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"THE VALUATION PROCESS OF REAL ESTATE INVESTMENT PROJECTS"

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Firma dello studente

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"Come raggiungere un traguardo? Senza fretta ma senza sosta."
GOETHE

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Introduction

The ownership and control of a building have been deemed a central issue for an individual's life because real estate fulfils the primary human need of home.

However, nowadays people often decides (for cultural, social and mainly economic reasons) to rent the apartment in which to live or work, renouncing to fully control the property through the purchase.

Consequently, many individuals, those have the financial capacity, purchase real estate not with the aim of personal satisfaction of primary needs but for preserving capital and making a profit.

Thus there are two reasons that induce the economic player, household or company, to purchase an urban property:

• Have an advantage from the self-consumption of the real estate, when the property is used as a home or is instrumental to production;

• Generate future cash inflow when they see the acquisition of property as an investment.

This thesis investigates the real estate investment world from the point of view of companies those own income-producing properties and it is organized is such a way to have a complete overview on the property market, on the international standards that regulate the transcripts of the financial statements and on the most used evaluation technics for appraise an entire property investment. We are going to support the final part of investment access with real case data.

The first chapter is useful to set the framework of our work. The initial step is to clarify both the advantages and the risks of investing in this sector. When the main strengths and weakness are well-defined, the appropriate characteristics of a market research are presented and the decision making process and the subsequent investment strategy are described.

The second chapter is concerned the International Standards for Real Estate Valuation. Indeed we have considered opportune to have a brief overview to the different valuation property technics and the strictly regulation that standardizes the evaluation process and the transcription of the data in the financial statements.

In the third and fourth chapters the thesis becomes more practical with the application of a real case for better understanding the steps of investment evaluation and risk analysis.

In particular the third chapter is about the feasibility analysis. The feasibility study can be defined as a technical-economic project to verify the existence of a reasonable chance of meeting the objectives of an investment through a selective action of mutual adaptation between solution implementations and limited financial resources (Manganelli, 2015). We are going to develop a feasibility analysis through the most used indices, such as mortgage constant, debt coverage ratio, break-even point, rate of return on capital invested and on equity invested.

After the feasibility analysis, the investor needs a more sophisticated analysis that measures cash flows for each year over the expected holding period of the investment. For this reason the computation of Internal Rate of Return and its comparison with the various capital costs is needed. Also, a careful risk analysis is fundamental for a wise investment activity. The analysis should permit to vary the assumptions to simulate a pessimistic and an optimistic set of outcomes and to analyse the main sources of income.

This two functions of the investment analysis, known as cash flow analysis and risk analysis, are discussed in the fourth chapter of our thesis.

CHAPTER 1

Real Estate Market

1.1. Real Estate Investor Motivations

Why do people invest? Some economist argue that people save a portion of actual income to endow future consumption and consequently handle investment decisions frequently. Rarely, however, is the consumption argument stated by real estate investors (Pyhrr and Cooper, 1982). For these reason we cite below the main advantages and disadvantages of real estate investments.

1.1.1. Investment Advantages and Returns

Investment incentives and returns are obviously different for each investor. Individual motivations vary considerably from corporate or institutional objectives. The perceived advantages of certain real estate investments could change also over time and have to be revaluated every so often in accordance with varying approaches and strategies. These investment benefits and returns are reported by Pyhrr (1982) and they are normally an arrangement of the following:

- Pride of ownership: Many investors have the need to own and control real estate for his or her status. Owning a real estate is an emotional experience for many people and this is an important attribute to be recognized and dealt with (Pyhrr and Cooper, 1982).

- Personal control: This asset, different from bonds and stocks, gives the investor an opportunity to exercise personal and direct control over the asset. For many investors, the possibility to control directly a property, without interference from partners or other investors, is a sufficient reason for participation in real estate.

- Self-Use and Occupancy: Many investors acquire real estate for their own use. For example a purchase of single-family dwelling or condominium unit is a form of investment provides both physical shelter and tax shelter (Pyhrr and Cooper, 1982). Furthermore, the owner benefits from appreciation of property value and rent payments.

- Estate building: An investor can firstly acquire leveraged real estate, reinvesting then the money raised (which can be tax sheltered) and over the long run building up equity through loan amortization and appreciation of property value. Periodically, estates can be refinanced and the money reinvested tax free in other properties, replicating the process.

- Security of Capital: Mortgage investors try to protected their investments by logging liens against properties and demanding personal guarantees and assured collateral. Compared to other investment forms, real estate is usually ranked very high relating to security of capital.

- High Operating Yield: Through tenancies the investor can obtain a good return with minimum of risk. While before-tax yields are attractive to pension funds, which are tax exempt and often prefer to buy debt-free properties, most investors prefer to evaluate properties on a leveraged basis and take tax shelter factors into consideration (Pyhrr and Cooper, 1982).

- Leverage: One of the main positive effects of real estate is the investor's possibility to control a large asset with a small amount of equity capital. Through a high degree of leverage, investors can use other people's money to achieve their equity yield to significantly higher levels. Leverage financing, thus, is a key factor in most real estate investments.

- Tax Shelter Factors: Investors utilize tax-planning techniques to maximize after-tax cash flows over the long run.

- Capital Appreciation and Protection Against Inflation: The investors would receive a return from increases in property value. In addition to receiving cash flow they can benefit from tax shelter and equity build up through loan amortization. Furthermore, appreciation can be produced by two factors. First, it can be arise from an increase in demand relative to supply in a noninflationary economy. Secondly, price inflation can increase property prices noticeably.

Because of what has been described, we can infer that the most important advantages of real estate investment are the capacity to preserve capital by inflation, associated with a low risk profile, which has a good chance of funding being provided.

To these advantages, there is also the opportunity of having a noteworthy personal control over project management and capital invested. The investor throughout the holding period, must decides the best financing required for the acquisition of the property, the

administration that ensures the achievement of the objectives, the terms of the sale of the project, end all the other issues necessary to fully control the entire development investment.

Finally, among the positive reasons that can justify investment in real estate, especially for those who want to make their portfolio efficient, Manganelli (2015) explains that there is certainly a low correlation with other investment opportunities[1] (Fig. 1.1).
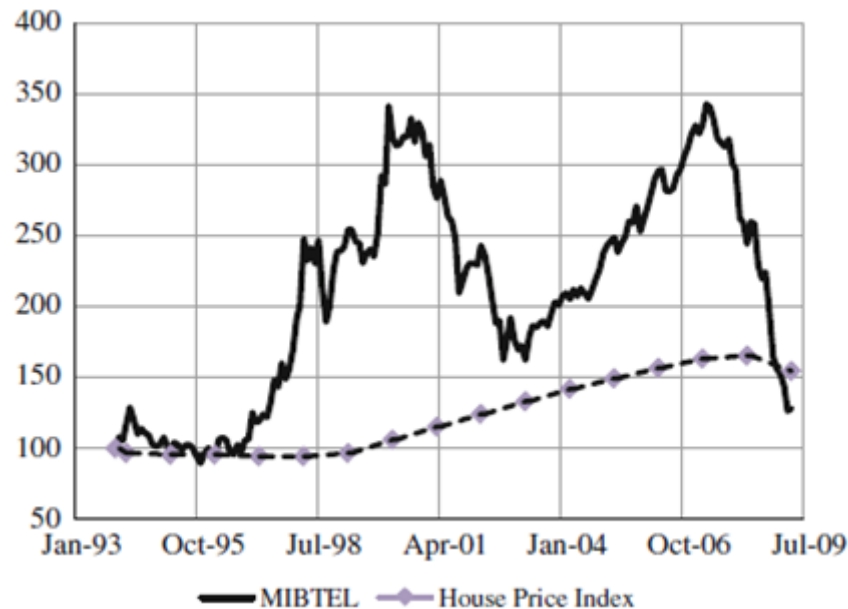
Fig. 1.1 Trends in real estate prices and stock market in Italy (Manganelli, 2015)

1.1.2. Investment Disadvantages and Risks

With the many apparent advantages and benefits emanating from real estate investments, it seems as every investor should invest all his or her savings in real estate sector. However, after careful analysis, it becomes clear that many advantages of real estate investment are really traps for the incautious. Pyhrr (1982) underlies also significant disadvantages, risks, and uncertainties associated with real estate investment:

- Illiquidity: Real estate is difficult to convert into cash quickly. The product is not standardized or traded on an exchange, so the time required for a purchase is relatively long. Sometimes financing is not accessible or interest rates

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[1] While on the stock market, data on returns and trading are widespread minute by minute, the price index and therefore the information on revenues from investment property is updated according to estimates on a weekly, monthly or semi-annual basis. This causes a levelling out of the performance of these indexes and makes it seem as though the real estate returns are less volatile than what they are shown to be, through a more frequent updating of the values.

However, such comparisons, though flawed, are essential for decision-making in the management of a portfolio. In the United States, the strong involvement of institutional investors in the real estate business has greatly contributed to the development of methods for comparison between different types of performance. In any case, the success of these techniques is subject to the update rate of the data (Manganelli, 2015)

make the purchase uneconomical. Moreover an illiquidity circumstance in a situation of financial stress can lead to investor insolvency, bankruptcy and personal ruin.

- The Management Burden: Most real estate investments require a significant effort in terms of personal involvement a this is often a sufficient reason to give up on property investments because it can create severe mental and physical stress.

- Depreciation of Value: While inflation may be raising the monetary value of real estate properties, appraisers are quick to emphasize the *real* depreciation occurs from three sources: physical, functional and locational (Pyhrr and Cooper, 1982).

- Government Controls: The socio-political decisions cause the joint effect of limiting development, restricting acquisition, decreasing cash flow and growth.

- Inflation, Deflation and Real Estate Cycles: Since the values of existing properties tend to move with construction costs and the prices of new properties , investors who have enough carrying power to survive short-run down cycles will usually benefit over the long run in a growing economy in which price inflation is occurring. However this is a little consolation, and it not always work (Pyhrr and Cooper, 1982).

- Legal Complexity: The contracts between owners, lenders and promoters are complex; they can make or break a transaction. Also investor who count on tax shelter to endow an important portion of returns can be deeply influenced by tax law reforms.

- Lack of Information and Education: The information essential to good decisions is imprecise, hard to find and likely to be inaccurate (Maisel & Roulac, 1976). Moreover, investors often don't have the interdisciplinary education necessary for effort complete investment decisions.

In other words, while it is true that real estate investing permits for a high personal control, on the other hand the investor should be prepared to have an active role in managing the investment.

Another disadvantage is linked with the characteristics of the property (non-transferable and indivisible) and the subsequent strong segmentation that decreases the size of the reference market. It may therefore occur that a property up for sale is not sold immediately. The real estate investment therefore has a poor attitude to be readily converted

into cash and, as mentioned above, there are no certainties with respect to the final sale price, in fact it could happen that the sale happens with loss of value. This feature is called liquidity of the investment and it differentiates this investment, little liquid, from other types of investment, which are carried out on very vast markets able to quickly absorb the trade orders.

Real estate is one of the most common opportunities, the investment is differentiated by the lowest degree of liquidity. Fraser (1985) asserts that the importance of the liquidity factor is mitigated because the transactions are less frequent than those of the securities market; at the same time, however, the low frequency of the negotiations was due to reduced liquidity.

Furthermore to the low level of liquidity, investment in real estate has a negative trait: that of requiring the use of a considering big amounts of money for the acquisition of property. While it is possible to access to a quite high level of debt, this does not allow the investor to do not use a significant commitment of funds. The purchase costs are added to the considerable costs for market analysis and to the transaction costs.

Likewise, Manganelli (2015) underlies that, if on the one hand the risk profile of the investor in real estate properties is quite low, the need for strong employment of capital involves excessive concentration of risk. In fact the same capital may be invested in more investment opportunities so differentiating the risk, or remaining in the same industry but amplifying the use of capital, one should be buying more ''diversified'' real estate for use and location to have an efficient portfolio.

Summarizing, every investor should be well motivated to conscientiously judge the risks, in the same way they access the expected returns, that are foreseeable from a property investment. Successful investors study many alternatives and choose the best one. Pyhrr (1982) explains that for doing that, it is necessary that they make a careful analysis of the intrinsic advantages and disadvantages of each investment, followed by a translation of these parameters into a forecast of returns and risks. Plans should always be developed to minimize risks and consequences of wrong judgment.

This is what we are going to do in the next chapters.

1.2. The Nature of the Real Estate Market

The real estate market is not a perfect market[2], but, in some cases, but takes on connotations that make it near monopolistic market structure (Manganelli, 2015), because of

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[2] A market is perfect if it is characterized by strong competition and there are the following conditions: (1) there are a large number of buyers and sellers with the opportunity to undertake free negotiations, and (2) the good traded are of uniform quality, and (3) each operator has full knowledge of the characteristics of the asset.

the very specific characteristics of a property and of the submarket where it is placed and the limited offer of buildings in a certain area. Between the causes that contribute to the imperfection of this market, the greatest problem is certainly due to the heterogeneity of the properties (for location, intended use, age, quality, size, etc.). Though the imperfection of the this market is also due to the lack of transparency of the mechanisms that generate prices and subsequently the difficulty in finding complete information about the transactions. Another factor of inefficiency in the real estate market is in the characters of the supply. In fact, if the demand, although pushed by different motivations can be considered pulverized, the same cannot be said with regard to the supply (Manganelli, 2015).

In real estate market, prices are not determined by many actors that compete for a similar goods, but on the contrary they tend to be set as a result of infrequent trades of real estate that could have very different characteristics, negotiated between interacting parties based on limited and often asymmetrical information. Manganelli (2015) confirms that the housing market has characteristics that are in the midway between monopolistic competition (the existence of a number of competing operators that produce goods which are sufficiently distinct to allow the consumer more choice) and the oligopoly (few sellers and market conditions prevent the entry of new players in the supply). Indeed economists categorize forms of market both according to the power that actors have to influence prices and depending on the speed with which new information is reflected on values. Buyers and sellers have a price-searching behaviour.

The following sections clarify the distinctive reasons for its inefficiency or imperfection.

