantial sum of Rs. 40,00,000.

The agent, Ajay Gupta, is calculating the premium for the three clients. Let's see how he goes about doing so:

Client 1: Age = 25 years. Sum insured = Rs. 5,00,000. Mortality rate = 0.0001

Risk premium = Rs. 50.

Client 2: Age = 36 years. Sum insured = Rs. 8,00,000. Mortality rate = 0.00081

Risk premium = Rs. 648.

Client 3: Age = 48 years. Sum insured = Rs. 40,00,000. Mortality rate = 0.00091

Risk premium = Rs. 3,640.

We can see that the premium charged differs with the mortality rate and the sum insured. The larger the sum insured, the higher the premium. We can also see that the mortality rate increases with the age of the insured person.

G2B Based on the risk premium calculate the level premium

As we saw earlier, with many life insurance policies the insurance company charges the same amount of premium for the entire policy term: it cannot be changed. Therefore, the premium set will need to take into consideration the future expenses and claims that the insurance company will have to pay. It will also need to take into account the effects of inflation, which means that the value of money decreases over time, so the premium the policyholder pays now will not hold the same value in later years. This means that the cost of inflation will be borne by the insurance company in the later years of the policy. Consequently, the premium will need to be set at a higher level than would appear to be appropriate initially. The higher premium collected in the early years is put into a reserve by the insurance company to meet the cost of future claims and expenses.

Let's look at the basic concept of level premiums with the help of an example.

(Please note: this is just a sample scenario)

Table 4.1

	Claim payment	Expenses	Segregation of premium
Year 1	Only a minimal claim amount will be paid.	Administrative expenses will be high.	Some of the premium amount received will be reserved for future. The rest will be used for claim payment and the expenses.
Year 2	The amount paid will be higher than the 1st year.	Administrative expenses will high but lower than Year 1.	Reserve fund will increase, but the amount deposited will be less compared to Year 1.
—			Reserve fund increases.
—			Reserve fund increases.
—			Reserve fund increases.
Year 10	The amount paid will be high.	Administrative expenses will be low.	The entire premium collected for that year is used for the payment of the claims and expenses. No amount is transferred to the reserve fund from the premium collected in that year.
Year 15	The amount paid will be high.	Administrative expenses will be even lower.	The premium collected for that year is not sufficient to meet the expenses and claims. Hence an amount is taken from the reserve fund to meet the deficit.
—			Reserve fund decreases.
—			Reserve fund decreases.
Year 20	The insured dies.	Expenses for processing the claim along with other administrative expenses.	The funds from the premium and reserve funds should be sufficient to pay the claim.

Remember, this table is only provided to give a simple understanding of the concept of level premium. In actual practice, the calculation of the premium is a much more complex process. The above table contains the calculation for a single life insurance policy, but insurance companies calculate the premium payment for a **group** of policies. The claims are paid from the common fund and the reserve fund is maintained for a **group** of policies.

Hence the reserve will be calculated by grouping homogeneous policies, based on the same age group, risk associated, type of policy taken, policy term etc. The consolidated amount for the reserve fund is determined and this amount is then divided by the number of policies.

In an ideal scenario the reserve fund will increase in the initial years, break even in later years, and then begin to diminish in later years until it finally becomes nil. But new proposers go on enrolling and the premiums and claims keep flowing in and out of the fund.

G2C Calculate the net premium

The premium that is collected by the insurance companies for traditional plans is invested in securities as mandated in the **Insurance Act 1938**. The insurance companies earn interest as income from their investments.

This interest earned is also considered for the premium calculation. The actuaries make an estimate of the amount of interest that the investments are expected to earn. Based on the estimate of these interest earnings the premium charge can be reduced.

Figure 4.5

$$\text{Premium} - \text{Interest earnings} = \text{Net premium}$$

There are some important points to remember when thinking about how the premium is adjusted for the interest earned on its investment:

- the premium is invested, until it is required to pay claims;
- for level premiums, the reserve funds are also invested; and
- the interest expected to be earned also depends upon the term of the policy.



Be aware

The actuaries follow a conservative approach for calculating the expected rate of interest on investments. The expected interest is adjusted with premiums.

G2D Add loadings

A further adjustment is made to the net premium in order to calculate the gross premium (the actual premium that is paid by the policyholder). This adjustment is to take account of the expenses and profit of the insurance company. This process is known as loading.

The following items are added in loading:

- administrative expenses, such as the cost of running the building, employees' salaries, etc.;
- medical expenses incurred for medical underwriting;
- processing fee;
- expenses involved in the renewal of the policy;
- claim settlement expenses;
- profit margin; and
- bonus loading for with-profit policies.



Be aware

Maximum expenses are incurred at the time of inception of the policy. These expenses have to be spread over the entire term of the policy when determining the premium.

