

CHRONICLE N°18

Net operating income: indexation versus market rent over nine years - 3/6/9 lease

For this eighth Chronicle on net operating income, and for the following Chronicles on this theme, we will make the simplifying assumption (which will be lifted later) that we are working on the case of a single-tenant building leased in part (between 0 and 100% of the building) at the initial date t_0 .

As in the general case discussed in **Chronicle 17**, we will assume that the tenant has signed a standard 3/6/9 lease. He therefore has the option of renegotiating the financial terms of the lease with his current landlord every 3 years, or of terminating his lease and finding another premises to let at the current market rent. In this case, the landlord will have to find another tenant who will rent the premises at the market rent. No account will be taken of the frictional costs incurred by landlords and tenants when moving (costs of finding tenants/premises, costs of refurbishing premises/costs of moving, etc.).

We will focus our analysis on the impact on net operating income of the difference between the indexation of the running rent and the change in the market rent (no support measures, no management costs and no vacancy).

In this Chronicle, we will add the simplifying assumption that indexation and the rate of increase in market rent are constant, and we will deal only with what happens over a 9-year period. These two assumptions will be discussed and relaxed in subsequent Chronicles.

Thus, by adding the assumption of constant growth rates, the systems of equations (1) to (4) in **Chronicle 17** can be simplified and written as follows:

In this framework, in the 1st year, net operating income is equal to the market rental value (mrv) at the time the lease is signed in t_0 :

$$(1) noi_{0,1} = mrv_0$$

with: noi : net operating income
 mrv : market rental value

In the 2nd year, the net operating income is equal to the running rent for the second year, i.e. the rent for the first year plus rent indexation ($ri\%$) while on the anniversary date of the lease, the market rental value follows its own trend ($mr\%v$) in line with market tensions.

$$(2) \begin{cases} noi_{1,2} = rrent_{1,2} \\ mrv_1 = mrv_0 \cdot (1 + mr\%v) \\ rrent_{1,2} = rrent_{0,1} \cdot (1 + ri\%) = mrv_0 \cdot (1 + ri\%) \end{cases}$$

with: $rrent$: running rent

In the 3rd year, the same principle applies.

$$(3) \begin{cases} noi_{2,3} = rrent_{2,3} \\ mrv_2 = mrv_1 \cdot (1 + mr\%v) = mrv_0 \cdot (1 + mr\%v)^2 \\ rrent_{2,3} = rrent_{1,2} \cdot (1 + ri\%) = mrv_0 \cdot (1 + ri\%)^2 \end{cases}$$

In the 4th year, the tenant has the option of terminating the lease. He may therefore choose to leave his current premises if the market rent is lower than the running rent (which they are currently paying). In this case, the landlord will have to find another tenant who will rent the premises at the market rent. Apart from friction costs, this is equivalent to the current tenant being able to renegotiate his rent every three years.

The rental income for the 4th year can then be written as:

$$(4) \begin{cases} \text{if } mrv_3 > rrent_{3,4} \text{ then } noi_{3,4} = rrent_{3,4} \\ \text{if } mrv_3 < rrent_{3,4} \text{ then } noi_{3,4} = mrv_3 \\ mrv_3 = mrv_2 \cdot (1 + mr\%v) = mrv_0 \cdot (1 + mr\%v)^3 \\ rrent_{3,4} = rrent_{2,3} \cdot (1 + ri\%) = mrv_0 \cdot (1 + ri\%)^3 \end{cases}$$

The same principle applies on each three-year anniversary from the end of the firm term of the lease.