1.2.1. Segmentation

The housing market can be seen as a complex aggregation of numerous submarkets discernible in relation to the factors that determine the demand and supply and the manner in which the two functions interact (Manganelli, 2015). A certain degree of homogeneity of the product can be defined within these submarkets and within certain limits. For example, the fixed location is one of the main factors that makes the property unique. The assets that belong to the same segment can be considered as a set of similar products, namely connected by an almost continuous "chain of sustainability", that compete in the search for the buyer through the price mechanism (Dandri, 1969).

The degree of substitutability between two properties can be measured using the concept of cross-elasticity of demand. In other words, if the increase in the price of property

A causes an increase in sales (and therefore demand) of property B, then A and B are substitutable goods (Triffin, 1947). Obviously, the greater the ratio between the variations of demands of B with respect to the change in the price of A, the greater the degree of substitution between the two properties.

In the housing market, when the prices of properties in a given area grows and this produces an increase in prices in another area, then these areas belong to the same submarket. Looking at the mechanisms of the formation of values and rents shows that the most important segmentations are determined by location and destination (Manganelli, 2015).

Nevertheless, in some cases the limits of a definite market are difficult to establish. Some submarkets have a very great spatial horizon or are at least unclear. For certain targets or types of buildings, the market may have a regional or national range.

1.2.2. The Short and Long Period

In analysing the behaviour of sub-markets, some economists have distinguished a standing stock period and a construction period, namely a static phase and a dynamic phase. It is, of course, a purely conventional classification since in fact the market is never completely stopped (Manganelli, 2015).

Manganelli explains that this hypothesis imply that in the static phase new buildings are not built and property stock remains unaffected. The static phase coincides with the condition that economists call the short term, an interval during which the entrepreneur is not able to change the total factor productivity. This happens because in the short term (i.e. in the static phase) the supply is realistically rigid so it is an acceptable approximation. In the static phase the prices and quantities traded (the number of transactions during the period) are thus essentially determined by the behaviour of potential buyers (demand).

The dynamic phase, on the contraries, coincides with the medium to long term; the prices depend on the presence of new construction, from demolition and/or processing. In other words the prices are mainly determined by the sellers (supply).

1.2.3. Cycles in the Housing Market

Manganelli (2015) defines the term cycle refers as the recurrence of fluctuations that characterize the equilibrium of the real estate market, never stable. By a cyclical movement the author means that "as the system has an upward direction, the forces pushing it upwards at first gather force and have a cumulative effect on one another but gradually lose their strength

until at a certain point they tend to be replaced by forces operating in the opposite direction; which in turn gather force for a time and accentuate one another, until they too, having reached their maximum development, wane and give place to their opposite". This means also that there is some recognizable degree of regularity in the time-sequence and duration of the upward and downward movements.

A proof of the cyclical nature of the real estate market is also the diagram in Fig. 1.2, which relates the relative property price index to the market of residences in Italy with the corresponding index representing the number of transactions (NTN).
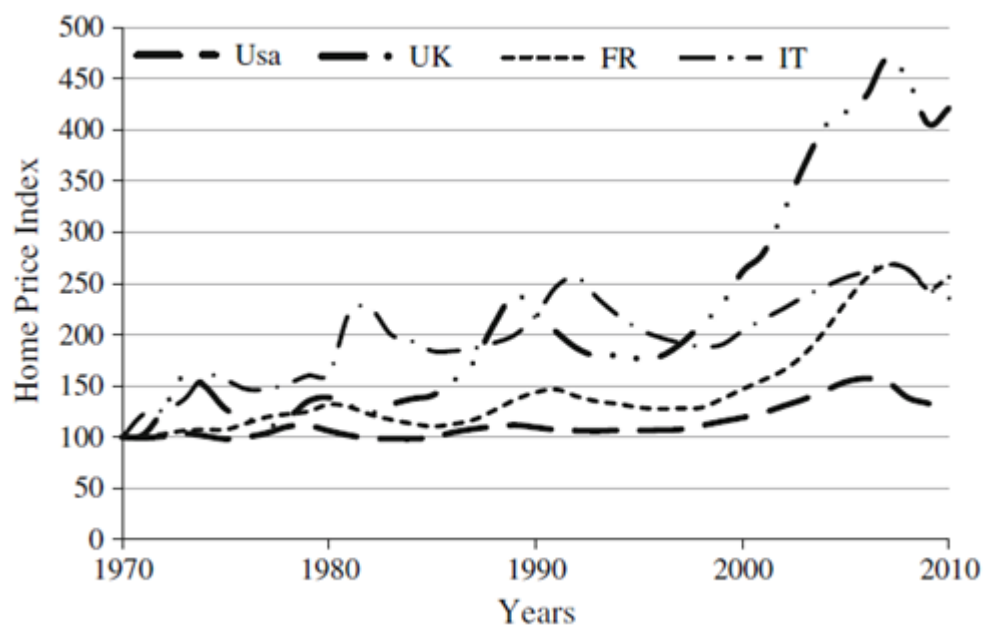
Fig. 1.2 Prices of residential property registered in the USA, the United Kingdom, France and Italy, 1970-2010 (Manganelli, 2015)

However we should take into consideration also the phenomenon of the crisis, that is the fact that the substitution of a downward for an upward tendency often takes place suddenly and violently, whereas there is "no such sharp turning-point when an upward is substituted for a downward tendency" (Keynes 1936).

In this cycles Manganelli (2015) identifies four phases. In the first prices are stable but the number of transactions grows. Explicitly, in this phase the price is lower compared to a hypothetical equilibrium condition. In the second part, the supply, taking into account its distinctive rigidity, responds to the increase in demand and prices begin to rise. The increase in prices and the consequent higher profits that are produced, attract new investors and encourage the old to take advantage of the positive moment. As result new properties are build, trying to capture the higher demand. In the third phase of the property cycle, a slow

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decline in the value of property begins. The supply is at its maximum and tries to resist a quick decrease in the number of transactions. It is the most risky phase of the market cycle. Indeed demand is no more capable to match the number of new properties which have come in the market, and not at the high prices they were originally quoted at.

In the fourth stage, the value of property drops at a very fast rate and demand for property begins to decrease significantly. Actors involved in the real estate market become conscious of the overvaluation of property prices and the fear of the decline in the property market leads to many people backing out of investment in property.

The prices remain low until the excess supply is exhausted and at this point, the market begins to grow to the next peak. The imperfection of the real estate market contributes to the perpetuation of this cycle. The lack of information and the length of time it takes to construct new property contribute significantly towards the imperfection in the property market.

In the real estate market the demand reacts first because of the increased rigidity of supply. So the supply is subordinated to the demand. The pursuit of demand is uninterrupted and the meeting between supply and demand is never a stable situation. However it is important to underlying that in spite of the cyclical fluctuations in the medium term that characterize all real estate submarkets, in the long run an increase in the value of property is observed (Manganelli, 2015).

In other words the equilibrium condition around which the market revolves is not stationary.

1.2.4. Global Linkages

While the benefits of integrated markets are still present "after the fall", the internationalization of real estate has primarily concerned large urban areas (Tiwari and White 2010). The authors explains that in these large urban areas, supply and demand for real estate are affected by much of the same market fundamentals and the market drivers that have affected this integration of supply and demand for investment property in urban markets are still in operation. Goddard and Marcum (2012) claims that after the fall it has been clearer that the markets don't move in unison. In effect while the globalization has increased the integration of world markets, urban centers face differences in the real estate market cycle. Moreover, smaller cities and more rural communities are less connected then large cities are to other large cities throughout the world. Thus these smaller communities face higher differentiation in market cycles than the urban centers. This implies that the profitability of an

investment property is highly dependent on the region where the property is located. Thus, the specific location of a property is very important in determining the viability of an investment alternative (Goddard and Marcum, 2012).

Jones, Lang, and Lasalle[3], a professional services and investment management company specializing in real estate with global headquarters located in Chicago, produce a quarterly "property clock" which discloses in which area of the European market cycle a specific market (i.e. a City) falls relative to a specific property type (i.e. residential property). The property clock (as shown in Fig. 1.3) consists of a circle with four quadrants representing whether the rental rates are accelerating, whether rental growth is slowing, whether rental rates are falling, or if rental rates are bottoming out.
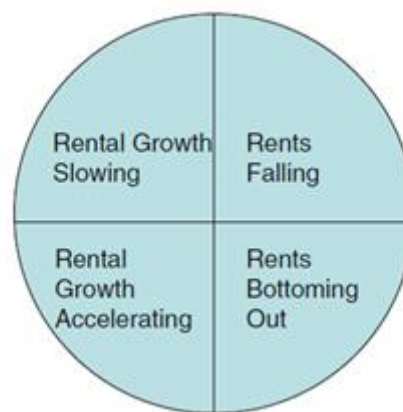
Fig. 1.3 Jones Lang Lasalle's "Propery Clock" diagram (http://www.ap.jll.com/)

1.2.5. Comparative Advantage

Some geographic areas performs better than others due to the idea of comparative advantage developed by the economist David Ricardo. From the point of view of real estate context, some locations will outperform other locations because of specific aspects that are location determined. Sometimes these specific factors could be natural advantages. For example a property could receive capitalization effects being in proximity to tourist or beach destinations (retail, residential, hotel, etc.). Ceteris paribus, these natural advantages serve as a comparative advantage from one location relative to another (Goddard and Marcum, 2012).

Other comparative advantage determinants are not as easily quantified, like, for example, the proximity of major employment hubs. In this case most broker packages reveal

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[3] For updated data see: http://www.us.jll.com/united-states/en-us/research/property-clocks/retail-property-clock

the primary employers in a certain area and compare residents growth with regional and national averages[4] (Goddard and Marcum, 2012).

1.2.6. Supply and Demand Analysis

Goddard and Marcum (2012) explain that once the comparative advantage of a given market is determined, the next step is to predict the level of supply and demand for an investment property in a given market[5], because the determination where a current market is with respect of the availability of space will reveal whether lease rates in the area are increasing or decreasing.

This could imply that the current vacant space[6] is considered inappropriate because of the age or condition of the space or that the vacant space is relatively new and has not been on the market long enough to be occupied by willing tenants but, in any case, vacancy occurs in the market. Of course if the level of vacancy decrease drastically, the rent price for the remaining space will increase and probably property developers will infer a profit opportunity and new construction projects will result. If new space is added to a market lower the occupancy rate, negative absorption has occurred. If new construction continues persistently, the market vacancy rate could increase further and the rental rates in a given area drop. Thus, new construction and the desirability of existing space in a given market can help to determine the forward evolution of rent rates. When in a certain market the quantity of space demanded falls, at the same way does the price of rental space. Property owners in a market with negative absorption may consider alternative uses for a given property (Goddard and Marcum, 2012).

Mueller (1999) provides as illustration of this concept Fig. 1.4. A dark line in Fig. 1.4 represents the long term average occupancy rate for a given market. When the current occupancy rates are less than the average occupancy rate, rents are not increasing and in fact may be decreasing depending on the current market cycle quadrant for the given market. Once the current market occupancy rises above the average, new construction may ensue. Rental rates will increase until supply equals demand. If the rental rates increase beyond the market equilibrium point, eventually new construction will begin to diminish the rental rates for newly signed leases.

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[4] Evaluating the primary employers for a given area is known as economic base analysis, which involves the calculation of a location quotient.
[5] The market equilibrium is here defined as the currently experienced level of occupancy, lease rates, and property expenses per property type in the region.
[6] For example, consider a given market that has an overall occupancy rate of 80%. This implies that the amount of currently available space (vacancy rate) is 20% higher than the current level of demand.

As shown in Fig. 1.5, the market quadrants can be added to the viewpoint and the real estate market cycle can be broken up into four phases. The first phase is the recovery phase that is where many markets find themselves today after the last financial crisis. During the recovery phase, no new construction is planned and vacancy rates are beginning to show improvement and for this reason rates begin to bottom out.
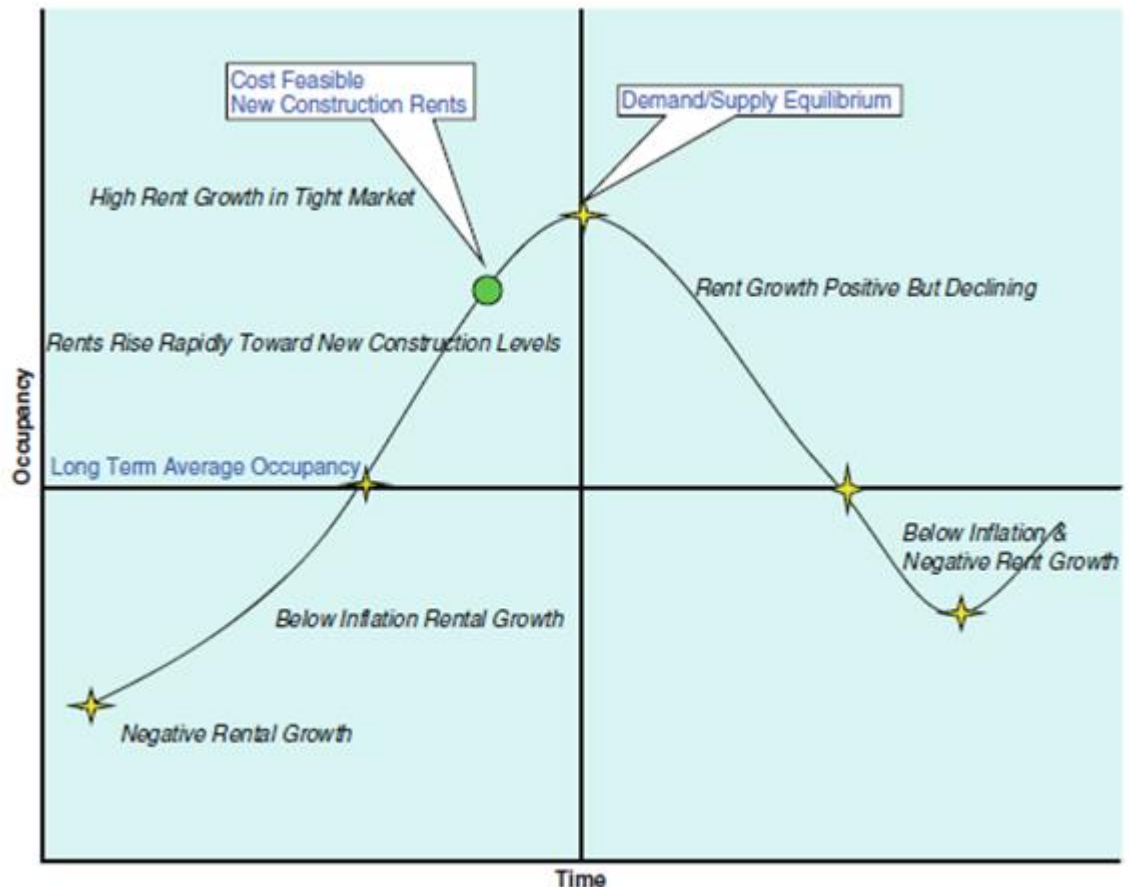
Fig. 1.4 Physical market cycle characteristics (Mueller, 1999)