G2E Arrive at gross premium to be charged

The type of policy – whether it is a single premium plan, a level premium plan, flexible premium plan or an annually renewable plan – will affect the gross premium to be charged. For instance, when calculating the premium for a single premium plan the insurance company will need to determine how many policyholders are likely to take up the plan and how many death claims it will expect to have to pay during the policy term.

Similarly, whether the premium is to be paid annually, semi-annually, quarterly or monthly will also need to be taken into account. Most insurance companies first calculate the premium for annual payment, and then make a further adjustment for monthly payment. Insurance companies generally collect a 'frequency loading' if the premium is not being paid annually.



Example

Let's assume that an insurance company charges a 5% frequency loading for a monthly premium plan. The annual gross premium has been calculated as Rs. 25,000. So the monthly gross premium that the policyholder will have to pay will be:

$$25,000/12 \times 1.05 = \text{Rs. } 2,187.50$$



Be aware

Some insurance companies calculate the gross premium inversely. That is, they first calculate the monthly premium and then calculate the annual premium. Certain discounts are allowed for annual premiums. The reason for the discounts is that the higher the frequency of premium payment, the higher the administrative cost for the insurance company. So discounts are offered by insurance companies to encourage policyholders to choose an annual premium payment plan.



Question 4.4

Briefly define the following terms:

- loading;
- frequency loading.

H Calculating bonuses

The policyholders who purchase participating insurance policies (with-profit policies) are entitled to participate in the profits of the insurance company. These profits are distributed to the policyholders in the form of bonuses. There are four types of bonus given by insurance companies.

- simple revisionary bonus;
- compound revisionary bonus;
- terminal bonus; and
- interim bonus.

H1 Simple revisionary bonus

The insurance company declares this bonus and adds the declared bonus to the sum insured. This is paid out at the time of the claim or the maturity of the policy, or at any other time as specified by the insurance company.

Example

If ABC insurance company declares a bonus of 5% for every Rs. 1,000 sum insured then the bonus will be Rs. 50. If Smita Patel has bought a policy for a sum insured of Rs. 1,00,000 then her share of the bonus will be Rs. 5,000. This amount declared will remain the same until the time it is paid out, unlike a compounded bonus where the amount is added to the sum insured and the next year's bonus is calculated on this enhanced amount.



H2 Compound revisionary bonus

Under this method the insurance company computes the annual bonus on a compound interest basis, i.e. the bonus is added to the sum insured and the next year's bonus is calculated on the enhanced amount.

Case study

Rahul Khanna owns two participating policies of Rs. 5,00,000 each. Let's assume that on the first policy he gets a bonus using the simple revisionary method and on the second policy he gets a bonus using the compound revisionary method.

The insurance company has declared a bonus of 5% of the sum insured. Rahul has a sum insured of Rs. 5,00,000 so the bonus will be Rs. 25,000. Hence Rahul's payable maturity amount will increase to:

- sum insured for simple revisionary basis = Rs. 5,00,000 + Rs. 25,000 = Rs. 5,25,000.
- sum insured for compound revisionary basis = Rs. 5,00,000 + Rs. 25,000 = Rs. 5,25,000.

In the next year, the insurance company declares a bonus of 3% of the sum insured. This year Rahul's payable maturity amount will increase to:

- sum insured for simple revisionary bonus = Rs. 5,25,000 + Rs. 15,000 = Rs. 5,40,000.
(Rs. 15,000 is 3% of Rs. 5,00,000)
- sum insured for compound revisionary bonus = Rs. 5,25,000 + Rs. 15,750 = Rs. 5,40,750. (Rs. 15,750 is 3% of Rs. 5,25,000)

Note: in the above case the bonus in the case of the simple revisionary method will always be calculated on the sum of Rs. 5,00,000.

In the case of the compound revisionary bonus, in the first year the bonus will be calculated on the sum of Rs. 5,00,000 and this will be added to the Rs. 5,00,000. In subsequent years the bonus will be calculated on the increased sum and added to the amount it was calculated on.



H3 Terminal bonus

This bonus is given by the insurance company as an incentive to the insured to continue with the company long-term until the end of the policy. For long-term policies, of say 20, 25 or 30 years, the insurance company may give a terminal bonus on maturity along with the sum insured and the regular bonuses that are declared by the company every year. Some companies may declare the terminal bonus every year, but it accrues and is payable only on the maturity of the policy. This bonus is also known as a 'persistency bonus'.

H4 Interim bonus

A valuation has to be made every year by insurance companies, by law. Policies on which death claims are made or which mature between the two valuation dates also contribute to the surpluses, although this is disclosed only in the valuation made after their closure. As these policies have left the insurance company's books before the valuation date, they will not participate in the process of valuation. However, insurance companies pay an 'interim bonus' to such policies at the rates as at the last valuation. In India the payment of interim bonus is made mandatory under section 112 of the **Insurance Act 1938**.



