Property Profitability versus Property Risk: From territorial impacts to market behaviour

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1. Introduction

Understanding the economic and financial mechanisms constraining changes in the land utilisation and the economic territory evaluation are areas strongly influenced by different factors. This paper's objective is to obtain a proxy for the foreseeable analysis of financial models and of the profitability evaluation and risk inherent on real-estate projects.

The study of the factors – accessibilities, services, transports, possible outstanding litigations on the property, etc. – affecting the changes in property prices is fundamental in real-estate evaluation. It is increasingly apparent that obtaining information on the variables influencing property prices that may integrate the Real-estate investment fund and the analysis of its "Profitability versus Risk", in parallel with supervising the activity underlying this subject are gaining importance.

Presently, the changes in prices and risks inherent on the territory are explained through Real-estate evaluation models – comparative method, profitability method, cost method and other models used at an international level – combined with the current explicative financial models. These explicative financial models are based on the economic and financial risk evaluation using as major methods the Net present value (NPV), the Internal rate of return (IRR), the Investment recovery period (IRP), the Benefit-cost ratio (BCR), and some economic and financial indicators. These financial variables make it possible to foresee property prices, to study the economic-financial viability and to calculate its property risk, and, above all, to inform on the trends explaining their volatility.

The analytical models developed may be used for a number of situations (property, buildings, urban area). However, their interpretation is useful when formulating hypotheses on the layout of Real-estate investment funds. "Profitability versus risk" should always be based on an explicative model of real-estate reality through a partial analysis system.

2. Property profitability evaluation methods

The territory evaluation in real-estate terms is a vast and complex issue, difficult to be treated and analysed in a short research. Therefore, this paper presents only an expose of all the methods related to real-estate evaluation. A short evaluation analysis will be presented for the major findings and objectives.

The financial and economic issues are in some way appropriate to property evaluation methods. Evaluating some asset (serving an economic activity) consists in calculating its present value from the forecast of its future revenue. Even when its value formation is based on future economic revenue, a current analysis is necessary on future projections, based on numeric data and economic cycles well known in the past. The definitions for the basis of profitability items are as follows:

Profitability as a result of property valuation – Capital Profitability

$$P(t, t-k) = \frac{V_t - V_{t-k}}{V_{t-k}}$$

Profitability as a result of property rental – Rent Profitability

$$P(t, t-k) = \frac{D_t}{V_{t-k}}$$

Pt – Profitability of an asset in period t;
Vt – Price/Value of an asset at the end of period t;
Vt-k – Price/Value of an asset at the end of period t-k;
Dt – Total nominal revenue of an asset during period t (rents and other dividends net of sundry costs).

The asset value definition is common to all experts. However, evaluation practices may differ significantly. The evaluations purpose is to establish a market value of real-estate assets. Pursuant to Council Directive 91/674, Article 49: "*Market value shall mean the price at which land and buildings could be sold under private contract between a willing seller and an arm's length buyer on the date of valuation, it being assumed that the property is publicly exposed to the market, that market conditions permit orderly disposal and that a normal period, having regard to the nature of the property, is available for the negotiation of the sale*".

The market value of the property is the estimator factor freely and unconditionally established between buyers and sellers, taking into account the common valuation concepts, means and purpose of the asset valuation as well as the existing and available technology used in the territory where it is inserted. The share of the market value deemed useful in every evaluation depends on its purpose, given that the risk level and the uncertainties surrounding the value calculation depend on the receiver of the evaluation and on the investor. In order to make an evaluation it is necessary to obtain a forecast, to be acquainted with the legal context and with the framework of the property in question, as well as with the factors that may have a bearing on the evaluation. The evaluation of every non-building plot of land requires consultation of the planning instruments and land management in force and must comply with the limitations and conditions on the utilisation, fruition and change of the property, and/or calls for information on the opportunities and valuation standards.