Because of the recovery of the market improves, vacancy rates drop and rental rates rise and for these reason new construction are planned and the expansion phase start again. The expansion phase continues as long as rental rates continue to increase and the underlying economic conditions of the market remain positive. Eventually the demand and supply equilibrium point is achieved. Unfortunately the equilibrium point of the market is typically determined after it has been realized because there isn't any indication that signal the achievement of the equilibrium. This means that those projects that were completed after the equilibrium point was achieved will not experience occupancy and rental rates as were expected at the start of construction. Mueller (1999) claims that this period of uncertainty is the third phase and is known as the hyper-supply phase. Towards the middle to end of this

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third phase, increased vacancy ensues as new construction continues with the resultant negative absorption. The fourth phase is known as the recession phase. In this phase of the market cycle, rental rates drop, vacancy rates increase, and new construction ceases. The length of the recession phase depends on the level of overbuilding in the market, the severity of the economic downturn, and the strength of the market fundamentals.
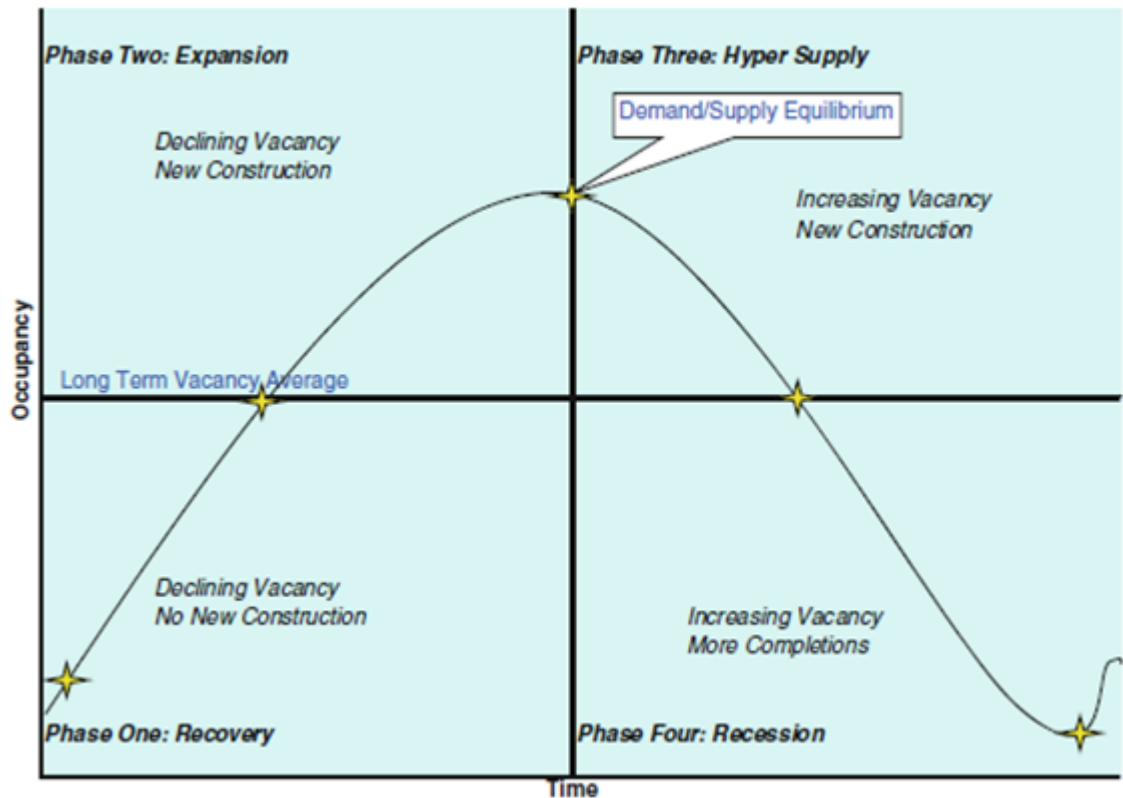
Fig. 1.5 Market cycle quadrants (Mueller, 1999)

1.3. Property Life Cycle Pyramid

Pyhrr and Cooper (1982) have design the property life cycle pyramid to exemplify that, from an investment timeline perspective, investment real estate tends to exhibit certain known characteristics regardless of property type. As shown in Fig. 1.6, the pyramid has an upside period where risk at the beginning is high and then it decreases, and a downside period where risk increases as the property ages over time.

During the first four stages of the pyramid developers are the typical investors. In fact developers will typically establish how an existing portion of land (or an underutilized building) can be developed thus that the entrepreneurial profit can be achieved. This process

is presented as the "ground floor" first stage in Fig. 1.6. The second stage of the pyramid would typically involve pursuing a loan commitment from a financial institution.

When financing has been obtained, the investor will invest additional equity into the project so that construction (or renovation) can begin. This construction or renovation of the building is illustrated as the interim stage of the pyramid.

The fourth stage referred to tenancy. During this stage, tenants occupy the property hoping to achieving a break-even occupancy rate, where the gross revenue is equal to the sum of the annual operating expenses and annual debt service requirements (Pyhrr and Cooper, 1982).
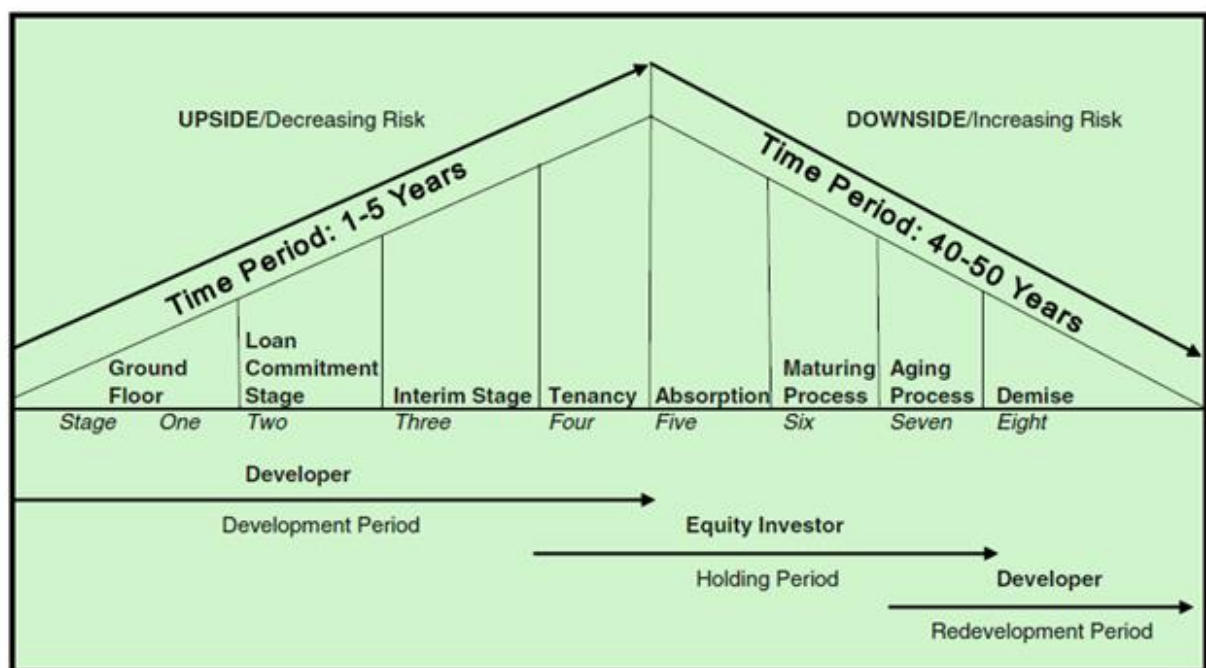
Fig. 1.6 Property life cycle pyramid (Pyhrr and Cooper, 1982)

When occupancy rises above the break-even rate, cash flow starts to accumulate to the investor. This stage represents the "top of the pyramid" and presents the best possibility for the initial investors to realize profit by selling the property to equity investors. In the aftermath of the "Yes era", many projects had difficulties moving from the tenancy stage to the absorption stage, as break-even occupancy proved to be a chimera (Goddard and Marcum, 2012). As a property ages, any premiums achieved in rent and occupancy given innovation or superior condition will decrease. So conservative equity investors could find the absorption and maturing process stages to be more appropriate periods for investment than the earlier stages. For illustration purposes, Fig. 1.6 assumes that the third stage is the initial construction or main renovation of the property for its highest and best use.

The long downward slide from a property value perspective starts in the absorption stage. Given the time period of 40-50 years, many equity investors could buy and sell the property before the necessity for redevelopment at the end of the economic useful life of the property.

In practical the property life cycle pyramid is helpful to illustrate how different stages attract to different investors. The illustration also suggests that there is a trade-off between risk and return over the property life cycle (Pyhrr and Cooper, 1982).

1.4.The Market Research

In the paragraphs above we have seen some important characteristics and mechanisms that influence the housing markets. However it's important to focus our attention also on the practical process of a market research. In fact the success of a good investment is based on an adequate market research because the peculiarities of the real estate market and, in particular, the large possibility of differentiation of investment properties, compel to increase efforts in the research market, surely greater than those required in other sectors of the economy (Manganelli, 2015). For this reason these paragraph lays out the key phases of market research and classifies its essential parameters, the results of market research that are used for the final decision.

The main goal of these studies is to forecast the potential demand and the supply's conditions today and tomorrow. In this sense the output of market research have to provide useful information for locating and defining architectural building products, and then the basic elements for the calculation of return on investment (Manganelli, 2015).

Not only entrepreneurs direct housing market researches but also other subjects involved in this sector such as banking institutions interested in assessing the risk of interventions, or the Public Administrations in order to provide the guidelines for the development of cities and the amount of services and necessary infrastructure. Clearly, every operators will complete a research in line with objectives of their studies.

1.4.1. The Accessibility and Quality of Data and the Source

For making a market research the collection of a sufficient amount of information is necessary. However this part is hindered by low availability and quality of the information delivered. On the, other hand, Manganelli (2015) says, in recent years (especially after the financial crisis) a more important role is being given to the financial analysis of real estate investments and a creation of comprehensive and detailed databases is going forward.

Regarding to the sources from which the information comes or depending on the way it is collected, the information is divided into primary and secondary.

Primary information is taken from direct sources and the analyst find it as a function of a particular type of investigation; secondary information comes from indirect sources and consequently it is collected previously and for different purposes depending on the aim of the research. Obviously, the first involves a greater expenditure of resources, while the main shortcomings of secondary information are related to the form in which they are made available (usually not consistent with that required by the analyst) and the fact that they are often outdated (Manganelli, 2015).

Sometimes these problems can be surmounted through an update and reset of data. So the secondary one are replaced or supplement with the primary ones, that is reachable by a direct survey carried out through observations or interviews.

Whit the term information in the housing market we are referring mainly to the prices because they represent real and objective data (Manganelli, 2015).

An important clarification is reported by Manganelli (2015): "The perfect measures of economic size (the value) relating to goods obviously different from the one to be evaluated; the prices are the only basis of the estimate. When prices are not available or search for these lead times and high costs, it is possible to acquire information about the willingness to pay through interviews. In this way, the market is simulated".

The prices don't exhaust the request for information necessary for an accurate analysis of real estate investment because much of the market survey focus on descriptive elements for example the profile of the typical tenant (based on the information obtained by the tenants of similar properties), the profile of the typical resident/consumer or reactions of the renters to hypothetical future variations in terms of the lease, etc. The indirect sources are divided both in public authorities (Inland Revenue Statistics Institute, the Provincial Administrations, Chambers of Commerce) and in private (estate agents, brokers) specializing in market research. With regards to the information of the price there are several indirect sources that provide average quotations (note that it is not prices) classified by type of property and location (Manganelli, 2015).

The use of these sources is therefore able to provide an overall picture about the trends and market behaviour in a particular area and with reference to particular segments.

1.4.2. The Development of the Research

Market research is formed by a process composed by a series of different stages, becoming more complex and costly as the level of the analysis becomes more detailed.

An investment decision is supported by the finding, organization and analysis of information that may relate to the general aspects of the real estate market, the characteristics of the property and, finally, the characteristics of the investor Of course the basic rule for an accurate market research necessitates the careful definition of the problem to solve and of the goal one wants to achieve before starting to collect data. In this way it is possible to determine the type and amount of information that is necessary. Often the local authorities and Chambers of Commerce drown up the general economic forecasts that are usually available for free or at a modest cost and in this way it facilitates the collection of data referred to the past and current conditions of metropolitan or regional market, and referred to the demographic and socio-economic status of potential end-users (tenants or buyers). However, note that the purpose of the analysis is to estimate the future conditions with reference to a specific property, which is influenced in a limited way by trends in a wide market area (Manganelli, 2015). Moving from the general level of analysis to those progressively more specific, there is less obtainable information.

Obviously it is necessary to understand the economic mechanisms that control the real estate market on a comprehensive scale (national, regional or provincial) is the starting point for the investigation of the local housing submarket. Moreover the specific property is subject to a competition, derived from a very small size sub-market. For this reason techniques that permit to switch from the available data of the real estate market at regional or metropolitan level are used to a forecast of the submarket of which is part the specific property (Manganelli, 2015).

Myers and Beck (1994) have described a possible strategy for generating a forecast on the performance of variables that effect supply and demand of a specific property. It is partitioned into following steps:

I. General data collection: public and private research institutions periodically develop aggregate estimates of macroeconomic parameters.

II. Specific data collection: they proceeds to the collection and organization of information relating to the physical and economic characteristics of the particular market segment to which the property belongs. Through these data they try to forecast changes in the macro-market.