Suggested activity

Visit the website of any life insurance company. Study the bonuses declared by the company for the past five years. How is the bonus distributed to the participating policyholders by the company?

I The agent's role in underwriting

Agents are in direct contact with the proposer and so have an important part to play in the underwriting process and are considered as 'primary underwriters'.

- The agent has to ensure that the proposal form submitted is completely filled out by the proposer. They also have to make sure that the questions have been answered honestly by the proposer as the proposal form is the basis on which the proposal will be accepted or rejected.
- If the agent is helping to complete the form, they should fill it out honestly and accurately. The answers provided should not be prejudiced in any case. The answers of the respondents should be recorded as objectively as possible and any elements of misinformation or incomplete information need to be avoided.
- Being in direct contact with the proposer, the agent is in a good position to assess why the proposer wants to take out insurance. If they feel that the proposer's intentions are not genuine, they should mention that in their report. As the agent conducts a personal discussion with the proposer and their family, the agent needs to assess the responses they give. If the proposer supplies information that seems to be contradictory, they need to question them further about it.
- The agent can help the proposer to calculate their human life value (HLV), to determine the amount of life insurance they should take. Taking life insurance as per the HLV calculation amount provides income protection to the family and helps it meet its financial liabilities, even after the income provider's premature death.
- The agent can speed up the underwriting process by submitting the required documents and the proposal form in a timely manner. Should an additional medical check-up be required, the agent should help the proposer make the necessary appointment with the doctor and ensure the doctor's report is submitted as quickly as possible.
- If the insurance proposal is accepted, the policy may be sent directly to the insured or given to the agent for delivery. The agent may still have a role to play even if the proposal is rejected. Although the insurance company will send a letter to the proposer explaining why their proposal has been rejected, the agent can get in touch with the proposer personally and explain the reason(s) for the rejection.



Question 4.5

What is the role of the agent when the underwriter rejects the proposal?

Key points



The main ideas covered by this chapter can be summarised as follows:

The process of insurance underwriting

- Underwriting is the name given to the procedure of assessing proposals and deciding whether to accept the risk and, if so, on what terms.
- Each company develops its own criteria and guidelines for the selection of risk.
- The insurance underwriting process includes the following steps: collection of information; analysis of the risk; estimating potential exposure; determining the probability of occurrence of loss; accepting or rejecting the proposal; classifying and rating the accepted policy in a risk group; and issuing the policy.

Obtaining the required information

- The underwriter can collect the information about the proposer from several sources such as the proposal form, medical examination report, agent's confidential report, additional information and a report from the tax authorities.

Moral and physical hazards

- Physical hazards refer to the physical characteristics of the risk associated with the life insured, e.g. age, occupation, gender, residence, habits, hobbies, physical characteristics, medical condition, physical handicap, medical history of family, personal history etc.
- Moral hazards refer to the attitude, state of mind or intentions of the proposer.

Financial, medical and non-medical underwriting

- Financial underwriting usually caps the amount of life insurance an individual can get. Financial underwriting is used to make sure that the person insured qualifies for an amount of insurance that does not exceed their insurable interest.
- For medical underwriting the underwriter needs to check the medical records of the proposer for the past few years and requires a medical check-up.
- For non-medical insurance, the proposal form is more detailed. In non-medical insurance underwriting, the insurance agent or a high ranking official may be called upon to submit special reports.

Human life value (HLV)

- In life insurance HLV is used as a yardstick to determine how much life insurance cover a person should have.
- The income replacement method of calculating HLV equates human life value to the present value of future earnings.

Liens

- Where the underwriter feels that the risk associated with a person might decrease over time they may accept such proposals with a lien.
- If the insured dies within the lien period, then the insurance company will not have to pay the full sum insured.

Pricing and calculating the premiums

- Pricing refers to the process of calculating the rate of the premium that will be charged on insurance policy.
- The process of calculating the premium is as follows:
 - calculate risk premium;
 - based on risk premium calculate the level premium;
 - deduct the expected interest on investments;
 - add loading; and
 - arrive at the gross premium to be charged.

Calculating bonuses

- Policyholders who purchase participating insurance policies (with-profit policies) are entitled to participate in the profits of the insurance company. These profits are distributed to the policyholders in the form of bonuses.
- There are four types of bonus given by insurance companies: simple revisionary bonus; compound revisionary bonus; terminal bonus; and interim bonus.

The agent's role in underwriting

- Agents play an important role in the underwriting process as they are in direct contact with the proposer. The agent's role in the risk selection process is particularly important.