

## CHRONICLE N°21

### Net operating income: indexation versus market rent over 18 years - detailed analysis

For this eleventh 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 18-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.

In the tenth year, the lease signed for nine years no longer applies, and a new one needs to be negotiated. This allows both parties to bring the running rent into line with the market rent.

$$(5) noi_{9,10} = mrv_9$$

**Chronicle 20** presents the various calculations and graphical results of these situations in detail, using 3 examples.

This time we will look at the impact on the average growth rate of net operating income, calculated over 18 years, when indexation and the growth rate of the market rental value are varied between 0 and 5% in steps of 1%.

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.

For a 3/6/9 lease over 18 years, applying formulae (1) to (5), here is the result in terms of the average growth rate of net operating income:

average growth rate of net operating income (noi%)  
(over 18 years)

ri%							
5	0.79	1.60	2.43	3.27	4.13	5.00	
4	0.60	1.43	2.27	3.13	4.00	4.55	
3	0.43	1.27	2.13	3.00	3.55	4.14	
2	0.27	1.13	2.00	2.55	3.15	3.79	
1	0.13	1.00	1.55	2.15	2.79	3.49	
0	0.00	0.55	1.15	1.79	2.49	3.24	
	0	1	2	3	4	5	mrv%

For example, if rent indexation (ri%) is 4% and the growth rate of the market rental value (mrv%) is 1%, then the average growth rate of net operating income is approximately 1.43%.

Clearly, when indexation is equal to the growth rate in the market rental value, then the growth rate in net operating income is equal to indexation. (blue boxes)

However, **when indexation is strictly higher than the growth rate of the market rental value, then the average growth rate of net operating income is significantly lower than indexation.** (green boxes)

And over 18 years, in contrast to the 9-year calculations made for chronicle 19, **when indexation is strictly lower than the growth rate of market rental value, the average growth rate of net operating income is significantly higher than indexation.** (purple boxes)

In the case of a firm 6-year lease, taken over 18 years, applying formulae (1) to (5), here is the result in terms of the average growth rate of net operating income:

average growth rate of net operating income (noi%)  
(over 18 years)

ri%							
5	1.02	1.75	2.51	3.31	4.14	5.00	
4	0.76	1.52	2.31	3.14	4.00	4.55	
3	0.52	1.31	2.14	3.00	3.55	4.14	
2	0.31	1.14	2.00	2.55	3.15	3.79	
1	0.14	1.00	1.55	2.15	2.79	3.49	
0	0.00	0.55	1.15	1.79	2.49	3.24	
	0	1	2	3	4	5	mrv%

We find the same type of result but with a slight increase in the average rate, linked to the change from 3 to 6 firm years when the indexation is higher than the growth rate of the market rent.

When the indexation is lower than the market rent, the net operating income growth rate is the same, regardless of the type of lease, since rental income follows inflation for nine years, then adjusts to the market rent in the tenth year before following indexation again.

**In the case of a firm 9-year lease, taken over 18 years**, applying formulae (1) to (5), here is the result in terms of the average growth rate of net operating income:

average growth rate of net operating income (noi%)  
(over 18 years)

ri%							
5	2.80	3.18	3.58	4.02	4.49	5.00	
4	2.18	2.58	3.02	3.49	4.00	4.55	
3	1.58	2.02	2.49	3.00	3.55	4.14	
2	1.02	1.49	2.00	2.55	3.15	3.79	
1	0.49	1.00	1.55	2.15	2.79	3.49	
0	0.00	0.55	1.15	1.79	2.49	3.24	
	0	1	2	3	4	5	mrv%

This time, in contrast to the 9-year results in Chronicle 19, we no longer find perfect protection of indexation against net operating income when indexation is higher than the rate of increase in market rent. This is normal, since in year 10 the running rent paid by the tenant is adjusted downwards to return to its market level when the lease is renegotiated.

And, unsurprisingly, when the indexation is lower than the market rental value, the net operating income growth rate is the same, whatever the type of lease, since net operating income follows inflation for nine years, then adjusts to the market rental value in the tenth year before following indexation again.

**It is therefore worth remembering that, taken over 18 years, property provides full protection against inflation only when the rate of increase in the market rental value is greater than or equal to the indexation.**

In our next Chronicle, we will summarise the results obtained from the analysis of the dynamics of net operating income since Chronicle 10.

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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.