3. Financial evaluation of real-estate investments

"Investment in construction" means the possibility of "a project intended to ensure not only the full recovery (reintegration) of the capital invested in its construction and rental, but also to create additional financial revenue adequate to cover capital interest (own capital or third-party capital) as well as to remunerate entrepreneurial management activity and its risk. This possibility will materialise through the definition of profitability index*".* The profitability analysis of real-estate projects follows two lines of action, namely:

- Analysis of economic profitability (project perspective) – this analysis is independent from the financing sources, with no breakdown of investment values into own capital and third-party capital;
- Analysis of financial profitability (promoter perspective) – this analysis is intended to evaluate the consequences of financing on the project profitability. Operating costs shall include charges with third-party financing and investment is obtained from the sum of own capital that the corporation intends to invest in the project.

The evaluation of investment projects comprises two main aspects: profitability and risk. The higher the risk level of a given investment, the larger will be the expected return, in order to attract potential investors. This concept is known as "risk-return ratio". This is the base to use the risk-adjusted evaluation rate technique, which raises the evaluation rates whenever evaluating high-risk projects. Profitability may be measured directly and may be translated in terms of monetary percentiles. Risk, in turn, cannot be directly measured. This concept is difficult to understand, to define and to translate. Risks that cannot be eliminated, reduced or transferred through appropriate risk management and that eventually materialise are, in general, responsible for a number of adverse effects on investment, thereby obviously reducing its profitability. However, the historical analysis information related to the performance of a given investment typology permits the investor to obtain an idea on the evolution of profitability rates over time, i.e., access to the last performance data of such investment typology.

3.1 Method evaluation of real-estate investments

The profitability analysis of real-estate investments estimates the existence of criteria and indicators for appreciation. A real-estate project is only viable when it is profit-making. Moreover, financial covering is necessary, which consists in the existence of own capital, third-party capital and project self-financing. The purpose of profitability analysis is to give the

investors instruments providing a basis for better decision-making. Different indicators of financial profitability should be calculated for the profitability study, based on the economic evaluation methods of investment projects, and it can be described as follows:

1. The Net present value (NPV) corresponds to the cash flow discount for zero time (the decision moment) when using a monthly or annual discount rate, depending on the financial flow frequency. Projects that involve higher initial investments and receive their return in a more distant future become unfavourable for high discounting rates. High discounting rates occur in increased inflation periods, confirming that real-estate projects are hardly profit-making in high inflation situations. Analysing only the NPV indicator, an optimum project is the one that corresponds to the highest NPV value.

2. The Internal rate of return (IRR) is the value of the discount rate that fulfils the NPV=0 expression. According to the IRR indicator the best project is the one that has the maximum value for IRR. Projects whose IRR is lower than the minimum rate of return required by the investor are rejected.

3. The Investment recovery period (IRP) corresponds to the period of time (months) necessary for the total invested capital to be reimbursed. The Investment recovery period focuses more on liquidity than on profitability, because it privileges capital liquidity.

4. A real-estate project is selected when Benefit-cost ratio (BCR) is higher than the unit. This indicator makes it possible to compare a number of projects with different investment values.

5. The Equivalent monthly income (EMI) changes the net cash flow values into a constant monthly income for the project duration. According to this indicator the best real-estate investment is the one with the highest EMI value. The EMI value is the direct result of the real-estate project assessment, by using coefficients depending on the monthly discounting rate and on the number of years.

6. The Equivalent monthly rent (EMR) corresponds to a constant monthly revenue, which is equivalent to the corresponding profit flows plus the investment. This indicator should be used in the comparison of real-estate projects that differ on their duration and on the invested capital value.

There are three alternative methods to carry out the project evaluation from the promoter point of view. The first one is known as Adjusted Net Present Value (APV). It consists in adding to the NPV the financial effects due to financing by means other than own capital. In alternative, the NPV calculation can be corrected, by replacing the discount rate by an average rate weighed by the cost and percentage of the different types of capital (third-party and own capital) – method of the weighed average cost of capital (WACC). Finally, the share that corresponds to third-party capital can be deducted from the invested capital, but including the financial costs (liabilities related to loans, for instance), and new cash flows can be discounted at a corresponding discount rate to an indebted corporation – own capital flow method (Flow-to-Equity).