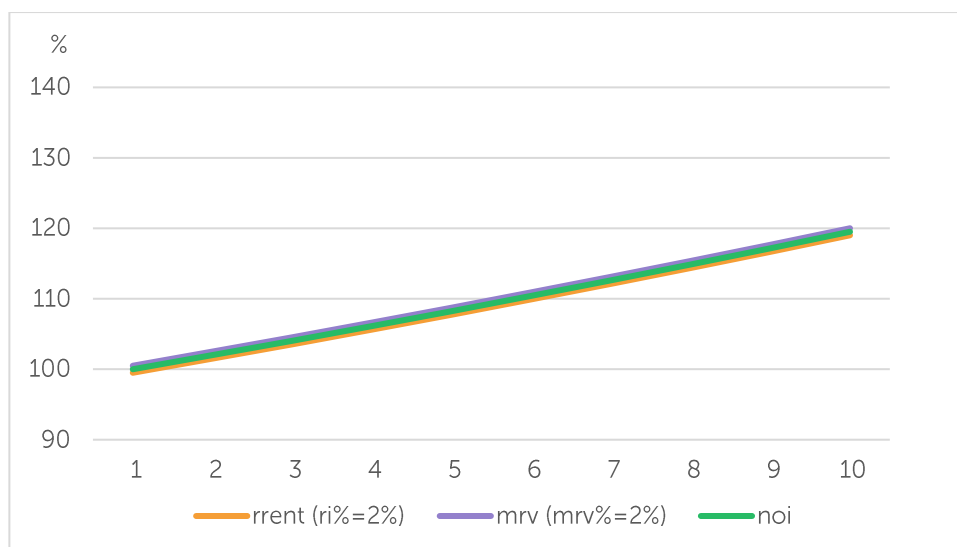
Let's take three examples to see what happens.

Case 1: Let's assume, over a period of 9 years, that **the indexation and the market rental value evolve at a constant rate of 2% per year:**

Period	rrent (ri%=2%)	mrvt (mrv%=2%)	noi	noi%
1	100,0	100,0	100,0	
2	102,0	102,0	102,0	2,0
3	104,0	104,0	104,0	2,0
4	106,1	106,1	106,1	2,0
5	108,2	108,2	108,2	2,0
6	110,4	110,4	110,4	2,0
7	112,6	112,6	112,6	2,0
8	114,9	114,9	114,9	2,0
9	117,2	117,2	117,2	2,0
10	119,5	119,5	119,5	2,0

This is the most trivial case: the running rent and the market rental value move at the same rate, and there is no three-yearly arbitrage possible. Rental income evolves at a common rate of 2%.

Graphically, this gives us the following result:



We can conclude that, in this case ($ri\% = mrv\%$), the growth rate of net operating income is systematically equal to indexation as in the general case discussed in **Chronicle 11**:

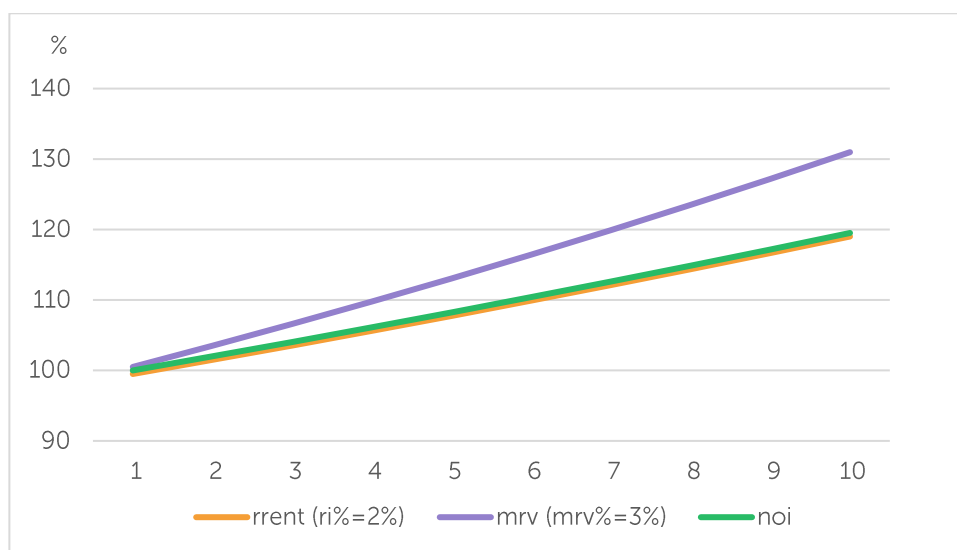
$$(5) \text{ noi}\% = ri\%$$

Case 2: let's assume that, over a period of 9 years, **indexation rises at a constant rate of 2% per annum while the market rental value rises at a constant rate of 3% per annum:**

Period	rrent (ri%=2%)	mrvt (mrv%=3%)	noi	noi%
1	100,0	100,0	100,0	
2	102,0	103,0	102,0	2,0
3	104,0	106,1	104,0	2,0
4	106,1	109,3	106,1	2,0
5	108,2	112,6	108,2	2,0
6	110,4	115,9	110,4	2,0
7	112,6	119,4	112,6	2,0
8	114,9	123,0	114,9	2,0
9	117,2	126,7	117,2	2,0
10	119,5	130,5	119,5	2,0

This is the case where the indexation is systematically lower than the increase in the market rent. In this case, over the 9 years of the lease, the tenant systematically chooses to stay and accept the annual indexation of his rent.

