

Calculation of Fair Price in Aleatory Transactions involving the Sale and Purchase of Bare Ownership

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1 Executive Summary

This report analyses and evaluates the viability and benefits of a lifetime annuity contract for the sale and purchase of bare ownership of a property, **to aid decision-making for both parties.**

The Fair Price is the calculation of the conditions of the agreement. It consists of the evaluation of the owner's right to have the use of their property and the evaluation of the lifetime annuity that they are to receive.

The fact that it is called 'fair price' should not be a source of confusion; this term refers solely to the technical calculation based on the agreed factors, especially the lifetime annuity amount, and does not necessarily mean that the agreement is fair or beneficial to both parties.

Under identical conditions, variations in the lifetime annuity amount will cause the fair price to rise or fall, depending on if the lifetime annuity increases or decreases.

The agreement will be balanced for both parties if the fair price is similar to the property appraisal.

These aleatory sale and purchase transactions allow buyers to acquire the ownership of the property without the right to use it ('bare ownership'), at a lower price than the market value of the property and enable sellers to secure a constant flow of income ('monthly lifetime annuity') whilst retaining the right to live in their home until the time of their death ('right of usufruct').

The buyers acquire the bare ownership at a cost that is lower than the market value of the property, which represents a long-term investment and allows them to diversify their property investments.

The sellers, on the other hand, have the guarantee of a lifelong income and continued residence in the property, thereby ending concerns about the management of their wealth and potential conflicts regarding inheritance.

This assessment does not concern a sale and purchase transaction involving a cash payment for a property, but rather an aleatory transaction, as the length of time that

the seller will live is not known in advance.

The analysis considers risks such as the seller's life expectancy, which may increase the total cost for the buyer, and the seller's premature death, which will reduce the total income from the property.

The results for the agreement itemised in the parameters for this sale and purchase transaction are as follows:

Fair price of the transaction €333,488.42

Value of usufruct €164,395.70

Value of bare ownership €169,092.72, for a lifetime annuity of €1,500.00/month.

2 Definition of the Transaction and Objective

The transaction that we are analysing consists of the sale and purchase of the bare ownership of a property, with the seller retaining the right of usufruct for life. This type of transaction is considered to be subject to uncertainty and, therefore, a fair price should be established, by both the seller and the buyer.

3 Definition of Concepts

3.1 Value of Usufruct

The value of usufruct is calculated actuarially as the present value of the lifetime income that the usufructuary will not be paying for the use of the property.

3.2 Bare Ownership Value

The bare ownership is the value of a property without the right of usufruct. It represents the value of the property without taking into consideration the right of the usufructuary to live there.

3.3 Fair Price

The fair price should be the sum of the valuations of the usufruct and bare ownership, as both elements involve uncertainty.

$$\text{Fair price} = \text{Value of the usufruct} + \text{Value of the bare ownership}$$

3.4 Monthly Lifetime Annuity

The monthly lifetime annuity is the monthly amount that the usufructuary will receive whilst they are alive as payment for the bare ownership.

3.5 Rental profitability

Rental profitability refers to the return that the owner obtains from renting their property compared to its value. This is a key indicator in the property market that is based on data provided by the Bank of Spain.

3.6 Valuation Rate of Interest

The interest rate used in calculating the lifetime annuity is a key parameter that is used to deduct the future rental income from the current value, thereby making it possible to determine the present value of the usufruct and bare ownership.

3.7 Life Table

Life tables (PER2020) are actuarial tools that are used to estimate the probability of a person of a certain age living to a specific age. These tables are essential in evaluating products and services that rely on life spans such as in this case.

3.8 Life expectancy

Life expectancy is a statistical measurement and indicates the average number of years that a person is expected to live after a certain age, based on current mortality rates. This is a crucial tool in demography, public healthcare and actuarial analysis, and is of significant use in the evaluation of financial and insurance products, such as lifetime annuities and bare ownership.

3.9 Initial contribution

The initial contribution is the amount of money that the acquirer (purchaser of the bare ownership) pays when they sign the contract. This contribution can be considered to be: - Part of the price of the bare ownership, which is paid as a down payment. - An advance payment that will be complemented with the subsequent lifetime annuities.