4. Evaluation of real-estate investment fund portfolio

In the 60's and 70's, specially in the U.S.A, the real estate market was looked in a more systematic way, when the portfolio management theories developed for the transferable securities values had started to be applied to the real estate assets. In such a way, it was possible to the financial analysts to start having available information about the market evolution and analysis, so they act in an informed, clarified and systematic way. The particularisations that distinguish the real estate assets from other financial assets hadn't disappeared and they are reasons for the modern theories application on financial assets management. The deepening and knowledge level of these studies continue in the U.S.A e the U.K with considerable advances and systematization of the information.

According to Brown and Matysiak (2000), *"(…) Most of the decisions on real-estate asset portfolios are, for example, based on evaluations, and not on prices. Given their importance and distinct use, an aspect that must be considered is that evaluations are in fact a good proxy for prices. (…)"*

Real-estate assets are held and managed by professional "institutional" investors, such as, real-estate partnerships, open- and closed-end investment funds, pension funds, and are essentially evaluated for professional companies. Generally, the appraisers are external entities, but sometimes companies internally evaluate part of or their total assets. It's crucial to guarantee that, on average, buyers and sellers use the same type of information and that therefore there is no relevant mismatch between evaluation values and transaction prices.

At an international level, most investors believe that it is not worth comparing evaluations among countries. See, for instance, the following examples:

- In France and in the United kingdom the market income values are not sufficiently detailed and are systematically unavailable;
- In the Netherlands, the rationality of the evaluation is based on raw yields;
- In addition to standardisation of practices and methodologies, evaluations must be adapted to the local practices, namely rental control, operational costs, rental structures, etc.

4.1 Profitability evaluation methods on real-state actives portfolio

Profitability is the basic objective act of owning and managing portfolios. Financial asset profitability, in a period of time, can be defined by:

$$P(t,t-k) = \frac{V_t + D_t - V_{t-k}}{V_{t-k}} \text{ or } P(t,t-k) = ln\left(\frac{V_t + D_t}{V_{t-k}}\right)$$

According to the Modern Portfolio Theory (MPT), based on the works developed by Markowitz (1952, 1959), has been applied to real-state assets portfolios. This theory assumes that the investors are hostile to risk, that the assets profitability is described through a normal probability distribution and that the markets are efficient. So, the average asset profitability ($\overline{P}$) is the arithmetic profitability average verified in a succession of n time periods:

$$\overline{P} = \frac{1}{n}\sum_{t=1}^{n} P_t$$

The average profitability corresponds to the expected profitability value, being so a statistical measure of the average value of its probability distribution. This way, a portfolio of n assets in the period t will have as profitability:

$$PP_t = \sum_{t=1}^{n} (P_t w_t)$$

PPt – Portfolio profit in t period;
wt – Weighting of one asset in the portfolio in t period.

According to the market model, the individual security profitability is related linearly with the market profitability. The formula that expresses the relation is named characteristic straight line and may be defined as follows:

$$P_{jt} = \alpha_j + \beta_j Pm_t + e_{jt}$$

Pjt – Profitability of the j security in t period;
Pmt – Market profitability in t period;
Bj e αj – Parameter of the security j, that define the profit and market relation.
ejt – Residual term, with null average value and by hypothesis isn't correlated with the following factors: market profitability, residual term of other securities or the same security all over the time.

In a general mode, $Pm_t = \frac{Im_t - Im_{t-1}}{Im_{t-1}}$

Imt – Market index in end of t period;
Imt-1 – Market index in end of t-1 period.

The security beta parameter measure, in statistical terms, the trend for an asset covariate with the market. It can also define a security beta as a contribution measure for the market profitability volatility of the asset.

4.2 Society management point of view versus the investor point of view

To calculate and evaluate an asset profitability, a number of conditions should be defined, such as, analysis view and calculation methodology. Both analysis optics can be adopted, in one hand the manager optics (managing society), on the other hand the participant optics (investor in the participation units). The manager point of view doesn't take in account the commissions charged to the subscriber and the tax benefits that he will have.