III. Analysis of the relationship between general and specific data. One needs to connect the information previously obtained to those similar relating to the metropolitan area and the region that means they should identify the relationships between the measured variations at regional and national levels, with those that characterize the real estate segment investigated.

IV. Projection of the general indexes: they make forecasts about the most significant regional and urban variables, based on the previously observed relationships that exist between them and other variables in the macro-level.

V. Projection of specific indices: through the comparison of past trends of variables and similar variables related to the real estate segment investigated, correlations that will define the future trend of the specific parameters of the property should be identified.

Manganelli (2015) specifies as the most operative search method consists in arranging from the general level to the specific level, in the following order:

1. Analysis of national economic trends (inflation, interest rates and economic growth) that can, as shown in the preceding paragraphs, to some extent affect the corresponding trend in real estate values;

2. Analysis of economic, demographic and regulatory frameworks of the urban area that could have effected in the local demand for real estate;

3. Definition of the geographical boundaries of the market area for identifying the competition due by similar properties;

4. Analysis and demand forecasting (rent and/or potential sale) in the restricted market.

5. Identification and study of competition in the specific submarket;

6. Estimate of the potential supply of new housing units coming from similar competitors in the next future years;

7. Comparison between the characteristics of the current and future competing properties and targeting of the potential tenants for the property in question.

The results of market research and related analysis should be organized in a final report.

1.5. Reliability of the Research

A market research is effected by the stability of market conditions, the complexity of the property and the risk attitude of the investor (Manganelli, 2015).

In other words if the market is stable and the property has a few peculiarities, research and highly detailed market surveys are not necessary. The investors have to evaluate the more appropriate deepen of the analysis compared with their attitude to risk, avoiding to spend excessive amount of time and money.

Of course in all circumstances characterized by unexpected changes in current market conditions such as new policy guidance, migratory movements and increase in construction activity, investors need to search information and data in quantity and quality sufficient to make predictions about the impact of these changes on the local real estate market.

1.5.1. Costs and Benefits of Research

The deeper the preliminary analysis is the lower is the level of uncertainty associated with the decisions. However an extensive investigation implicates expense so an investor may decide to renounce to a greater knowledge, according to its attitude to risk. Quite the reverse, the investors who don't want to face excessive risks, prefer to spend more resources in research reducing the possible profit margins. The interaction between the extra costs associated with the research and the benefits that are obtained by collecting a greater number of information, is illustrated in a qualitative way, in Fig. 1.8 published by Manganelli (2015).
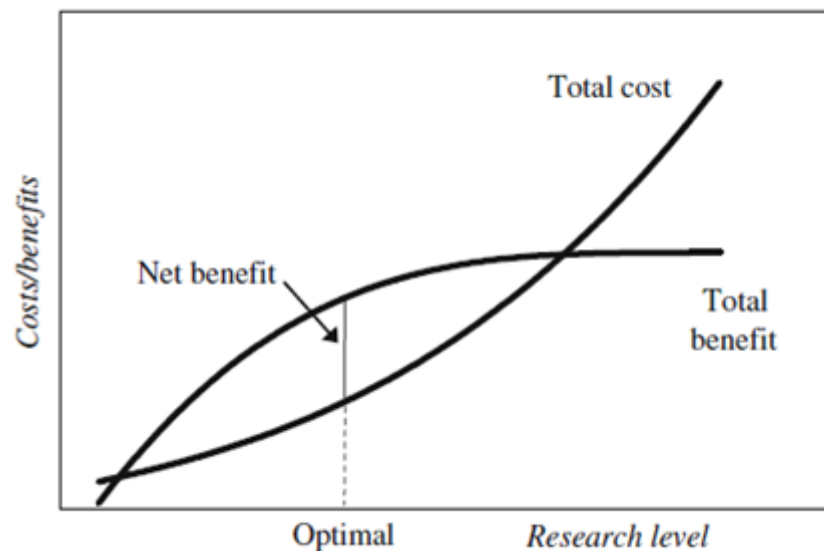

Fig. 1.8 Costs, benefits and optimal level of research

Source: Manganelli (2015)

The author explains that the optimal situation would be that corresponding to the maximum distance between the achievable benefits and costs associated with these. Therefore

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it is not opportune to persist with the research beyond this optimal point, because, after this limit, the higher costs of analysis (marginal costs) would be greater than the gains measured on the benefits (marginal benefits), thus reducing the net benefit. Of course, it's difficult to have an objective measure of the benefit obtained from the research so the optimal level remains a purely theoretical.

1.5.2. Market Potential Analysis

Summarizing the paragraph above, the investment analysis should always include the study of the economic situation of the country and the relationships between the national and the local real estate industry, going from the general to the particular. As we have already said the influence of national factors on submarkets of geographical areas is very significant. However, finding the correlation between the macroeconomic level and the local one is quite complicated and usually the changes in the economy of a country are manifested in the demand and supply of real estate services differently localized and with some delay.

Crucial to the analysis is the information linked with the population, the level of employment, income levels and planning regulations. An clear representation of the importance of such information is evident in the Fig. 1.9 that show the relationship between 'price per square meter to buy apartment in city centre' and 'average monthly disposable salary' (income) for the year 2013 (source: www.numbeo.com).

Manganelli (2015) underlies that an investor "should then complete the cognitive framework by gathering information that takes into account the liveliness and dynamism of the real estate market. One of these is, for example, the volume of loans, which in turn directly connects back, like many other economic activities, to the interest rate applied for funding".

Another crucial data for the market data analysis is the level of rents and occupancy rate of existing buildings. That means, low level of fees can indicate a high supply of spaces and limited demand, such as a high employment rate could imply an imminent rental growth. The social development of a community can be forecasted taking into consideration the number and types of businesses and their volume of business. The economic growth that follows siting of new activities results in increases in population, income and consequently induces changes in the use of soils (Manganelli, 2015).
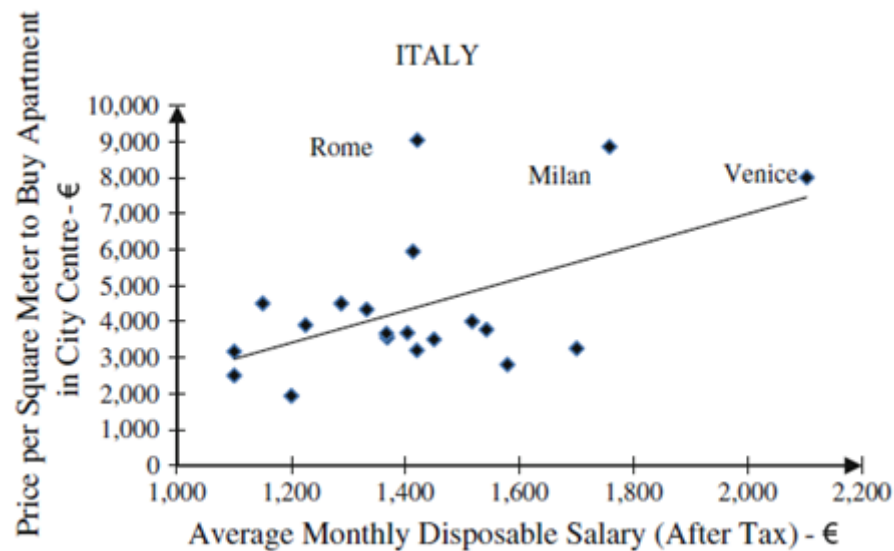
1.9 Relationship between "price per square meter to buy apartment in centre" and "average monthly disposable salary" in major cities in Italy, 2015 (www.numbeo.com)

1.5.3. The Rental Market

The rental market, which has as its object the use of the property, is diversified from the sales market (Manganelli, 2015). Investors often buy real estates because of the ability of these properties to generate a flow of benefits and the most important part of these benefits is originated from net operating income that they obtain from the tenants.

It is important to specifying two distinction among the owners. In fact people has different behaviour if they take advantage of real estate with the primary purpose being a large scale investment activity, compared to those who do not consider property as an economic activity, for example a family purchasing a property.

Manganelli (2015) explains that, although in legal terms an investment activity in large scale cannot give rise necessary to a real business, and thus it may happen that real estate assets of considerable consistency are administered on a family basis, in economic terms the division is necessary because:

1. As we have already said, the rental market behaviour of the small proprietor is different to that of the administrator of large real estate portfolios, especially in the setting of rentals and the choice of the filling rate of the units available;

2. The individual properties show considerable mobility between the sales market and rental market.

As a reference model for the analysis of the trend of the rental market, we are going to consider the supply from companies that offer property on a continuing basis and for which it is their main economic activity.

Businesses operate on the market with the aim of maximizing profit. As regards the market model that can schematize their behaviour, each owner/investor has a very small portion of the total supply and any property is equal to another. Taking this into account and the degree of freedom that the owner has in the determination of the relationship between levels of rentals and vacancy rate, a state of monopolistic competition represents the realty. The owner is conscious that the costs vary marginally with the variation of the vacancy rate while the profit are contingent on the number of units rented and the level of rentals. In these conditions, the economic optimum is achieved with a particular combination of these two variables. The lease is the consequence of a negotiation on the offer of a service, that dourer for all the lifetime of the investment, but the payment of which is not fixed throughout this period. In fact if the rental fee negotiated at the beginning of the service remains unchanged for the duration of the investment, the owner could occupy all units if he or she progressively reduces the rentals up to the point in which the marginal revenue equals the marginal operating cost. Manganelli (2015) writes: "Assuming constant expenditure, that is independent from the amount of rented units, the balance would be achieved by practically nil marginal rentals, namely those offered for the last units still to be rented. In fact, if the owner tries to occupy the units that are still free by reducing the rentals, such action could finally produce a decrease in the net profit; any reduction of the rental applied to real estate, vacancies still will have to be applied in a reasonable interval even to the units already occupied". However in practice the owner cannot keep different rentals for individual tenants for a long time. Consequently in the future he or she will have to combine action on rentals with action on vacancy rate. Once one reaches the equilibrium condition, the ability to increase profits by reducing the vacancy rate can result from an increase in demand. For example, a period of general expansion of economic activity could determines a rise in the demand for production space for rent and this causes a rightward shift of the curves of the average revenue and marginal revenue. In the short term, the presence of vacancy rate implies a certain degree of elasticity of the supply in the rental market, unlike what happens in the sales market. This leads to a new state of equilibrium, which corresponds to an increase in the average level of the rentals and a higher occupancy rate of the properties offered.

The rental market thus shows a different trend to that of the market sales, although the two markets are logically interrelated.

We all know that the main cause of economic crisis of 2008 was housing bubble. The method normally utilised by economists to determine any speculative real estate bubble is based "on the pricing of assets" in practice on the relationship between housing prices and the cost of housing services, that means the rentals. A ratio prices/rentals considerably above its historical average is a indication of an overestimation of house prices. About this Manganelli writes: "The empirical confirmation in fact showed that in the last phase of strong growth in real estate prices (2000–2005) the ratio prices to rentals (index of nominal prices divided by the component relating to the rent of the house price index consumption) reached all-time highs in the countries (Ireland and Spain) where the effects of the bubble were most evident. This approach is based on the concept that rentals are a proxy for the dividend correspondent to the purchase of a property namely the dividend of the nonfinancial real estate investment business". From this point of view, with the same boundary conditions an expected increase in future dividends leads to an increase in the value of the underlying asset. That is to say, high rents rise the demand for investment, causing the increase of purchase prices. Instead the opposite mechanisms should be generated when low returns in the housing market (low compared with returns on alternative investments, which in turn may be reflected in mortgage rates) result in an increase in the demand for rent by individuals who find it more convenient, with respect to the purchasing of the property. On the other hand an overestimation of the purchase price of the real estate would lower purchases and increased rental demand, which in turn would rise even to the rentals. To explain this, we can looks at housing as a consumer good and the purchasing and renting must therefore be observed as perfectly substitutable economic actions in relation to the need to satisfy. It's fundamental to remember that two substitutive goods or services have positive cross-price elasticity of demand: that is, the higher the degree of substitutability between two properties, the greater the decrease in demand for a property, due to the increase of the price of the other.

An indicator that represent exactly the relationship between housing prices and rentals, that means that reflects a real condition of over or under evaluation in the real estate market, is not available because different external forces are acting on the two compartments or the same actions can produce different effects on the two markets. Some studies in literature show that price developments in the two compartments strongly divert (Fig. 1.10). In a previous book, Manganelli explains that the structural limitations of this kind of models are related to the current legislation of rentals, the procedures for measuring reference prices, as well as the different liquidity of the sales market compared to the rental market due to high transaction costs and constraint indebtedness (Manganelli et al. 2014a).
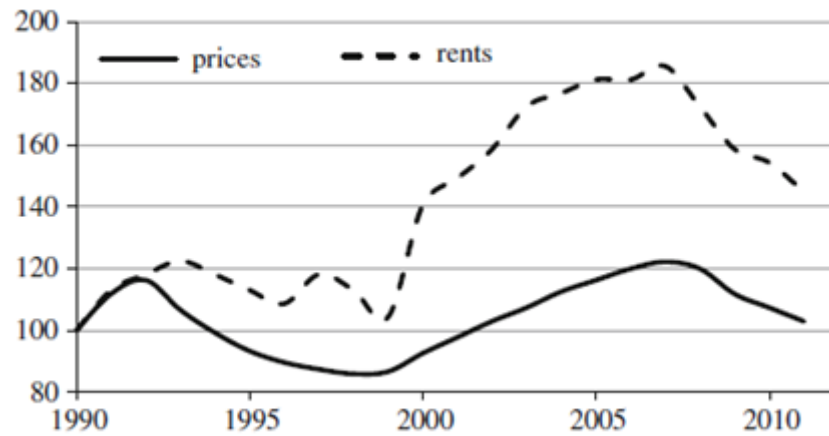
Fig. 1.10 Changes in gross rentals and index prices of residential properties in Italy (Manganelli, 2015)

1.6. The Decision Making Process

The choice of investment in real estate implies a preliminary analysis of data concerned the specific market, the property that the investor intends to buy and finally the desires of the end-users.

The preliminary analysis of the technical, territorial, economic, financial and administrative-management of an operation real estate is the best guarantee of its future profitability. During this part of the investment valuation, variables that can have an effect on the final decision are defined, measured or estimated.

