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HOW TO ENSURE SUFFICIENCY OF FINANCIAL BACKING TO COVER FUTURE LOSSES ON RESIDENTIAL BUILDINGS IN EFFICIENT WAY?

Abstract: Paper deals with issues connected with financial backing to cover future losses on residential buildings. Three basic types of financial backing are judged: savings, credit and insurance. Particular advantages and disadvantages are discussed. Financial backing's creation costs calculation is introduced. Recommendations leading to the optimization of financial backing's structure are specified in the end of the paper.

Introduction

Owner, whether natural person, corporate body, municipality or state, has to take care of owned property properly. When we will focus particularly on existing buildings care consists among others in technical care and financial care. This paper will pay attention to financial care because ensuring the sufficiency of financial backing to cover future losses is one of the most important issues carried by owner. Sufficiency of financial backing protects people from unfavorable events and the unwanted actions of other people.

Types of Financial Backing

There are several ways how to ensure financial backing. Savings, credit and insurance are mostly used.

Term savings differs from saving. Saving generally means putting money aside (e.g. in the bank) whereas the savings refers to the money itself once saved.

Credit is the provision of resources by one party to another party where that second party does not reimburse the first party immediately, thereby generating a debt, and instead arranges either to repay or return those resources at a later date (e.g. granting a loan). [18]

Insurance is the collection of agreed financial amounts – premiums from one's own clients – the policy holders and insured persons. These funds make up a so-called insurance reserve. The moment that an event occurs to a client for which they have concluded an insurance contract; they receive a corresponding amount from this reserve. A part of the reserve is kept by the insurance company to cover their operational costs. The event that constitutes the trigger of a claim should be fortuitous, or at least outside the control of the beneficiary of the insurance. Whenever, insurance should be considered as the most important type of financial backing.

Apartment insurance, insurance for houses and apartment blocks, and insurance for country cottages should be taken into account. These are all related products which are only different in the type of property insured. They provide protection from situations of a natural element character, burglary and theft, intentional damage or destruction of property, damage by vehicles or injury to the owner of the insured home. [13]

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Comparison of Savings, Credit and Insurance

Each type of financial backing has certain advantages and disadvantages.

Savings

Main advantages of savings are low costs (credit and insurance include operation costs and profit of lender / insurance company) and direct interest in prevention. On the other hand disadvantages are mainly: big amount of money which cannot be invested in long-term investments as time deposit or obligation (money must be saved with high liquidity) and incidentalness of damage (creation the sufficient amount of savings requires time (usually in the course of years), but loss can occur immediately).

In the case putting the constant amount of money aside we can count “annuity future value”. Formula valid for annuity future value:

$$AFV = A_s * \frac{(1+i)^n - 1}{i} \quad (1)$$

where: AFV ... annuity future value, A_s ... one annuity amount, i ... interest rate, n ... period (in years).

Credit

Credit is advantageous by inutility of reserves thus money can be invested. Main disadvantages are: downgraded prevention of borrower, high costs (the cost of credit is the additional amount, over and above the amount borrowed, that the borrower has to pay; it includes interest, arrangement fees and any other charges) in addition there is no certainty that lender will grant the loan to borrower/applicant.

In the case of installment credit with constant installment (credit + credit interest) one partial installment is counted as:

$$AC = \frac{(1+r)^p * r}{(1+r)^p - 1} * D \quad (2)$$

where: AC ... annuity, D ... debt amount, r ... annual credit interest rate, p ... term of expiration.

Insurance

Thirdly, when using insurance we don't need to create reserves and money are at disposal immediately (insurance reserve is created by insurance company). On the other hand insured has to pay premium (the fee paid by the insured to the insurer for assuming the risk including insurer's overhead costs and profit). Insurance policies contain too many exclusion clauses. Insurers require limited risk (insurance benefit limit) of catastrophically large losses as well (typically, insurers prefer to limit their exposure to a loss from a single event to some small portion of their capital base or to absolute value). Insurer will not return already paid premium when no loss will occur. [13]

Total premium (premium insurance) depends on the amount of insurance coverage that clients buy and the price that insurance companies charge for that coverage. The price of

insurance is influenced by insurance companies' investment earnings (that's why the price differs among insurance companies). Insurance companies set their rates so that the sum of premiums and investment earnings will pay average level of claims and dividends. [8]

Total premium is the sum of partial insurance premiums (e.g. flood, windstorm, fire, hailstorm, landslide, fall of ice). E.g. flood insurance denotes the specific insurance coverage against property loss from flooding.

$$PI = \sum_{i=1}^n (PI_1 + PI_2 + \dots + PI_i + \dots + PI_n) \quad (3)$$

where: PI ... premium insurance.