In respect to the calculation method, the analysis can have in consideration the distributed incomes reinvestment by the assets that compose the funds, in same new fund units. In the participant optics, the acquired net profits vary in participant to participant, according to the respective fiscal profiles and applied amounts. The analyses in the manager optics will be able to assume the reinvestment of distributed incomes, for that will be necessary to know the net property values of the participation units along the stated period, the incomes, respective distribution dates and net property values of the participation units in the immediately next days to the ones of incomes distribution. This way, the formula for the profitability calculation of real estate investment fund portfolio, in one determined period, will have to be:

$$P(t,t+k) = \sum_{t=0}^{n} \left(\frac{VPL_{t+k}}{VPL_t} \times \prod_{i=1}^{n} (1 + \frac{P_i}{VPL_i}) - 1 \right)$$

VPLt, VPLt+k – Net property values of the participation units in t and t+k period;
Pi – Profits of the participation units, distributed by the fund in k period;
VPLi – Net property values of the participation units in the immediately period next to the profit distribution;
i – Distributed profit number in k period;
t – Time horizon of the analysis.

This formula leads exactly to the same values that the profitably arithmetical formula when incomes distribution doesn't exist or when these are distributed in the end of the period, in such way:

$$P(0,t) = \sum_{t=0}^{n} \left(\frac{Gains + \sum_{t=0}^{n} Income}{Invested\ Amount} \right)$$

In the funds where incomes distribution occurs, these are added to the participation unit net property value in the last day of the month where the distribution occurred.

4.3 The Investment Property Databank in Portugal

The "Investment Property Databank" (IPD), which refers to investment funds in Portugal, collects pertinent items for an evaluation of the real estate assets. According to the regulations in effect, this value must have as upper and lower limits the respective acquisition value and the simple average value assigned by the respective expert appraiser.

The real-estate investment funds, as any another financial product, are intended to evaluate the profitability/risk binomial. Thus, the fund management companies aim at applying investors' savings where they will be able to obtain better profitability, while at same time they diversify investments in order to reduce risks, which is necessary to make profitability-versus-risk evaluations.

The IPD collaborators collect, annually, information about portfolio investment in real estate assets, withheld in a directly or indirectly way. The collected information is validated by the real estate portfolio managers and includes items as:

- Evaluation, evaluation methods, appraiser identification, considered hypotheses to establish the market value to each asset;
- Transactions, alienations, acquisitions and assets in promotion;
- Capital expenditures and incomes registed in the month when they occur;
- Information about the lease state and leaseholders collected with December reference date of each year.

The evaluations have a basic impact in the formula "Total Return" used by the IPD for performance calculation in each property level and in the real estate portfolio return level. The IPD considers that, to get a necessary real estate performance vision, it is necessary to calculate the total return, related with "*variations in the net capital expenditures property value increased by the net operational costs incomes during the year",* where the following formula appears:

$$TR = \sum_{t=0}^{n} \left(\frac{Cv_t - Cv_{t-1} - Ce_t + NI_t}{Cv_{t-1} + Ce_t/2 - NI_t/2} \right)$$

Cv – Capital value;
Ce –Capital Expenditure;
NI – Net Income.

IPD analyzes the performance from individual property to global portfolio. The management companies of real estate assets desire to get precise explanations on real estate assets individual behaviour face to the average, that is, benchmark that is created by real estate performance attribution. This analysis depends on the real estate capital movements and can be decomposed in:
- Capital valuation - the increase of the real estate assets value withheld during the year, expressed as net capital expenses, in a percentage of the capital applied during the year;
- Incomes return - the net income received during the year expressed in invested capital percentage terms;
- Investment volume - Investments that happened in the market, where these transactions will assist the appraisers in their work.

5. Risk notion. Risk management

According to Knight (1921), risk makes it possible to build possible scenarios that may be submitted to a given entity in the decision-making process. Occurrence probabilities may be assigned to these possible scenarios. According to Porfírio (2003), risk is related to any situation affecting the corporation value deviating it from its business purposes. According to this author, risk always occurs when there is no full certainty as to a given future reality. It is therefore essential to always obtain more information in order to consolidate any investment decision with the purpose of reducing risk and uncertainty involved.