In this sense, it is crucial to construct a valuation model that permit the identification of critical parameters, that are relevant to decision-making, elaborating the information and finally interpreting the results to which it leads.

The first points to valuate with care any investment are the immediate commitment of important economic resources that could have alternative uses, and then the prospect of likely but not assured future benefits. In the case of investment property, there is the additional difficulty of working in an environment that has little or incomplete information (Manganelli, 2015).

A method to manage these numerous interrelated variables is the application of a decision making process that underlines the fundamental problems of the investment for facilitating the delineation of possible solutions and indicate the more affordable design alternatives.

An important clarification has to be done. In the economic evaluations framework, the feasibility analysis is not to be confused with the practice of the estimate. The estimation, in

fact, is used for the determination of the property value. That means that the evaluator does not take into consideration the ordinary use for which the property is intended, but aims to identify the highest and best use for the property being valued, especially in relation to his management skills and economic capabilities. This implies that although in both cases the analyst estimates the flow of net revenue that the property can generate, feasibility analysis and estimation employ similar models but produce fundamentally different data (Manganelli, 2015).

Even though its complexity, the analysis of real estate investments is very similar to other types of investments, from the point of view of the decision-making process.

In fact, at every step of the way identified, an unsatisfactory outcome involves the redefinition and revision of the inputs of the previous steps. The process then comes to the final decision in an iterative manner, by successive approximations (Fig.1.11).

In the particular case of a real estate, the decision-making process takes on characteristics varying on the type of intervention and strategies of the specific investor.
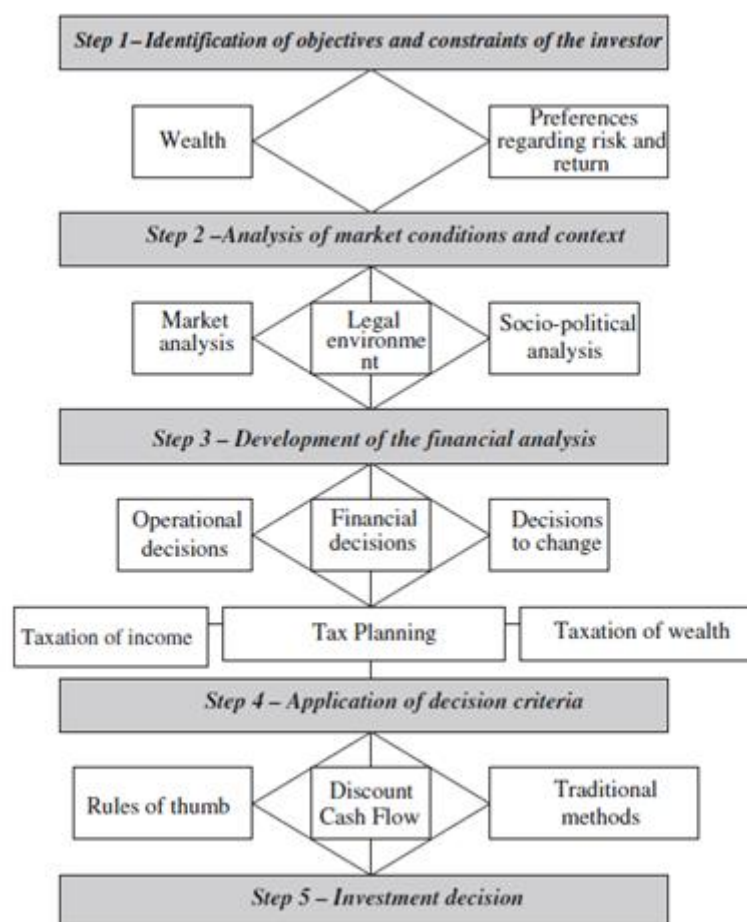
Fig.1.11 A model of decision-making process relating to the generic investment (Manganelli, 2015)

1.7. Investment Strategy

Investor's primary financial goal should be the to maximize financial wealth over long run. Hence real estate investments are viewed as good projects in order to maximize expected returns relative to risks (Pyhrr and Cooper, 1982).

The first step for investing in real estate is to develop a strategy to delineate the level of the returns and risks and their nature and how they can be achieved by the investor through the purchase of real estate.

Strategy is implemented firstly fixing investment goals, setting objectives for investor's organization taking into consideration external and internal forces, preparing specific policies to achieve objectives, and ensuring their proper implementation so that the basic purposes and objectives of the investor will be achieved.

A proper, methodical and calculated planning system can reduce the number and gravity of decision-making mistakes. It will result in a strategy that considers the interrelationships among the external environment, social mores, investor resources and personal values.

1.7.1. The Investment Process

Pyhrr and Cooper (1982) illustrate the investment analysis and financial structuring process can be viewed as ten sequential stages.

The separation of these steps is to a certain degree arbitrary because the stages are highly interrelated, but it just represent a typical sequence of events that an investor usually may experience.

The Pyhrr and Cooper model (1982) covers the period from an investor's initial interest in a real estate investment through the purchase, operation and termination of a property. The output from each step become the input of the next. If at any time during the process the investor reaches a point at which the investment being analysed is no longer attractive in terms of increasingly stringent criteria, the project can be dropped at that point or the information concerning its shortcoming can be used as feedback to restructure the deal. Then, after changes have been made in the assumptions and expected outcomes, the analysis is resumed several steps earlier.

The model describes a general process that is important to most equity investors in income property in any price range.

The ten steps be summarized by the authors as follows:

1)   Determine an Investment Strategy: the investor determines his or her overall investment philosophy, objectives and criteria, plans and policies. The investor then selects those that will use as initial screening criteria. These criteria are used to exclude from the investment analysis properties that don't meet the investor's objectives. Other investment criteria are applied at different stages of the process.

2)   Generate Alternatives: The investor tries to find properties that meet the basic screening criteria.

3)   Analyse the Property Using the Basic Financial Feasibility Model: the basic financial feasibility model utilizes a one-year cash flow projection and inputs data on the investor's return/risk requirements as well as lender's basic loan underwriting requirements. This first basic model is used to arrange and test the basic economics of the project, the available financing alternatives, and the investment value range for the property. Property that don't meet the investment criteria imposed at this stage of the analysis are released from further consideration or modified until the criteria are met.

4)   Negotiate Basic Terms with the Seller: the investor starts to discourse and negotiate the basic parameters of the deal with the seller, including the price.

5)   Do Detailed Feasibility Research: the investor collects and studies information in four areas: market and marketability factors affecting the property, the physical and structural condition of the property legal, political and environmental considerations and management and operation of the property.

6)   Structure the Tax Benefits: the investor structures the tax package before a discounted cash flow after-tax analysis of the property can be performed to determine its complete rate-of-return and risk characteristics.

7)   Perform a Discounted Cash Flow Analysis: the investor examines all the information and data generated from the previous phases and makes a discounted cash flow after-tax analysis of the property. A detailed analysis of the rate-of-return and risk parameters of the project is performed, including a sensitivity analysis of key financial variables, and the results are compared to the most stringent investment criteria developed in the first step. At this point the investment has successfully passed the hierarchy of other tests imposed at each step of the process and a final investment decision is made.

8)   Engage in Final Negotiations and Closing: in this phase the investor knows what trade-offs affect the returns and risks associated with the property.

Ideally, the final purchase contract is drawn and closing details are arranged at this point.

9)   Manage the Property: after the acquisition, capable property management is fundamental for a successful ownership. In fact, property management should achieves the cash flow projected on which the investment decision was based through both authority and accountability. Different types of management exists depending on the investor: for example venture management is responsible for managing the property manager reporting to the investors and monitoring the performance of the property, the smaller investor may perform all management functions, while larger institutions prefer to delegate responsibility to specialists and professionals.

10)   Terminate of the property: the moment of sale is critical if the investor is to obtain the most favourable price and terms. After the closing, the venture is dissolved and final reports are issued to the investors.

All phases described above are important for long-run success, in particular for the acquisition process. In this stage returns and risks are examined and designed and the nature of the investor's portfolio is established. If the process of acquiring properties is poorly structured and executed, good return/risk performance is unlikely to follow (Pyhrr and Cooper, 1982).

Although the ten-step process is dynamic and should be modified to fit each situation, it does provide a checklist of essential considerations for the investor who wishes to participate in the real estate investment process.

In the next chapters we are going to analyse and perform the point three (Analyse the Property Using the Basic Financial Feasibility Model) and the seven one (Discounted Cash Flow Analysis).

CHAPTER 2

The International Standards for Real Estate Valuation

In the first chapter we have already clarified that, in the economic evaluations framework, the feasibility analysis is not to be confused with the practice of the estimate. The estimation, in fact, is used for the determination of the property value and the evaluator does not take into consideration the ordinary use for which the property is intended. This implies that although in both cases the analyst estimates the flow of net revenue that the property can generate, feasibility analysis and estimation employ similar models but produce fundamentally different data (Manganelli, 2015).

Before proceeding with the feasibility analysis, it is opportune to have a brief overview to the different valuation property technics and the strictly regulation that standardizes the evaluation process and the transcription of the data in the financial statement.

2.1. Real Estate Valuation

The investment choice (i.e. the property to buy) is the result of an evaluation about its economic convenience.

Manganelli (2015) clarifies this step explaining that the same real estate subject of the investment, when it is positioned on the market for sale, it is then expose to a valuation planned for the prediction of the most probable market value: "The seller is interested in knowing the equivalence between the property and the amount of money that will allow the exchange, on the valuation date (or in the near future), with an independent party interested in buying after adequate marketing, during which the parties (seller and buyer) act with equal capacity, prudently and without compulsion. Likewise, an investor interested in entering the same property in his portfolio will evaluate the convenience to buy".

This evaluation allows a comparison between the market value and the investment value. A particular investor attaches this value to a property for specific operational objectives.

Consequently the value of the properties is not related to the most probable market value because the value for the investor measures the importance for him or her of the flow of benefits that the property will produce in the future; thus, it reflects the assumptions that the investor makes about:

• The ability of the property to produce income;

• The most likely holding period;

• The final sale price;

• Taxation;

• The financing instruments available.

These factors affect the net benefits coming from the ownership of the property and, since some of these components vary on the economic and fiscal investor's condition, the investment value is particular and different for every investor (Manganelli, 2015).

The author continues claiming that, from another point of view, the property value corresponds to the highest price that the investor is willing to offer for the purchase of property as the result of an analysis that involves the expectation of profit. Conversely, the buyer, in opposition to the seller, considers the fees and profits associated with the maintenance of the property or divestment.

We can summarize what we have said above arguing that, if the value of the buyer's investment Vb is higher than that of the seller Vs (Fig. 2.1), there is the condition for the occurring of the sale of the property, at a price that will be placed within the range of fluctuation defined by Vb and Vs. The final price (net of transaction costs) will depend on their ability to conduct the negotiations, but certainly both the seller and the buyer will benefit from the deal (Manganelli, 2015).
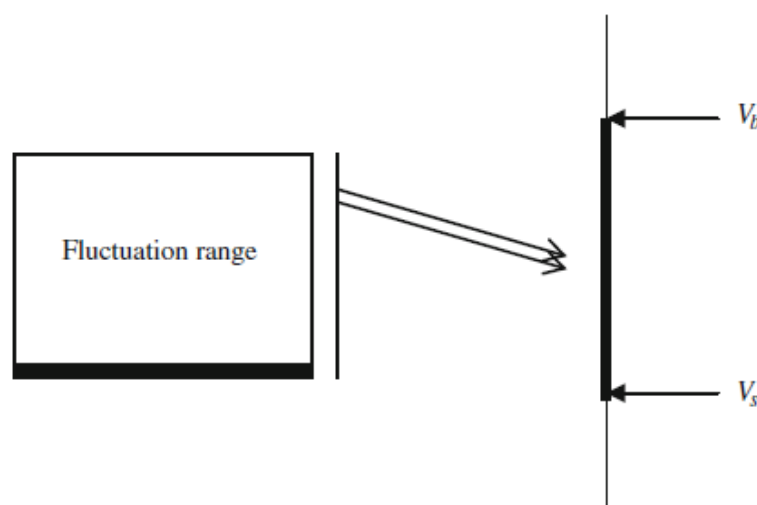
Fig. 2.1 The investment value

Therefore, for a given level of demand for space (that allows the prediction of the potential profitability), the real estate investor can determine a maximum price that he is willing to pay for the purchase of property involved. When this value is higher than the market price, the investor could find it convenient to include the property in his or her portfolio. On the contrary, he could decide to sell when prices rise above his investment value. Clearly, if there is a greater difference between the most likely market price and the value of individual investment, there will be a greater potential profit for the buyer and the seller. However, the factors that affect the value of investment (rents, operating expenses, income taxes, and cost of capital) also affect the most probable market value so, when the values of investment of market operators vary, the activities to buy cause movements in the same direction also in market values (Manganelli, 2015).

As we all know, the speed with which the market values react to changes to new information and to changes in demand is a measure of market efficiency because a market is efficient when all relevant information has an immediate effect in the prices7. For this reason those who work in an efficient market do not have the ability to make gains consistently above average because the possibility of extraordinary profits intervenes when few individuals know the relevant information.

2.1.1. Valuing Real Estate Versus Homogenous Assets

Before starting with the description of the most used techniques for valuing a real estate, it's important to have a look at the heterogeneity of real estate when compared with more homogeneous assets such as stocks and bonds. In fact it is quite easy for investors to estimate the cost of capital when the assets are quite homogeneous. Because most stocks and bonds are frequently traded, there is also more data available in order to measure market expectations regarding those investment classes.

On the contrary in the case of real estate when the various debt scenarios are combined with diverse management, markets, submarkets, and tenant mix scenarios, the capacity to find pure comparable properties is very difficult (Goddard and Marcum, 2012).

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7 Efficient market hypothesis (EMH) formulated by Eugene Fama (1970) suggests that, at any given time, prices fully reflect all available information on a particular stock and/or market. According to the EMH, no investor has an advantage in predicting a return on a stock price because no one has access to information not already available to everyone else.

Furthermore if we take into consideration also the lower frequency with which real estate is bought and sold in comparison with stocks and bonds, the cost of capital becomes much harder to estimate than for more homogeneous asset classes.

Even identical properties with identical debt and equity components can achieve different values because the investors purchasing the properties utilize differing assumptions when compiling their pro-forma operating statements.