Analogously, total insurance rate is the sum of partial insurance rates, thus quotation is:

$$IR = \sum_1^n IR_1 + IR_2 + \dots + IR_i + \dots + IR_n \quad (4)$$

where IR is total insurance rate as the sum of n partial insurance rates. Contemporary insurance practice distinguishes between basic insurance rate and flood insurance rate in Czech Republic. As mentioned before, insurance companies examine flood risk separately from other elemental risks (e.g. fire, windstorm, hailstorm). In such case quotation can be modified to:

$$IR = BIR + FIR_i = BIR + FIR_B * k_i \quad (5)$$

where: IR ... total insurance rate, BIR ... basic elemental insurance rate, FIR_i ... flood insurance rate for i -flood zone, FIR_B ... flood insurance rate for basic (1st) flood zone, k_i ... flood zone ratio.

Total annual premium depends on various criterions (coinsurance value, capital assured, basic insurance rate, flood insurance rate, insurance discount and additional insurance) as results from following quotation:

$$TAP = CA * (BIR + FIR_B * k_i) * \left(\frac{100 - DIS}{100} \right) * \left(\frac{100 + ADD}{100} \right) * \left[1 - \frac{1}{720} * \{40,228 * \ln(x) - 158,58\} \right] \quad (6)$$

where: TAP ... total annual premium, x ... coinsurance value, CA ... capital assured, BIR ... basic insurance rate, FIR ... flood insurance rare, DIS ... insurance discount, ADD ... additional insurance.

Combining the Financial Backing

Therefore, how to ensure sufficiency of financial backing to cover future losses in efficient way? The main idea is disadvantages suppression and advantages enjoying by combination of savings, credit and insurance as illustrated in Fig. 1. Insurance should be considered as the most important component of financial backing.