According to the Federal Reserve System (FED), risk management is the process permitting management to identify, quantify, monitor and control the risks associated with its activity and with the transactions under its management. The corporation evaluation risk exposure resorts to economic and reality-modelling theories through mathematical and statistical techniques, making it possible to assign probabilities to scenarios and sensitivity analysis and consequently limit risk situations and potential uncertainties. This type of analysis leads to a viable forecast of the results and subsequently to an effective decision making by corporate managers.

The importance of risk-exposure management is widely discussed in the financial milieu. Different perspectives on the subject are often discussed, largely influenced by those in favour of the agency theory which distinguishes between the interests of managers and investors in the same organisation. Above all, discussions are held on who should always be favoured in a given business: investors or the corporation itself.

5.1 Types of risk incurred by corporations

Developments in international markets and the volatility inherent on capital, together with the internationalisation of corporations and real-estate projects, will eventually have a bearing on the performance of economic agents. The evaluation of profitability immediately raises the risk threat. Only funds with similar risk levels and with the same management purposes should be compared. Every investment project, either domestic or external, has an associated risk level. It is only natural that all investors in a project of this nature require an additional premium for their investment, which should be pro rata to the risk level of the project, i.e., the higher the risk involved, the larger the premium required by investors.

Whether deciding to invest abroad or to maintain business and/or financial relationships with external counterparties, corporations should endeavour to diversify the exposure risks to which they are subject (see Table 1). Risk is present whenever a trading or financial operation is made with an external counterparty implying inflows or outflows or funds in foreign currency. Any situation implies risk either for holding assets or for foreign exchange liabilities.

Table 1 – Investment Fund Volatility

Annual Class Volatility	Risk Type	Annual Volatility Range
0	Very Low	[0%,2%]
1	Low	[2%,5%]
2	Average	[5%,10%]
3	High	[10%,20%]
4	Very High	≥ 20%

Source: Real estate investment funds regulation n. º 8/2002 from the Portuguese Stock Market Commission

The Fund is exposed to the risk associated with the assets forming its portfolio at any moment, as defined in investment policy. Therefore, depending on portfolio allocation regarding these assets, the risk associated with the Fund will change depending on the portfolios. The participant receives no guarantee as to preserving the invested capital or as to the profitability of his investment, wherefore there is an actual risk of losing a share of the investment. Real-estate investment funds incur the risks underlying the assets forming the respective portfolios, namely:

- Price risk – changes in prices as a result of events inherent on their own activity;
- Market risk – changes in prices of the respective assets, due to a number of factors, namely geographical location, economic activity sector, quality of leaseholders;
- Financial risk – the utilisation of financial leverage for real-estate investment raises the risk level associated with the asset;
- Inflation risk – changes in the inflation rate may affect real profitability;
- Interest rate risk – price changes due to changes in the yield curve lead to changes in investors' requirements as regards their profitability. The real-estate market is rather sensitive to this risk because this type of asset has associated a high leverage level;
- Management risk – real-estate investments require effective management having as its main purposes to maximise dividends (to maintain the property rented at best price) and valuations associated with the property;
- Exchange-rate risk – this risk is always present when the funds are invested in assets denominated in foreign currencies. Should the currency in which the fund is denominated devalue vis-à-vis the euro, its countervalue in euros decreases, and the overall value of the fund is also negatively affected;
- Credit risk – counterparty risk for non-compliance on the maturity date or for not being able to fully comply in the future;
- Liquidity risk – risk inherent on the possible failure to convert investment in net assets in the short term;
- Risk associated with legislation – property is subject to specific legislation and taxes. The introduction of changes represents a risk factor to the assets;

- Country risk – risk arising from the fact that some countries in which the Fund is able to invest are considered to be emerging countries with developing markets. This risk may hedge the risk associated with environmental conditions where the utilisation of property depends on the environment surrounding it;
- Other risks – some funds are invested in geographical areas where regulations do not exist or are less demanding and sometimes are not subject to any kind of supervision by competent authorities, or where they are not required to meet prudential regulations to mitigate the risks involved in their investments resulting in lower investment protection.