Graphically, this gives us the following result:



We can conclude that, in this case ($ri\% < mrv\%$), the growth rate of net operating income is systematically equal to indexation as in the general case discussed in **Chronicle 11:**

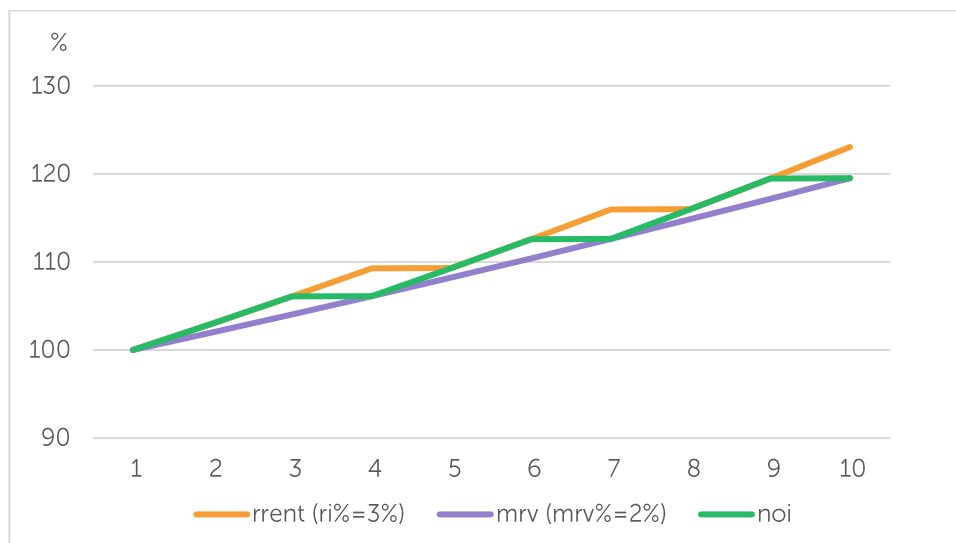
$$(6) \text{ noi}\% = ri\%$$

Case 3: let's assume that, over a period of 9 years, **indexation rises at a constant rate of 3% per annum while the market rental value rises at a constant rate of 2% per annum:**

Period	rrent (ri%=2%)	mrp (mrp%=3%)	noi	noi%
1	100,0	100,0	100,0	
2	103,0	102,0	103,0	3,0
3	106,1	104,0	106,1	3,0
4	109,3	106,1	106,1	0,0
5	109,3	108,2	109,3	3,0
6	112,6	110,4	112,6	3,0
7	116,0	112,6	112,6	0,0
8	116,0	114,9	116,0	3,0
9	119,5	117,2	119,5	3,0
10	123,1	119,5	119,5	0,0

This is the case where indexation is systematically higher than the increase in market rent. In this case, over the 9 years of the lease, the tenant systematically chooses, every three years, to threaten to leave and can therefore renegotiate his rent at the level of the market rental value (except for friction costs: costs of finding premises + costs of moving).

Graphically, this gives us the following result:



We can conclude that, in this case ($ri\% > mrp\%$), the net operating income growth rate no longer follows the general case discussed in Chronicle 11.

Thus, for 3 years, net operating income grows at the same rate as indexation and then, in the fourth year, falls back to the market rental value.

In our next Chronicle, we will analyse the consequences on the average growth rate of net operating income, calculated over 9 years, when indexation and the growth rate of the market rental value are varied between 0 and 5% with a step of 0.5%. We will deal successively with the case of a standard 3/6/9 lease, a firm 6-year lease and a firm 9-year lease.

These chronicles are linked to my activity at the IEIF, a Paris based think tank on real estate where I conduct research into the modelling of major property variables. For those less familiar with property analysis, these chronicles can be a source of information and a knowledge base. For experts in the field, their purpose is to launch discussions and exchanges on the various subjects I cover. Some of the chronicles will be based on known and familiar elements, while others will deal with research elements and present some of the results of my work.