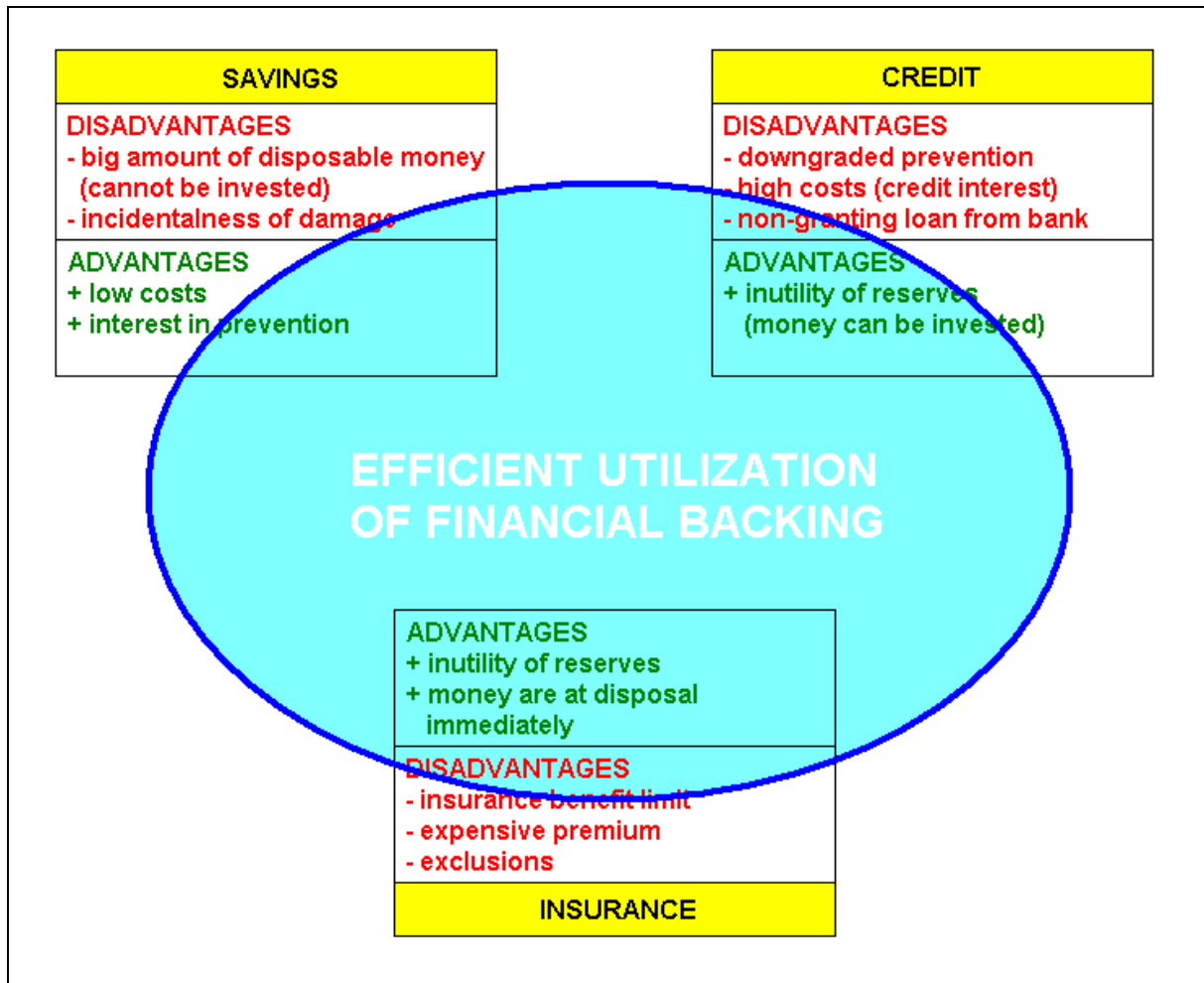


Fig. 1: Efficient utilization of financial backing

Financial Backing's Structure vs. Financial Backing's Creation Costs

We have to distinguish between financial backing's structure and financial backing's creation costs. House owner has two basic goals:

- 1) ensure sufficiency of financial backing and
- 2) ensure efficiency of expended money, i.e. pay as few as possible to create financial backing.

Financial Backing's Structure

Financial backing can be distributed among own sources and extraneous sources. When savings, credit and insurance are taken into account, financial backing's structure comprises:

- insurance benefit (indemnification - when insured parties experience a loss for a specified peril, the coverage entitles the policyholder to make a claim against the insurer for the covered amount of loss as specified by the policy) - IB,
- own savings - S,
- interest from invested savings (investment with high liquidity) - IS,
- credit (amount of debt) – C and
- payments resulting from insurance policy (indemnification over upper insurance benefit limit, coinsurance) - PCI.

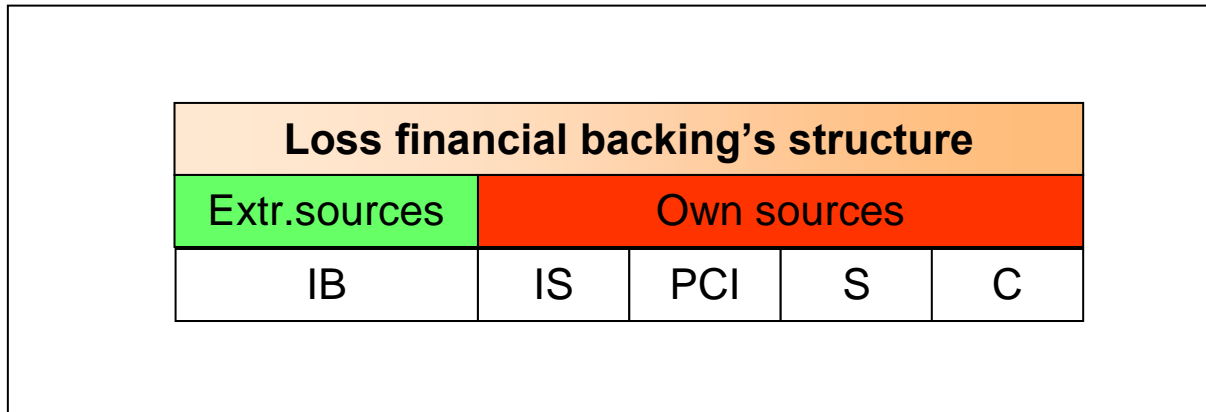


Fig. 2: Loss financial backing's structure

Financial Backing's Creation Costs

To ensure efficiency of expended money house owner has to minimize costs of financial backing's creation. Such costs are represented by:

- premium payments – PP,
- payments coming from insurance policy – PCI,
- savings – S,
- credit – C and
- credit interest - CI

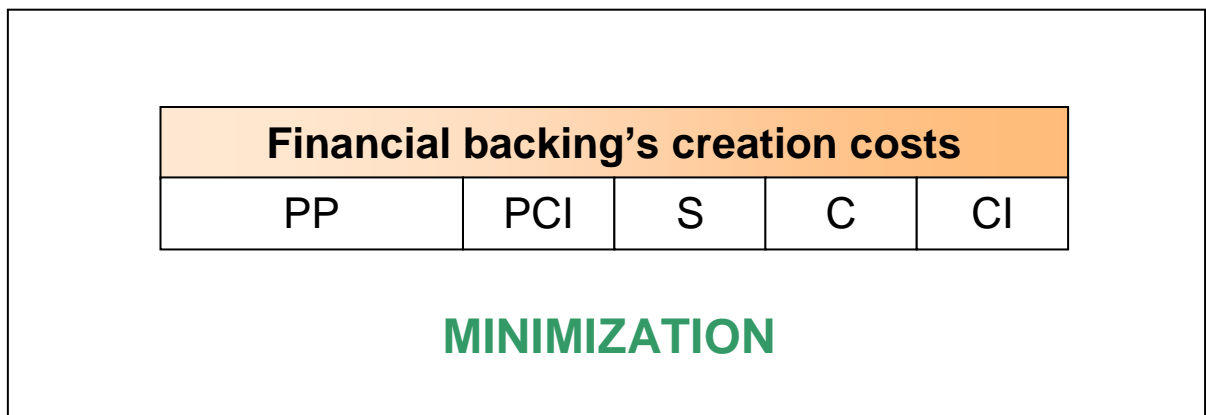


Fig. 3: Financial backing's creation costs

Factors Affecting Financial Backing's Efficiency

There is a lot factors affecting financial backing's efficiency. Some factors are general, some of them are uniquely related to particular financial backing's type.

General factors:

- duration of examined period,
- value of property,
- loss frequency,
- extent of particular losses,
- location.

Insurance factors

- extent of insurance coverage (insured hazards),

- flood zone,
- insured value,
- deductions from premium (e.g. fire-resistant materials),
- additional premium (e.g. insufficient security against theft),
- premium amount,
- coinsurance value,
- upper insurance benefit limit.
- Savings factors
- interest rate of invested savings,
- limited capability to create savings.
- Credit factors
- interest rate of credit interest,
- ability to repay the debt.

Calculation of Financial Backing's Creation Costs

Even following formula for financial backing's creation costs calculation can be used in practice we have to take into account few limiting conditions. Those conditions are connected e.g. with formulas (1) and (2), thus formulas used for calculation of savings and credit.

- saving annuity amount is constant,
- interest rate of invested savings is constant,
- savings will be used to cover losses at the end of examined period,
- constant installment of credit + credit interest,
- interest rate of credit interest is constant,
- doesn't take into account distribution of losses in time (issue related with savings),
- all losses pass condition of insurance event.

Insured value can be different from value of property. In such case, property is insured only within the range of corresponding rate:

$$\frac{\text{insured value}}{\text{value of property}} \quad (7)$$

(also called as underinsurance coefficient). When taking factor of underinsurance into account, formula for total premium (throughout the whole examined period) will be:

$$TP = n * \left\{ VP * \frac{\sum_1^m PL_j - A_s * \frac{(1+i)^n - 1}{i} - AC * \frac{(1+r)^p - 1}{(1+r)^p * r}}{\sum_1^m PL_j} \right\} * (BIR + FIR_B * k_i) * \left[\left(\frac{100 - DIS}{100} \right) * \left(\frac{100 + ADD}{100} \right) * \left[1 - \frac{1}{720} * \{40,228 * \ln(x) - 158,58\} \right] \right] \quad (8)$$