5.2 Real-estate portfolio risk evaluation methods

According to the Modern Portfolio Theory (MPT), based on the works developed by Markowitz (1952, 1959), the investment risks are associated with profitability volatility of underlying asset, due to the unforeseeable probability that all variables may constrain it. This characteristic is intrinsic to the market and to the impossibility to forecast reality. Therefore, the pattern deviation (σ) is an absolute measure of the risk associated with the asset profitability and may be defined as follows:

$$\sigma = \sqrt{\frac{1}{n-1}\sum_{t=1}^{n}\left(P_t - \overline{P}\right)^2}$$

Pt – Asset profitability in period t;
$\overline{P}$ – Average profitability.

The relative risk is given by the asset variance coefficient (VC): $VC = \dfrac{\sigma}{\overline{P}}$

According to the MPT model, the optimum portfolio may be determined by quantifying the position of the investor towards risk through the profitability-risk ratio or indifference curve function. This function reflects the premium required by investors for their investments per risk level. Thus, the risk of a portfolio with n assets in period t will be:

$$\sigma p = \sqrt{\sum_{i=1}^{n}\sum_{j=1}^{n}cov_{ij}\ w_i w_j}$$

COVij – Covariance between the profitability of assets i and j;
Wi, j – Weighting of the assets j and i in the portfolio.

According to Sharpe (1963), with the Sharpe coefficient it will be possible (Sp) to measure the portfolio's unit risk premium. For each asset, the coefficient is an index aggregating profitability and risk measures, simplifying the portfolio optimisation process. Two portfolios with different average/variance efficiencies will necessarily have different Sharpe coefficients. The equation is as follows:

$$Sp = \frac{Pp - Rf}{\sigma p}$$

Pp – Portfolio profitability;
Rf – Profitability of a risk-free asset;
σp – Portfolio risk.

According to the market model, the risk is broken down into two shares, as follows:

$$\sigma_j^2 = \beta_j^2 \sigma_m^2 + \sigma_{ej}^2$$

$\beta_j^2 \sigma_m^2$ - Systematic or non-diversifiable market risk, taking into account the factors affecting the market, such as interest rates, inflation, etc.;

σ_{ej}^2 - Specific, non-diversifiable or systematic risk related to all specific events of the asset.

According to the Mean Absolute Deviation (MAD) and developments found in recent works by Young and Graff (1995) and Myer and Webb (1990), the mean absolute deviation has gained the status of reliable and recommended measure for risk dispersion, and may extend to real-estate profitability. According to Konno (1988), portfolio risk may be evaluated by the mean absolute deviation or MAD:

$$MAD_p = \frac{1}{n}\sum_{t=1}^{n}\left(\sum_{j=1}^{m}(p_{jt} - \sum_{t=1}^{n}\frac{p_{ij}}{n})\times w_j\right) \text{ where } 0 \le w_j \le 1$$

The MAD theory translates more clearly the dispersion of certain assets, in particular when the distribution is not exactly regular, with less emphasis on deviations.

5.3 Risk hedging

Management companies, depending on their investment policies, may have recourse to derivative techniques and financial instruments (forward, futures and money markets, options and swaps) to hedge the risk of the assets forming the funds they manage. Risk exposure resulting from the assets underlying the derivative financial instruments cannot exceed the value of the fund's net asset and, in case of instruments traded out of the regulated market, the fund's exposure cannot exceed, per counterparty, a third of its assets. Generally, the of derivative products valuation takes into account the probable final value and it is based on criteria derived from the value of bid offers, disclosed through specialised media such as the "Bloomberg" system. In the absence of such conditions, recourse is usually made of universally accepted evaluation models.