The calculation of a locally determined property value can sometimes be problematic when the frequency of comparable sales declines, or when no truly comparable properties exist (Goddard and Marcum, 2012).

We have to take into consideration other remarkable differences between these two asset classes.

First there is a difference in the way financial assets and real assets create cash flow. More accurately, real assets typically have a finite life cycle while financial assets have an infinite life cycle.

Secondly risk and return models used to evaluate financial assets can't be used to evaluate real assets because of the difference in liquidity and types of investors between the two markets (Damodaran, 2012).

If the investment cash inflows were certain, one could use the risk-free rate as required rate of return. However this is not the case in real estate investments because they are uncertain by their nature, so a required rate of return must include an adjustment to take the uncertainty into account.

However both real and financial assets have also many similar characteristics such as their value is determined by the cash flows they generate, the underlying uncertainty of the cash flows and the expected increase of these cash flows. So, keeping constant all the other aspects, the higher the level of cash flow growth and the lower the underlying risk of the investment are, the greater the value of the asset is (Kolbe and Greer, 2009).

2.2. The International Standards for the real estate evaluation

Usually an investor in real estate sector commissions the completion of an appraisal to an independent appraiser for the evaluation of the property. This happens because the investor could desire an unbiased valuation for purposes of agreeing on a fair sales price for the property or, if the buyer of the property requires financing by a bank, the bank will utilize the appraisal in order to set their loan to value ratios (Goddard and Marcum, 2012). Federal regulations direct that in order for a financial institution to utilize an appraisal for lending

purposes, that the appraisal must have been engaged by a financial institution and not the customer (CFR 2011). Therefore the aim of the appraisal process is to obtain a market value for the property that represents the most probable price in a competitive and open market. The Code of Federal Regulations requires some things in order to achieve a market oriented value like that, for example, the sale of the property must be an arm's length transaction[8], where the buyer and seller are not related, and both the buyer and the seller are assumed to be well-informed, rational market participants.

When an appraiser obtain the task from the bank or individual, he or she has to collect as much data as is possible that is relevant for the valuation of the property. The appraiser will write down the physical and legal description of the property, will identify the property rights to be valued, and will specify the purpose of the appraisal that could be motivated by an expected sale, estate settlement, or maybe the beginning of a foreclosure process (Goddard and Marcum, 2012).

In the particular case of real estate investments that produce incomes, the appraiser needs to determine the most significant variables that influence the profit, such as the market vacancy, market rental, and market operating expense averages, so the property specific information collected from the current owner of the property that can be compared with the market averages data.

The appraiser must follow many shared standard rules concerning the methodology for the estimation and the operational phases for real estate evaluation knowing as International Standards.

The International Standards for the real estate evaluation are based on the concept of "base of value."

Among these the principals are:

- International Valuation Standards (IVS);
- European Valuation Standards (EVS);
- Appraisal & Valuation Standards (Royal Institution of Chartered Surveyors RICS);
- Uniform Standards of Professional Appraisal Practice (USPAP).

The contents of these international Standards in practice consist in:

- technical definitions;

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[8] An arm's length transaction is a transaction in which the buyers and sellers of a product act independently and have no relationship to each other. The concept of an arm's length transaction is to ensure that both parties in the deal are acting in their own self-interest and are not subject to any pressure or duress from the other party (http://www.investopedia.com)

- applicable appraised criterions;
- items regarding the qualification of the valuers and the professional code of ethics;
- guiding rules for application methodology

The International Valuation Standards (IVS), included in the so-called "The White Book", have been predisposed by the International Valuation Standards Council, that is located in London and the last edition was in 2013. As reported in the Glossary January 1st 2014, according to the IVSs, the market value is so defined: «The estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion» (IVS, 2013).

The evaluation report represents the elaboration through which the valuer concludes his or her own estimative operations. Summarizing it illustrates the goals of the estimation, the performed surveys, the realized inspections, the criterions and the methodologies of evaluation, the possible assumptions and bounding conditions.

The Europeans Valuation Standards (EVS) consist in the so-called "The Blue Book", whose last edition, that is the eighth one, reports the EVSs 2016, draft by TEGOVA, The European Group of Valuers' Associations. According to the EVSs, the value of market is so defined: «The estimated amount for which the asset should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently and without compulsion» (EVS, 2016). This definition is the same as IVS.

The RICSs Valuation consists in the so-called "The Red Book", whose last edition (January 2014), reports the Professional Standards and it is compiled by the Royal Institution of Chartered Surveyors, located in London. The RICSs Standard market value definition is the same as VS.

The USPAPs, Uniform Standards of Professional Appraisal Practice, whose last edition is the 2016-2017, are predisposed by the Appraisal Standards Board, The Appraisal Foundation, in Washington. According to the Uniform Standards of Professional Appraisal Practice, the market value is so defined: «A type of value, stated as an opinion, that presumes the transfer of a property (i.e. a right of ownership or a bundle of such rights), as of a certain date, under specific conditions set forth in the definition of the term identified by the appraiser as applicable in an appraisal» (USPAP, 2016).

Finally it is necessary to remember the International Accounting Standards (IAS), subsequently turned into the International Financial Reporting Standards (IFRS), that are the international bookkeeping principles, emanated by the International Accounting Standards

Board of the International Accounting Standards Committee (IASC), that, from 1973, have represented the first attempt of world standardization of the bookkeeping rules and partially also evaluative.

A real estate company has to pay particular attention to the calculation of the fair value of its assets. In fact the fair value of the assets and the techniques used for achieving it are strictly regulated by IFRS and all the details have to be clarified in the balance sheet following international standards.

In particular IFRS 13 "Fair Value Measurement" provides a single IFRS framework for measuring fair value and requires disclosures about fair value measurement. The Standard defines fair value on the basis of an 'exit price' notion and uses a 'fair value hierarchy', which results in a market-based, rather than entity-specific, measurement.

IFRS 13 was originally issued in May 2011 and applies to annual periods beginning on or after 1 January 2013.

2.3. Overview of fair value measurement approaches

According to IFRS 13:B2 "The objective of a fair value measurement is to estimate the price at which an orderly transaction to sell the asset or to transfer the liability would take place between market participants at the measurement date under current market conditions". The measurement of the fair value by a company has to settle all of the following:

- the particular asset or liability that is the subject of the measurement (consistently with its unit of account);
- for a non-financial asset, the valuation premise that is appropriate for the measurement (consistently with its highest and best use);
- the principal (or most advantageous) market for the asset or liability;
- the valuation technique(s) appropriate for the measurement, considering the availability of data with which to develop inputs that represent the assumptions that market participants would use when pricing the asset or liability and the level of the fair value hierarchy within which the inputs are categorised.

IFRS 13 arranges also the support on the measurement of fair value, saying the fundamentals for the evaluation of the asset in a homogenous way for all the real estate investors.

Following these instructions, an entity takes into account the characteristics of the asset or liability being measured that a market participant would take into account when

pricing the asset or liability at measurement date, that means the condition and location of the asset and any restrictions on the sale and use of the asset [IFRS 13:11].

Fair value measurement assumes an orderly transaction between market participants at the measurement date under current market conditions [IFRS 13:15]. These transaction is assumed to take place in the principal market for the asset or liability, or in the absence of a principal market, the most advantageous market for the asset or liability [IFRS 13:24] and the fair value measurement of a non-financial asset takes into account its highest and best use [IFRS 13:27].

A fair value measurement of a financial or non-financial liability or an entity's own equity instruments assumes it is transferred to a market participant at the measurement date, without settlement, extinguishment, or cancellation at the measurement date [IFRS 13:34].

Finally the fair value of a liability reflects non-performance risk (the risk the entity will not fulfil an obligation), including an entity's own credit risk and assuming the same non-performance risk before and after the transfer of the liability [IFRS 13:42] but an optional exception applies for certain financial assets and financial liabilities with offsetting positions in market risks or counterparty credit risk, provided conditions are met (additional disclosure is required) [IFRS 13:48, IFRS 13:96].

2.4. Valuation techniques

"An entity uses valuation techniques appropriate in the circumstances and for which sufficient data are available to measure fair value, maximising the use of relevant observable inputs and minimising the use of unobservable inputs" [IFRS 13:61, IFRS 13:67].

In substance, we can distinguish the international methodologies of real estate evaluation in three different approaches, that are:

- methods directed to the market, consistent in the market approach;
- methods directed to the income, consistent in the income approach;
- methods directed to the cost, consistent in the cost approach.

Regarding the market approach, the definition of the IVS Glossary 2014 it is the following: "To valuation approach which provides an indication of value by comparing the subject asset with identical or similar assets for which price information is available."

Insofar it represents a method directed to the market that is funded on the comparison of the property under evaluation with other properties (comparables) with the same characteristics. In other words market approach uses prices and other relevant information

generated by market transactions involving identical or comparable assets, liabilities, or a group of assets and liabilities like a business.

The income approach is defined, according to the IVS Glossary 2014, as: "A valuation approach that provides an indication of value by future converting cash flows to single current capital value". Therefore this method, income oriented, converts future amounts (cash flows or income and expenses) to a single current (discounted) amount, reflecting current market expectations about those future amounts. In some cases, a single valuation technique is enough, whereas in others multiple valuation techniques are more appropriate.

Finally the cost approach, according to the definition of the IVS Glossary 2014, is: "A valuation approach based on the economic principle that to buyer will pay no dark for an asset than the cost to obtain an asset of equal utility, whether by purchase or by construction".

Then this method, cost oriented, is based on the economic principle that a buyer won't pay for a good more than the necessary cost to get a good with the same utility, through the purchase or the construction. In other words it reflects the amount that would be required currently to replace the service capacity of an asset those are current replacement cost.

During the top of the "Yes Era"[9] frequently the sales approach values exceeded for consistent amounts the other two methods, which provided evidence that markets were unfair and that the prices that investors were paying during this time were not supported by the net operating income produced by the property (Goddard and Marcum, 2012). The following sections will discuss each of the three valuation methods in a deeper level.

2.4.1. The Sales Approach to Value

Goddard and Marcum (2012) define the sales approach as "the goal of estimating the sales price per square foot of properties deemed comparable to the subject property being valued". As we have already said, properties must have been sold via arm's length transactions to be a comparable sale, with correctly motivated and informed actors, and the sale must not have been made under pressure (for example in a foreclosure or obliged liquidation). In the same way, pending sales should generally not be used when compiling a list of comparable sales.

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[9] Goddard and Marcum (2012) use this name to indicate the period of expansion years from 2002 to 2007, real estate investment received much good press from everyone from government officials encouraging real estate ownership, to central banks encouraging bank lending via low interest rates, to various financial institutions offering ever more risky loan options, to investors who were seeking as much of a loan as they could possibly obtain while interest rates were low and while lending appetite was strong.

Every real estate has a different location and for this reason the geographic fit for possible comparables will depend on the type of property in question. Goddard and Marcum (2012) explain that for any property that is subject to local market risk, thus also for residential properties, the comparables selected should be close to the property under evaluations even if sometimes properties located in close proximity to the subject property are not truly representative of the property under evaluation. It may be valid to consider market transactions outside the immediate market if the property has a single tenant with a regional, national, or international reputation. Another important factor to take in consideration in the sales approach, the authors claim, is related to the recentness of the transaction. The timing of the transactions may depend on the quality of the performance of the local market. In fact, if the subject property is located in a stable market, the age of the sales can be older than if the market was depressed or declining. When an acceptable list of properties has been composed, the next step is to apply an adjustment factor per square foot for any material differences between the comparable property and the subject. Adjustments are required because every property differ from another so they could be related to differences in size, location, age, condition, quality of construction, and amenities.

As the comparable sales are historical, a negative adjustment to the final sales price per square foot for the comparable has to be made when the comparable exhibits a more favourable component relative to the subject (Appraisal Institute, 1996).

2.4.2. The Cost Approach to Value

The second form of valuation is the cost approach that is principally useful for new construction properties. However the cost approach is also useful for existing properties, when the appraiser will offer judgments on the effective age of the property through the cost valuation method (Goddard and Marcum, 2012). The effective age of a real estate is the residual economic useful life of the property estimated from the quality of construction and improvements made to the property since it was originally constructed, and for this reason the effective age can differ from the actual age of the property depending on the level of maintenance and modern amenities of the property. The Appraisal Institute (2008) explains that the theory of the cost approach is based on the assumption that a rational investor would not pay more for a property than the value of the land plus the replacement cost to build a similar property. Since the cost approach requires that land and improvements are valued separately, the approach is also useful for insurance purposes.

For an existing property, the cost valuation is calculated taking the replacement cost of the building based on construction materials and methodologies available in the current day, and subtract the deterioration of the building (Goddard and Marcum, 2012).

2.4.3. The Income Approach to Value

The third approach to value is the income approach. There are different methods to calculate the value of a real estate through its incomes depending on the complexity of the property in question. However it is fundamental to specify that the property must be an investment property in order to utilize the income approach to value. In fact, if the property serve as the primary residence of the owner, or serve as the primary site of business operation for a company, the income approach should not apply.

Goddard and Marcum (2012) presents an overview of the main income approaches that we describe below.

2.4.3.1. Gross Income Multiplier

The simplest method of performing the income approach valuation is the gross income multiplier (GIM). The GIM is a combination of the sales and income approaches, and usually it is used in evaluation for single family residences or, in general, for smaller properties with stable income streams. In this approach to value, the sales price is divided by the gross income of the property, for obtaining a market based multiple which can be used to set the current value of a property. The GIM differs slightly from the gross rent multiplier (GRM), just because the GIM does not specify that the income must be from rents, as does the GRM. Even though the GIM is categorized as an income approach valuation, it only considers the gross income of the property and not any expenses paid by the property owner, and for this reason this method is useful in the case the tenant has a strong national credit rating and a very long lease.

2.4.3.2. Direct Capitalization

This model utilizes both the income and expenses from the property, together with the determined characteristics of the market so as to obtain a property value. However not all expenses that are reported on the tax returns for a property (whether held individually or in a corporate entity) would be included in the analysis. Expenses such as interest, depreciation,

amortization, and depletion are not a part of the property valuation in this case. Interest expense is not included because the value is irrespective of the amount of indebtedness on the property. In other words, the value of the property should not change if the owner has a mortgage on the property or not. In fact the authors clarify that "an investor's return would change depending on whether a property is financed, but the value of the property should not be affected". Expenses such as depreciation and amortization are non-cash expenses, so they are not part of the valuation process for real estate valuation.