Table 1: Summary of used symbols

Symbol	Description	Unit of measure
TP	Total premium	Currency
N	Duration of examined period	Years
VP	Value of property	Currency
PL_j	Particular loss	Currency
M	Amount of losses during examined period	-
A_s	One annuity amount of savings	Currency
I	Annual savings interest rate	%
AC	Credit annuity	Currency
R	Annual credit interest rate	%
P	Term of credit expiration	Years
BIR	Basic elemental insurance rate	%
FIR_B	Flood insurance rate for basic (1st) flood zone	%
k_i	Flood zone ratio	-
DIS	Deductions from premium	%
ADD	Additional premium	%

Payments resulting from insurance, savings and credit form total financial backing's creation costs. As mentioned above, those costs comprehends

- premium payments: total premium during the whole examined period (*TP*),
- payments coming from insurance policy: sum of all indemnifications over upper insurance benefit limit and respective coinsurance payments (*PCI*),
- savings: represented by the sum of all annuity amounts during examined period (*A_s*),
- credit: represented by the sum of all credit annuity amounts during term of expiration (*AC*).

Therefore, formula for total financial backing's creation costs is:

$$TC = TP + \sum_0^k PIBL + \sum_0^l CIP + \sum_1^n A_s + \sum_1^p AC \quad (9)$$

where: *PIBL* ... payment over upper insurance benefit limit, *CIP* ... coinsurance payments.

Coinsurance payments are calculated according to the amount of particular loss. When coinsurance value (*CV*) is higher than particular loss (*PL*):

$$\text{if } CV \geq PL \text{ than } CIP = PL \quad (10)$$

Analogically, when particular loss is higher than coinsurance value:

$$\text{if } CV < PL \text{ than } CIP = CV \quad (11)$$

Payment over upper insurance benefit limit (*PIBL*) must be taken into account when particular loss (*PL*) is higher than upper insurance benefit limit (*IBL*):

$$\text{if } PL > IBL \text{ than } PIBL = PL - IBL \quad (12)$$

Conclusion - Optimizing the Financial Backing's Creation Costs

What are usual mistakes when managing loss financial backing structure and what should be recommended to optimize financial backing's creation costs?

Usual Mistakes

People tend to manage financial backing structure from short-term point of view. In such case they prefer to pay as little as possible at present and they don't think about future. Usually, savings at present consequently results in future higher expenses. Common mistakes are:

- uninsured property,
- underinsurance,
- extremely low coinsurance value,
- insufficient amount of total financial backing.

Recommendations

It's recommended to balance portion capital assured vs. coinsurance value and capital assured vs. upper insurance benefit limit. With higher self-insurance range policy holder pays less for premium but his participation on loss cover is higher. Analogically, with lower self-insurance range insurance policy holder pays more for premium but his participation on loss cover is lower. Self-insurance range does not affect quality of insurance (extent of insurance coverage is always the same).

Optimal self-insurance range depends mainly on quantity of anticipated future losses and also on the extent of particular losses. Low self-insurance range will be advantageous if we anticipate many small losses. High self-insurance range will be advantageous if we anticipate few big losses.

Obviously it's advantageous to combine basic types of financial backing (savings, credit and insurance). In such case it's possible to suppress disadvantages and enjoy advantages. In any case, insurance should be considered as the most important type of financial backing; savings and credit as supplementary types.

Optimizing the financial backing's creation costs means to expend financial sources in effective way. In other words we have to minimize our costs. This is the issue of calculation, usage of above stated formulas and comparison of various type cases.

48 different type cases had been investigated on one certain residential building (common family house within examined period of 40 years). Type cases differ from each other by structure of losses, flood zone and upper insurance benefit limit. Data evaluation gives following results: efficient financial backing for

- small losses (in total up to 6% – 8% building's value) are savings (eventually credit),
- medium losses (in total over 6% – 8% and up to 20% building's value) is combination of insurance, savings and credit,
- big losses (in total over 20% building's value) is insurance.

In any case, we have to keep in mind payments connected with coinsurance and upper insurance benefit limit (i.e. payments not indemnified by insurance benefit).

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