Managers believe it is worth resorting to hedging. Investors, in turn, have a different opinion, since they can chose a number investments (diversifying their investment portfolio) reducing their profit only slightly in case of risk. If we consider that expected cash flows follow a normal distribution with $\mu = E[V]$, where V corresponds to the value of future cash flows, the hedged position will be as follows:

Figure 1 – Expected profitability from risky/risk-free investments
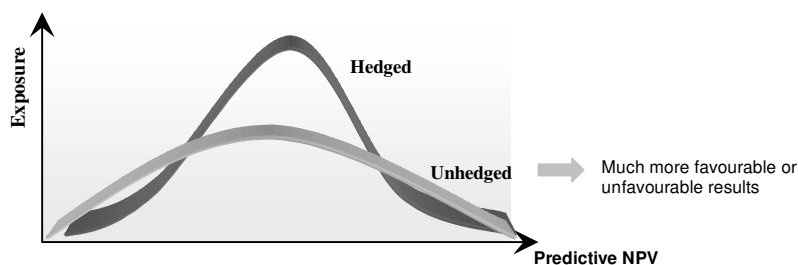
On the other hand, if the position is maintained unhedged, the curve will present a wider probability dispersion through several possible results for V. Therefore, the hedged position will allow a higher accumulation of probability to occur E[V], which means a decline in uncertainty against the payment of a given price.

Management companies base their investment policies on strict profitability and risk-diversification guidelines, aiming at maximizing the value of the fund units, by means of a thorough selection of the asset, chiefly real-estate, which form their portfolio at any moment in time. Holders of real-estate investment funds receive returns from the investment of their assets, mainly from two factors: rents from buildings and the valuation of real-estate over time. In order to reduce real-estate risk, funds managers try to diversify their real-estate investments by managing the investments preferably according to variables that are justifiable from an economic point of view:

- Acquisition of real estate or autonomous units;
- Sponsoring of real-estate construction projects, intended for their subsequent sale or rental;
- Associating with partners of recognized "know-how", intending to sponsor construction projects and their subsequent sale or rental;

- Real-estate rental, taking advantage of the better rental market conditions;
- Sponsoring programmes of construction plots, intended for subsequent sale, construction or exploitation;
- Acquisition of other rights on real estate, within the limits of the law, intended for their economic exploitation;
- Real-estate corporations, whose properties fall within the objectives of the Fund and that comply with the investment policy already defined, as well as real-estate investment fund units.

All in all, the variable rent gives rise to regular returns, and may be an alternative to the sale of the property, which only generates returns once. Therefore, funds may privilege rental to the detriment of sale, with clear advantages in terms of risk. The behaviours of the various office, housing, storage and trade markets are not perfectly correlated and react differently to the same economic factors. Management companies shall therefore invest in more than one segment, protecting their portfolios from negative changes in any of such segments. On the other hand, different regions have different economic supports, wherefore investments in different geographical areas may protect the portfolio from negative changes in any of those regions. Business developments also offer diversification opportunities: in one hand, investment in a plot of land for construction (maximum risk); on the other hand, rented buildings (minimum risk) where revenue flows have already been broadly determined.

5.4 Political risk
According to Buckley (1996), the political risk can be defined as an exposure to changes in investment or in the return of the cash flows resulting from changes in government policies. This type of risk is included in the composition of country risk. The evaluation of country risk usually takes the form of a *rating* or *ranking* by specialised publications in each country and covers factors such as political risk, economic risk, financial risk and transfer risk. Some international organisations systematically and permanently monitor the regular development of the economic and political situation in all countries, assigning them a risk country evaluation, such as OECD, Ducroire-Delcredere Country Risks, International Country Risk Guide (ICRG), Euromoney or Auslands Geschäfts Absicherung (AGA).
There are more radical situations involving political risk: expropriation or nationalisation. According to Buckley (1996), some concessions must be followed in case of an expropriation situation, namely: to accept local partners, to change expatriation management, to increase local investment, to contribute to political campaigns, to discontinue the payment of dividends, etc. Also worthy of mention are the threat of possible confiscation of resources and the possibility that foreign currency may become less convertible. In such occurrence, the investor should obtain local loans rather than incur the risk of having his revenue blocked.