The direct capitalization model applies a capitalization rate[10] to the estimated net operating income in order to obtain value. The net operating income is what is expected over the next year, and the cap rate should be reflective of market conditions.

Once the total operating expenses have been determined, they are subtracted from effective gross income in order to arrive at NOI. The property value for the income approach is determined by dividing NOI by the market based cap rate.

2.4.3.3. Discounted Cash Flow

The final variation on the income approach which we will introduce in this chapter is the discounted cash flow (DCF) model. The DCF is a multi-year window of the income and expenses of the property which are obtained during the identified holding period of the investment.

Similar to the direct capitalization approach models, the DCF technique values the property irrespective of whether the property is indebted and regardless of any consideration of tax benefits from accrued depreciation. Thus, Goddard and Marcum (2012) explain, the appraisal DCF does not include interest, depreciation, or amortization in the operating expenses.

For multi-tenant retail, office, and industrial properties, the DCF includes leasing commissions and tenant improvements, that are additional expenses typically not calculated in the direct capitalization model. These elements are estimates for the costs incurred during the holding period for finding new tenants in a given property.

Midst the various approaches to estimate the real estate value, the discounted cash flow (DCF) method is well accepted by academics and generally used by experts and it is

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[10] A capitalization rate is any rate that applies value to a stream of income, and is found by dividing the net operating income of the property by the sales price. The higher the cap rate, the more risk is inherent in the property, and the lower the property value.

probably the most used technique for this aim. The success of this model is due to its advantages and in particular to its economic rationality (Dulman, 1989).

The International Valuation Standards Council[11] (IVCS) lists discounted cash flow method as a suitable analysis method to be used when valuating property with the income approach. The Council in fact affirms: "In the absence of directly comparable sales evidence, the value has to be estimated using one or more market-based valuation approaches. Such approaches may use information from a variety of sources, including: discounted cash flow projections or income capitalization supported by comparable market data on construction costs, lease terms, operating costs, growth assumptions, discount and capitalization rates and other key inputs." (IVSC, 2015)

Discounted cash flow is an income valuation approach where a discount rate is applied to a series of cash flows for future periods to discount them to a present value (IVSC, 2015).

2.5. Fair value hierarchy

IFRS 13 aims to increase consistency and comparability in fair value measurements and related disclosures through a 'fair value hierarchy'. The hierarchy categorises the inputs used in valuation techniques into three levels and it gives the highest priority to (unadjusted) quoted prices in active markets for identical assets or liabilities and the lowest priority to unobservable inputs [IFRS 13:72].

If the inputs used to measure fair value are categorised into different levels of the fair value hierarchy, the fair value measurement is categorised in its entirety in the level of the lowest level input that is significant to the entire measurement (based on the application of judgement) [IFRS 13:73].

The descriptions of the levels are the following:

- Level 1 inputs: level 1 inputs are quoted prices in active markets for identical assets or liabilities that the entity can access at the measurement date [IFRS 13:76]. In this way a quoted market price in an active market provides the most reliable evidence of fair value and is used without adjustment to measure fair value whenever available. If an entity holds a position in a single asset or liability and the asset or liability is traded in an active market, the fair value of the asset or liability is measured within Level 1 as

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[11] The International Valuation Standards Council (IVSC) is an independent, not-for-profit organization that produces and implements universally accepted standards for the valuation of assets across the world in the public interest.

the product of the quoted price for the individual asset or liability and the quantity held by the entity.

- Level 2 inputs: level 2 inputs are inputs other than quoted market prices included within Level 1 that are observable for the asset or liability, either directly or indirectly. [IFRS 13:81]. These means that Level 2 inputs include quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, inputs other than quoted prices that are observable for the asset or liability and inputs that are derived principally from or corroborated by observable market data by correlation or other means ('market-corroborated inputs').

- Level 3 inputs: Level 3 inputs are unobservable inputs for the asset or liability. [IFRS 13:86]. Unobservable inputs are used to measure fair value when relevant observable inputs are not available, so in situations in which there is little, if any, market activity for the asset or liability at the measurement date. An entity develops unobservable inputs using the best information available in the circumstances, which might include the entity's own data, taking into account all information about market participant assumptions that is reasonably available [IFRS 13:87-89]. This is the case of real estate market where there are few transactions for location and often they are not available or easily achievable. Furthermore, as we have already said, every real estate is unique so the data related the property is.

2.6. Specific disclosures required

IFRS 13 requires a company to disclose information that helps users of its financial statements judge both the inputs and the valuation techniques used to create measurements for assets and liabilities that are measured at fair value and the effect of the measurements on profit or loss for the period for fair value measurements using significant unobservable inputs (Level 3).

For meeting the disclosure standards required, some minimum disclosures are required for each class of assets and liabilities measured at fair value in the statement of financial position after initial recognition (www.iasplus.com).

The disclosure that are required (however sometimes other disclosures are required where necessary) [IFRS 13:93] are listed below:

- the fair value measurement at the end of the reporting period;

Source: "GCP Student Living Plc" Financial Statement 2015

- for non-recurring fair value measurements, the reasons for the measurement;
- the level of the fair value hierarchy within which the fair value measurements are categorised in their entirety (Level 1, 2 or 3);

Source: "Great Portland Estate" Financial Statement 2015

- for assets and liabilities held at the reporting date that are measured at fair value on a recurring basis, the amounts of any transfers between Level 1 and Level 2 of the fair value hierarchy, the reasons for those transfers and the entity's policy for determining when transfers between levels are deemed to have occurred, separately disclosing and discussing transfers into and out of each level;
- for fair value measurements categorised within Level 2 and Level 3 of the fair value hierarchy, a description of the valuation technique(s) and the inputs used in the fair value measurement, any change in the valuation techniques and the reason(s) for making such change;

Source: "Great Portland Estate" Financial Statement 2015

- for fair value measurements categorised within Level 3 of the fair value hierarchy, quantitative information about the significant unobservable inputs used in the fair value measurement and a description of the valuation processes used by the entity;

- for recurring fair value measurements categorised within Level 3 of the fair value hierarchy:

  o a narrative description of the sensitivity of the fair value measurement to changes in unobservable inputs and eventual interrelationships between those inputs and other unobservable inputs used in the fair value measurement and how they could boost or mitigate the effect of changes in the unobservable inputs on the fair value measurement;

  o for financial assets and financial liabilities, if the possible change in one or more of the unobservable would change fair value significantly, an entity shall state that fact and disclose the effect of those changes.

- if the highest and best use of a non-financial asset differs from its current use, an entity shall disclose that fact and why the non-financial asset is being used in a manner that differs from its highest and best use.

IFRS 13 is applicable to annual reporting periods beginning on or after 1 January 2013. A company could apply IFRS 13 to an earlier accounting period, but it must disclose the fact for clarifying the situation.

Application is required prospectively since the beginning of the annual reporting period in which the IFRS is initially applied while comparative information doesn't need to be disclosed for periods before initial application.

CHAPTER 3

The Basic Feasibility Analysis

In this chapter we are going to study the procedure of construct a feasibility analysis before investing in the real estate sector, applying it to a real case.

Manganelli (2015) writes about that: "The feasibility study can be defined as a technical-economic project to verify the existence of a reasonable chance of meeting the objectives of an investment through a selective action of mutual adaptation between solution implementations and limited financial resources".

3.1. The Investment Value

Following the author we can define the process of the investment property analysis as nothing but an adaptation to the field of capital budgeting techniques used by financial analysts in investment securities. These techniques pass various phases and the main key points consist in the estimation of the expected net benefits, chronological adjustment (regarding timing differences in cash flows rising from the investment alternatives), quantification of the risks associated with possible alternatives and rating of alternatives centred on the relative risk-return combinations.

The result of the investment analysis, is just the estimate of what has been indicated as "fair value". The person who wants to buy will conclude the deal only if the value of the investment is higher than the market value of the property, and, on the contrary, the owner of the property will sell the real estate only if he will obtain a greater amount than the value he or she assigns to the property. Taking in consideration this new assumption, we can explain investment value in a form technically more precise: "It corresponds to the maximum amount that an investor is willing to pay for the purchase of a property, given the cash flows expected from the management of the property and the minimum rate of return acceptable by the investor himself" (Manganelli, 2015).

It primary admits the need to formulate a prediction on the amount of net benefits that the investment can generate. However this phase is the most delicate because future events

can never be predicted with absolute certainty, taking into consideration that many variables have to be estimated, as the revenues, operating expenses, the terms of financing, sales prices, the tax burden, the times in which these elements will materialize; furthermore every one of these items is a variable of the decision-making process that is associated with a more or less broad level of certainty (uncertainty).

In the second step of the scheme, namely the chronological alignment of the cash flows, formulas of financial mathematics must be applied to make comparable benefits and costs that accrue at different times. Also here subjectivity has an essential role because the prospect of profit is different between investors. Moreover the investment value depends also on the choice of discount rate.

3.2. The Feasibility Study

Manganelli (2015) dedicates an entire chapter for feasibility study and we will take the cue from his book.

Normally a feasibility study is carried out by a group of experts from the disciplines mentioned under the guidance of a coordinator because it is difficult that one person is competent in all these matters.

The feasibility analysis should not be used from a merely financial perspective. Indeed a proposal is practicable if:

• It is physically implemented, given the constraints of a technical nature;

• It is legally feasible, given the constraints of an administrative nature;

• It is financially sustainable.

In effect, there are numerous uses physically possible, but one can define feasible only those that are simultaneously feasible from both an administrative and financial standpoint.

In the case of real estate investments, the study is normally aimed at finding a solution to one or more problems, which is related to the fulfilment of different objectives. The problems could be set from different start points. For example the site could be predetermined and the objective is to decide the best possible use of the location that means the investor must select the alternatives that best meet the utilization aim. In this case the physical and legal characteristics of the property and its location (and thus the economic environment) are the starting point of the analysis.

Another case is when the destination is predetermined and the investor must identify the location. In other words, the type of use of the property is imposed and the investor needs

to recognize the most suitable location for its implementation. In this case, the initial data is the utilization aim and the characteristics of the economic environment.

The third case is the situation where the funds available are predetermined and the goal is to find the best investment opportunities. The cost estimate is particularly difficult and delicate and it should be the most possible accurate, because the amount of financial resources to be mobilized depending on them.

In relation to what it is said above and in accordance with the pattern of decision-making, a feasibility study on a real estate investment should be structured according to the following items (Manganelli, 2015):

1. Summary;

2. Goals and constraints;

3. Administrative feasibility;

4. Technical feasibility;

5. Analysis of the market (demand);

6. Analysis of the competitive framework (supply);

7. Choice of design features;

8. Estimate of production costs;

9. Estimated time of production;

10. Choice of financing (leverage);

11. Magnitude and timing of revenues;

12. Financial Analysis;

13. Conclusions and recommendations.

From our thesis point of view, we are interested to investigate the last four points, that are the financial feasibility issues.

First of all, the preliminary analysis of the financial feasibility combines the needs of both the investor and the institute who grants the loan because financing is triggered only if the project satisfies the needs of both parties.

The loan must be analysed as a function of various possible combinations of equity and capital funded and many parameters have to be considered in order to obtain full control of the loan such as the interest rate, the amortization period, the costs of start-up and termination of the loan and the impact on taxation.

Primarily, the lender has to be sure that the project can generate a cash flow that allows for the return of the loan, and then also that the most likely selling price of the project is sufficient if the investor fail to cover the debt if not yet extinct.

When the financing issue is clarify, then magnitude and timing of revenues should be analysed. It is necessary at this point to estimate the likely revenues, together with their temporal distribution. The amount of revenues over time must be in line with:

- Expected time of sale or lease, possibly distributed over time, when the building initiative covers more than one unit (e.g. apartment or office);

- The temporal development of unit prices in relation to the nominal rate of inflation and the trend of supply and demand;

- The expected payment formulas, particularly with regards to delays and discounts on payment, for example, in the case of a sale in advance done by simply looking at the plans.

Taking into consideration the most likely scenario, it is always wise to submit less favourable scenarios for defining the minimum acceptable condition.

The next point of the is the feasibility study is the Feasibility Analysis. Through the market analysis the investor obtain the data to develop the plan of future cash flows of the project. The cash flow summarizes, in one or more tables, the temporal dynamics and the possible outcome of the investment.

The tables relating to cash flows must be properly commented, recalling the assumptions and the options below to both the main prospect and possible complementary or alternative prospects.

Finally conclusions and recommendations have to be written. It distinguishes the evidence provided by the promoters or their experts from those acquired directly and usually it presents both the results believed most likely and both those judged sub-optimal or minimal. It could also contain recommendations about certain phases of the investment considered to be especially important or sensitive.

3.2.1. Case of Study

From this point we are going to apply the basic financial feasibility model to a real case. The purpose is to demonstrate how a potential investment project is evaluated using a financial feasibility model.

The original model, which this version is based on, was designed and developed by Pyhrr (1982).

The financial prospects of the company ("Company") has been prepared by the accountant office Welbeck Associates in London. Due to a confidentiality agreement, the name of the company cannot be identified.

The Company is a Scottish Private Limited Company (Ltd) funded in 2015, that issued an amount of £3,500,000 bonds with the purpose of making a real estate investment as large as the debt amount permits. The Company also issued £50,000 equity funds asking to the investors to make a loan at Company of sufficient size that, when combined with the arrangement fee and management fee, it will cover the expenses of the holding company. This equity is going to get repaid with interest at the end of the five years when the properties are sold and the bond holders have been repaid for their initial loan.

The planning horizon used for the analysis can be chosen as appropriate for each project being analysed and in this case it is 5 years.

Projected acquisitions are scheduled to start in October 2015 and the currency of the project is pound.

It is assumed that the debt will have 6.5% interests and that the principal repayment is going to be repaid on the fifth year of operation.

Financial statements presented in the model follow international traditions and regulations. A screen shot from the model showing the income statement, balance sheet, and cash flow statement for the project can be seen in the Appendices B, C,D.

