REAL ESTATE THEORY AND MODELLING

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CHRONICLE N°22

Net operating income: summary

After eleven Chronicles dedicated to net operating income, it is undoubtedly time to produce a second summary.

The first summary was produced in **Chronicle 15**. It summarised the work of Chronicles 10 to 14 and concluded that:

1. under the simplifying assumptions of a single building leased in part (between 0 and 100% of the building) at the initial date t_0, calculated over the firm term of the lease with a rate of increase in management costs identical to rent indexation,

2. by simultaneously considering the impact of rent indexation, support measures, management costs and vacancy,

3. then net operating income is equal to rent less the impact of average support measures, management costs and vacancy rate (occupancy rate) and the growth rate of net operating income is directly linked to the rent indexation rate and the growth rate of the occupancy rate.

$$(1)\ noi_{0,1} = (nrv_{0,1}.(1 - asm\%) - mc_{0,1}).occ\%_{0,1}$$

$$(2)\ noi\%_{t,t+1} = (1 + ri\%).\frac{occ\%_{t,t+1}}{occ\%_{t-1,t}} - 1$$

with:

noi	: net operating income
$noi\%$	: the growth rate of net operating income
nrv	: net rental value
$ri\%$	: rent indexation
$asm\%$	: average support measures (as % of net rental value over the firm term of the lease)
mc	: management costs
$occ\%$	: occupancy rate

Chronicle 16 shows that, if we remove the simplifying (but false) assumption that the rate of growth in management costs is the same as the rate of rent indexation, we can still consider that indexation, all other things being equal, remains a very good approximation, on average, of the rate of growth in net operating income.

We therefore find:

$$(3)\ noi\%_{t,t+1} \cong (1 + ri\%).\frac{occ\%_{t,t+1}}{occ\%_{t-1,t}} - 1$$

Chronicles 17 to 21 lift the much too restrictive assumption of an analysis limited to the firm period of the lease and extend it to 9- and 18-year horizons for French classic 3/6/9, firm 6-year and firm 9-year leases.

We then show that the time horizon selected (9 or 18 years), the type of lease (standard, 6- or 9-year) and the relative rate of growth of the market rental value and the running rent (the rent actually paid by the tenant, i.e. the initial rent plus indexation) become decisive variables in the rate of growth of net rental income.
For the sake of completeness, the dynamics of the occupancy rate must of course be reintroduced.

$$(4)\ anoi\%_{t,t+T} = f(T, ToL, mrv\%, ri\%, occ\%)$$

with:

$anoi\%$	: average net operating income growth rate
T	: time horizon of analysis
ToL	: type of lease
$mrv\%$	: growth rate of market rental value
$ri\%$	: rent indexation (index growth rate)
$occ\%$	: occupancy rate

Let's start by summarising the most intuitive conclusions drawn from these Chronicles, all other things being equal:

- **The higher the occupancy rate, the higher the average growth rate in net operating income,**
- **The longer the firm lease term, the higher the average growth rate in net operating income,**
- **The higher the rent indexation, the higher the average growth rate in net operating income,**
- **The higher the market rental value, the higher the average growth rate in net operating income, or it stagnates (depending on the time horizon used).**

The impact of the chosen time horizon is even more complicated, as it will depend on the relative growth rate of market rental value and indexation.

If the market beats indexation (the growth rate of the market rental value is higher than indexation) then, over more than 9 years, the average growth rate of net operating income beats indexation and becomes higher than the average growth rate of net operating income over a time horizon of less than 9 years.

On the other hand, if indexation beats the market, then over a period of more than 9 years the average growth rate of net operating income is not only beaten by indexation (which is normal) but becomes lower than the average growth rate of net operating income over a time horizon of less than 9 years.

We can therefore see that **over a period of more than 9 years, exceeding the term of the lease, the investor is taking on an additional risk that may pay off if the market rental value beats the indexation, or lose out if it does not.**

A comparison of the tables in Chronicles 19 and 21 is very clear.

Example for French standard 3/6/9-year leases:

average growth rate of net operating income (noi%)

(over 9 years)

ri%						
5	1,43	2,11	2,81	3,53	4,26	5,00
4	1,11	1,81	2,53	3,26	4,00	4,00
3	0,81	1,53	2,26	3,00	3,00	3,00
2	0,53	1,26	2,00	2,00	2,00	2,00
1	0,26	1,00	1,00	1,00	1,00	1,00
0	0,00	0,00	0,00	0,00	0,00	0,00
	0	1	2	3	4	5 mrv%

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%

As we have now reached the point where analysis can no longer be carried out using simple equations but requires simulations to be carried out, we will be bringing this chapter on net operating income to a temporary close with our next Chronicle. This will use our work on rental income and our conclusions to address and question the oft-heard claim that property protects against inflation...

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.