5.4.1 Political risk quantification models
According to Shapiro (1999), some models make it possible to quantify the acceptable political risk. This author developed a series of probability analysis models for special cases of measures to be implemented by the government. The main point will consist in calculating and analysing the impact of a series of measures implemented by the government on the cash flows of the investment project. The cases to be considered will be expropriation, blocked funds and increased taxes.
In the case of **expropriation,** the suggested proxy examines directly the impact of expropriation on the project present value, as follows:

$$VAL = -I_0 + \sum_{t=1}^{k-1} \frac{CF_t}{(1+r)^t} + p_k \frac{C}{(1+r)^k} + (1-p_k)\sum_{t=k}^{n} \frac{CF_t}{(1+r)^t} \text{ with } p_k = \frac{-I_0 + \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}}{\sum_{t=k}^{n} \frac{CF_t}{(1+r)^t} - \frac{C}{(1+r)^k}}$$

Pk – Expropriation probability;

CF – Remittable net cash flows generated by the project in year t;
Io – Initial investment;
r – Appropriate discount rate;
t – Time horizon of the analysis;
k – When the expropriation occur;
C – Compensation paid by the Government.

In the case of **blocked funds,** the suggested proxy examines directly the impact of the blocking of funds on the project present value, as follows:

$$VAL = -I_0 + \sum_{t=1}^{j-1} \frac{CF_t}{(1+r)^t} + p_j \sum_{t=j}^{n} \frac{CF_t(1+i)^{n-t}}{(1+r)^n} + (1-p_j) \sum_{t=j}^{n} \frac{CF_t}{(1+r)^t} \quad \text{with} \quad p_j = \frac{-I_0 + \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}}{\sum_{t=j}^{n} \frac{CF_t}{(1+r)^t} - \sum_{t=j}^{n} \frac{CF_t(1+i)^{n-t}}{(1+r)^n}}$$

Pj – Probability of blocked funds;
j - When funds became blocked;
i – Annual rate of reinvestment in the blocking territory;
n – Blocked funds remitted to the end.

In the case of **increased taxes,** the suggested proxy examines directly the impact of the change in the tax rate on the project present value, as follows:

$$VAL = -I_0 + \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} + p_m \sum_{t=m}^{n} \frac{CF_t - \pi_t \Delta T}{(1+r)^t} + (1-p_m) \sum_{t=m}^{n} \frac{\pi_t \Delta T}{(1+r)^t} \Leftrightarrow -I_0 + \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - p_m \sum_{t=m}^{n} \frac{\pi_t \Delta T}{(1+r)^t}$$

with $\quad p_m = \dfrac{-I_0 + \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}}{\sum_{t=m}^{n} \frac{\pi_t \Delta T}{(1+r)^t}}$

Pm – Probability of a tax increase;
m - When a tax increase coming;
ΔT – Change in the tax rate;
πt – Taxable profits.

In general, $\quad VAL = -I_0 + \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} + p \times PV \quad$ where $\quad p = \dfrac{-I_0 + \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}}{PV}$

P – Probability of occurrence of political risk event
PV – Present value of the renounced cash flows due to the political risk incurred

These quantitative measures make it possible to analyse the political risk in invested capital, and is the basis for a subsequent analysis of sensitivity to more critical variables.

6. Conclusion

Economic globalisation associated with sharp and volatile capital flows raise the issue of "Risk evaluation and territory profitability" as a crucial topic to be faced by investors. The utilisation of economic and financial models should be considered by any manager with the aim of investing the corporation funds, taking into account the inherent risks as an indispensable factor in the evaluation of real-estate investment profitability.

Municipal development planning is fundamental and should envisage a financial stabilisation strategy, looking for equilibrium equations among investments, permanent charges and financing sources. It is essential to have an available ample, reliable and transparent data on the market and its agents with a high degree of real-estate securitisation and institutional investment, within the context of a clear, stable and effectively implemented legal framework.

It is indispensable to pick up the economy in the territory and to adopt the appropriate plans to regulate the real-estate market. It is therefore essential to develop data on the real-estate market anchored on pillars based on a technically more sophisticated market evaluation code and on an official evaluation code able to maintain "normal prices" that are a reference for the evaluation of market volatility. This should therefore make it possible to establish a market-regulating land policy.

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