4 Data Provided

- **Date of birth:** 05/02/1945
- **Sex:** Male
- **Date of valuation:** 01/05/2025
- **Interest rate:** 3.00%
- **Growth of income:** 0.00%
- **Appraised value of the property:** €500,000.00
- **Initial contribution:** €80,000.00
- **Monthly lifetime annuity:** €1,500.00/month

5 Results of Actuarial Calculations

- **Actuarial value for the usufruct:** €164,395.70
- **Actuarial value for the bare ownership:** €169,092.72
- **Fair Price:** €333,488.42

Parameters used

- **Life Tables:** ES/BOE/2020
- **Gross rental profitability:** 3.50%
- **Interest rate:** 3.00%
- **Growth of income:** 0.00%

Additional information

- **Life expectancy:** 11.64 years

6 Survival Probability Table

For each year after the valuation date indicated, 01/05/2025, the table shows the probability of survival, the expected annual income from the usufruct, the expected annual income from the bare ownership and the sum of these two incomes.

Each row represents an additional year, beginning with the first year and continuing up the 39th year, thereby providing a clear overview of how these variables evolve over time relating to the Amounts of Income from Bare Ownership and Amounts of Income from Usufruct, and for all the years of life.

If the initial contribution in the first row of the table is made, corresponding to year 0, this represents the start of the operation, that is to say, the valuation date (01/05/2025). This row only reflects the initial contribution that the purchaser makes, as at this point neither the lifetime annuity nor the usufruct are payable. This contribution is shown as a single amount and allows for an accurate reflection of the initial economic flow of the operation.

Table of Results

Years	Survival Probability	Usufruct Rent	Property Rent	Total Rent
0	100.00%	0.00	80,000.00	80,000.00
1	96.77%	17,500.00	98,000.00	115,500.00
2	93.23%	35,000.00	116,000.00	151,000.00
3	89.38%	52,500.00	134,000.00	186,500.00
4	85.23%	70,000.00	152,000.00	222,000.00
5	80.79%	87,500.00	170,000.00	257,500.00
6	76.08%	105,000.00	188,000.00	293,000.00
7	71.16%	122,500.00	206,000.00	328,500.00
8	66.06%	140,000.00	224,000.00	364,000.00
9	60.87%	157,500.00	242,000.00	399,500.00
10	55.65%	175,000.00	260,000.00	435,000.00
11	50.48%	192,500.00	278,000.00	470,500.00
12	45.44%	210,000.00	296,000.00	506,000.00
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Years	Survival Probability	Usufruct Rent	Property Rent	Total Rent
13	40.56%	227,500.00	314,000.00	541,500.00
14	35.84%	245,000.00	332,000.00	577,000.00
15	31.29%	262,500.00	350,000.00	612,500.00
16	26.93%	280,000.00	368,000.00	648,000.00
17	22.82%	297,500.00	386,000.00	683,500.00
18	19.03%	315,000.00	404,000.00	719,000.00
19	15.60%	332,500.00	422,000.00	754,500.00
20	12.55%	350,000.00	440,000.00	790,000.00
21	9.87%	367,500.00	458,000.00	825,500.00
22	7.58%	385,000.00	476,000.00	861,000.00
23	5.66%	402,500.00	494,000.00	896,500.00
24	4.09%	420,000.00	512,000.00	932,000.00
25	2.85%	437,500.00	530,000.00	967,500.00
26	1.90%	455,000.00	548,000.00	1,003,000.00
27	1.20%	472,500.00	566,000.00	1,038,500.00
28	0.72%	490,000.00	584,000.00	1,074,000.00
29	0.40%	507,500.00	602,000.00	1,109,500.00
30	0.21%	525,000.00	620,000.00	1,145,000.00
31	0.10%	542,500.00	638,000.00	1,180,500.00
32	0.04%	560,000.00	656,000.00	1,216,000.00
33	0.02%	577,500.00	674,000.00	1,251,500.00
34	0.00%	595,000.00	692,000.00	1,287,000.00
35	0.00%	612,500.00	710,000.00	1,322,500.00
36	0.00%	630,000.00	728,000.00	1,358,000.00
37	0.00%	647,500.00	746,000.00	1,393,500.00
38	0.00%	665,000.00	764,000.00	1,429,000.00
39	0.00%	682,500.00	782,000.00	1,464,500.00
40	0.00%	700,000.00	800,000.00	1,500,000.00