It's fundamental that an investor understands the basic return and risk parameters of the property and know about how much it is worth before starting the negotiations with the other party. After preliminary negotiations have been completed, the investor will proceed to more sophisticated forms of analysis that we are going to analyse in the fourth chapter.

For the moment we must show how to work with a debt coverage ratio, how to compute rates of return on investment and finally we must teach the concepts of positive and negative leverage.

In the cash flow statement we estimate the most likely outcome. For each year over the expected holding period of the investment. Also, we may want to vary our assumptions to simulate a pessimistic and an optimistic set of outcomes, as we will see later when the subject of risk analysis is discussed. A more sophisticated cash flow analysis and risk analysis will be discussed in the fourth chapter of our thesis.

3.3. The Basic Financial Feasibility Model

As we have told above, in our real case first of all the Company analysed how many bonds it could rise and, basing on this information, it decided how many properties it could buy.

Due to an amount of debt equal to £3,500,000, the final decision is to buy 34 properties (Figure 3.1).

INVESTMENT AMOUNT	£3,500,000
COMMISSION PAID	5%
AMOUNT AVAILABLE TO SPEND	£3,325,000
DISCOUNT FROM ORIGINAL MARKET VALUE	30%
ANNUAL HOUSE PRICE RISE**	5.5%
NUMBER OF UNITS BOUGHT	34

Price	Result
<1,000,000	0
1,000,000≤x<1,250,000	11
1,250,000≤x<1,500,000	14
1,500,000≤x<1,800,000	16
1,500,000≤x<2,000,000	18
2,000,000≤x<2,500,000	24
2,500,000≤x<3,000,000	30
3,000,000≤x<3,500,000	34
x≥3,500,000	=Funds raised/Price

Fig. 3.1. Properties Acquisition (Source: Welbeck Association Ltd)

We also know that the average properties value is £85,750 but the Company have the possibility to acquire them at an average price of £60,025 (Appendix A).

Usually the lender specifies loan terms and acceptable debt coverage ratio, that he or she considers satisfactory. On the other side, the investor often determines the desired rate of return on the equity investment (ROE) that should be achievable and calculates the maximum offering price for the property. Obviously, if the asking price is less than the maximum offering price, the property is more attractive. The equity investor should not offer more than the asking price.

Thus in many cases the equity investor wishes to work forward through the model to determine the investment value of the project by capitalizing the cash flow. Sometimes the feasibility study starts from the investment value and the investor works backwards to determine intermediate values, such as coverage ratios and mortgage constants, or even beginning values, such as rents and expenses required to satisfy investor objectives. Thus, if the investor knows the basic formulas used in the model, the dependent variable can be changed and desired output data and values can be calculated (Pyhrr, 1982).

For these reasons our inputs are:
1. The maximum debt amount;
2. The maximum equity investment;
3. The maximum houses value and purchase price.

4.   Estimates of rents, vacancies, and expenses;

The final outputs of the model are estimates of:
1.   The mortgage constant;
2.   The debt coverage ratio;
3.   The break-even ratio;
4.   The rate of return on total investment;
5.   The rate of return on equity;
6.   The positive and negative leverage.

3.3.1. The Mortgage Constant

The mortgage constant is defined as the amount of annual debt service that is necessary to pay interest at some stated rate and the entire principal over the amortization period and it is stated as a percent (Pyhrr, 1982). In other words the mortgage constant, which is determined by the mortgage term and interest rate granted by a lender is calculated as the relation between annual debt service (annual principal repayment plus interests) and the total loan amount. An equity investor aiming to maximize cash flow (consequently the investment value of the property) would logically deal with a lender for the longest term and lowest interest rate possible, thus keeping K to a minimum.

The mortgage constant can vary periodically if a variable rate or renegotiated rate mortgage is chose to finance the real estate investment. In either case, both the interest rate and term can be adjusted depending on market interest rate conditions and the particular provisions of the mortgage instrument used.

	MORTGAGE CONSTANT (K)				
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
K	6.50%	6.50%	6.50%	6.50%	106.50%

In our case the mortgage constant won't increase each year as the loan is not amortized, since the denominator of the mortgage constant formula (loan amount) is not decreasing over the horizon period. Only the last year, when the principal is entirely paid, the mortgage constant increase considerably. It agrees with the investor return in the Appendix A.

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3.3.2. The Equity Investor's Strategy

Although the equity investor wants to agree for the highest loan amount, the lowest interest rate and the longest amortization term possible, at the same time the minimum purposes of the lender must be respected or exceeded. Of course the reason is that a mortgage loan proposal that doesn't joint the lender's interest rate, amortization term, coverage ratio, and break-even criteria has a low probability of being accepted.

Both the equity investor and the lender can utilize the coverage ratio and break-even point as measures of risk. Indeed high coverage ratio and low break-even ratios denote a low degree of risk because it signifies a lower probability of fail to pay debt service obligations, while low coverage ratios and high break-even ratios suggest a high degree risk. If the equity investor want to influence the level of risk as shown by these ratios, he or she can arrange the project price and loan terms to achieve the desired coverage and break-even ratios.

3.3.2.1. The Debt Coverage Ratio

The Debt Coverage Ratio is the relation between net operating incomes and debt service amount. It tends to be the primary financial criterion used by most institutional lenders and, therefore, is the key to creating acceptable financial packages (Pyhrr, 1982). Risk is explicitly considered by the bondholders in establishing the minimum acceptable coverage ratio and mortgage constant. If the lender know that a project is quite risky but still wishes to make the loan, he or she can compensate by raising the desired coverage ratio and mortgage constant.

THE DEBT COVERAGE RATIO					
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Debt Coverage Ratio	0.15	0.39	0.41	0.44	0.03
With the Cash Balance Carried Forward	5.19	4.58	3.99	3.42	1.14

First of all, it is important to know what the minimum required debt coverage ratio is. We consider as reference the thresholds of the market that usually vary from 1.15 to 1.35 (Source: www.fundera.com).

If we consider the net operating incomes, it is clear that they are not sufficient to cover the debt service and to satisfy the minimum threshold required by the bond holders for the rest of the holding period. Indeed a coverage ratio equal to 0.15 means that the net operating income of the first year covers only the 15% of the debt costs of the same period!

For this reason we have calculated the same index changing the nominator, substituting the NOI with the Cash Balance Carried Forward, but adding the debt costs and principal repayments. Indeed the Company knew that the operating income won't be sufficient in the future, so we remind that they have issued an amount of investment funds greater than the cost of properties to be bought with the aim of using the excess cash as liquidity to cover the losses during the future years. The Cash Balance Carried Forward is composed both from the net income of the year and the excess cash in the Company and, adding the debt costs, it represents the effective liquidity available for the Company before the debt payments, that means it is the real capacity of the Company to face the debtholders claims. From this point of view, even if the net operating incomes aren't sufficient to cover up the debt costs, the Company doesn't have liquidity problems and it has always a debt-coverage ratio higher than the minimum ratio required in the market.

3.3.2.2. The Break-Even Point

The Break-Even Point is calculated as the relation between the sum of operating expenses and debt service, and the gross possible income (such as the rent income).

This ratio is used by many lenders when they have to evaluate a loan proposal. Many lenders won't make a loan on a general-use income property for which the resulting break-even ratio is greater than 82-84%. The higher the break-even ratio, the higher the risk, and vice versa. Thus risk can be reduced by structuring a loan that reduces the break-even point.

A break even ratio of 191.2% means that the project can't generate a positive cash flow in the first year through the rent of the properties because even if the vacancy rate would be equal to zero, the operating income won't be enough to cover the debt service payments and the expenses.

THE BREAK-EVEN RATIO (Default Point)					
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Break Even Ratio	191.2%	159.0%	154.7%	150.4%	156.2%

The break-even ratio tells us that the project can't survive only through the income coming from the rents and this is the first signal that the project is merely a speculative investment, because the properties aren't hold as assets those produce inflows but probably as assets those will appreciate and will be re-sell at a higher price. This idea will be verify further in the analysis.

3.3.3. Computing Rates of Return on an Investment

Two important rate-of-return measures are critical for valuing the debt and equity structure of a project. The first is the rate of return on total capital (ROR), sometimes referred to as the free and clear return or the overall rate, while the second is the rate of return on equity.

3.3.3.1. Rate of Return on Total Capital

The rate of return on total capital is obtained from the relation between net operating income and total capital investment, that is the sum of equity and debt used to finance the project.

This rate measures the productivity of the total capital invested, including both debt and equity capital. As presented here, in the feasibility model section, it is used through one-year cash flow pro forma and shouldn't be mistook with the Internal Rate of Return (IRR), which considers the cash flow for the entire ownership period, and that we are going to calculate in the next chapter of this thesis.

RATE OF RETURN					
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ROR	1.4%	3.7%	3.9%	4.1%	154.3%

The Rate of Return is very low for the first four years, when the NOI is composed by the rental income, while the fifth year NOI blows up, because of the higher cash inflow due to the property sale. Again this is a clear picture of the project: the properties haven't been bought with an investment purpose but mainly with a speculative one. Indeed the investors don't benefit from the yearly rent income but only from the huge amount deriving from the appreciation of the properties.

3.3.3.2. Rate of Return on Equity

The second important rate-of-return measure is the rate of return on the investor's initial equity investment (ROE), sometimes called cash-on-cash return or equity dividend rate (Pyhrr 1982).

It is calculated dividing the net income with the equity investment. As we have already seen through the break-even ratio, the net operating incomes are not enough to cover the operating and debt expenses, so the net income is negative for all the years until the properties will be sold.

Using the formula, we can see a very pessimistic situation, where the equity holders are subjected to huge losses until the fifth year, when the properties are sold and they make a profit. However this is not the real situation.

As we have already said, equity investors agree to receive money only the last year of the holding period and to cover the yearly losses with the cash reserve of the Company. Summarizing they don't loss anything during the initial period and they gain a profit only when the properties are sold and the debt principal is repaid.

For this reason it is better to use a variant of the ROE formula, that is commonly used in the real estate framework. The ROE is calculated as the relation between cash flow to equity holders and equity investment (see Pyhrr, 1982). We call this rate ROE CF.

The computation of the cash flow is going to be face in the next chapter. For the moment we anticipate that the equity holders don't have any inflows nor outflows for four years, as they have agreed with the Company, while they receive £425,973 the last year, that is the profit of the Company after the properties have been sold and the debt holders have been paid.

The ROE for the first four years is equal to zero percent, while the last year it is very high, but equal to the fifth year ROE calculated with the other method.

RATE OF RETURN ON EQUITY					
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ROE book	-891.2%	-221.8%	-213.8%	-205.3%	850.3%
ROE CF	0.0%	0.0%	0.0%	0.0%	851.9%

3.3.4. Positive and Negative Leverage

Leverage exist whenever debt is present in the capital structure. In other words, leverage means use of debt financing (Pyhrr, 1982). The more debt is used with respect to the amount of equity, the greater the leverage.

If the addition of the mortgage increases the return on equity, the addition of the mortgage has resulted in a positive leverage. If the addition of the mortgage decreases the return to the equity, the addition of the mortgage has resulted in negative leverage (Fisher, Martin and Mosbaugh, 1991).

To better understand the concept, we can see at the idea of positive leverage as a "buy-low-sell-high" problem in financing terms. What we mean is that the investors expect to borrow money at one rate and reinvest it at a higher rate. If this doesn't happen, the long run outcome "is as disastrous as a policy of buy-high-sell-low" (Brown, 2005).

In our case the situation is unfavourable unless net operating income will rise over the holding period (by increasing rents or decreasing expenses) and the ROE will increase through property value appreciation and tax shelter. This happens the fifth year, when, as a matter of fact, ROE is higher than ROR.

The situation described here is inconvenient until the ROE is lower than the ROR. The problem is that K is 6.50% to the lender, so it's higher than ROR, creating the situation of a policy of "buy-high-sell-low" shown by Brown (2005). Summarizing during the first four years the leverage works against the equity investor; we have negative (or reverse) leverage.

The leverage is positive only the last year, when ROR blows up due to the properties selling and it is higher than K even if the debt principal payment cause a rising of the mortgage constant. For this reason the last year ROE is higher than ROR and the leverage works in favour of equity holders.

However we have to remind that all the indices of a project used in the feasibility model are calculated using a one-year cash flow pro forma model for each year, and they don't take in consideration the situation in the total holding period nor the time value of the money. The feasibility model is used by the investor for understanding the basic return and risk parameters of the property and know about how much it is worth before starting the negotiations with the other party. After preliminary negotiations have been completed, the investor will proceed to more sophisticated forms of analysis that we are going to analyse in the next chapter.

CHAPTER 4

Discounted Cash Flow and Risk Analysis

4.1. The Discounted Cash-Flow Analysis

Consistent with modern investment analysis, an offer is satisfactory only if its return rate is higher than the marginal cost of capital required. Starting from this point, it is necessary that the technique used in the evaluation of investments consider the time properly, such as a factor which essentially the cost of capital depends on. For this reason the main assumption of financial theory is exactly the distribution of a financial value over the time.

Consequently the most generally used technique for evaluation is the Discounted Cash-Flow Analysis (DCF). The adoption of this technique and its main profitability indicators is based on the concept that these indicators are more effective in supporting decisions compared to others that may be more useful in the analysis of management and budget, especially in the preventive stage and in the case of real estate investments (Manganelli, 2015).

The analysis of investment through the criteria of cash flows is used for that economic evaluations whom aim is investigating the net present value of an investment.

The evaluation of the profitability analysis of the cash flows is based on the determination of the present value or of the financial sum of operating flows discounted at the initial time and generated directly from the investment.

4.1.1. The Net Present Value

The net present value (NPV) is defined as the increase of wealth which is initially projected and which the operator makes through investment. For this reason the NPV is a key indicator of the profitability of the investment and coincides with the sum of the present values of the incoming and outgoing individual cash flows.

The general formula that describes the NPV is as follows:

$$NPV = \sum_{t=0}^{N} \frac{CF_t}{(1+r)^t}$$

where
N number of periods, investment time horizon or period of analysis;
CF_t expected cash flows;
r discount rate (minimum acceptable rate of return).

Fig. 4.1. Source: Goddard and Marcum, 2012

Like in the case of investment property, if the initial capital investment (the purchase price) at year zero is CI, the Net Present Value can also be determined as:

$$NPV = \sum_{t=1}^{N} \frac{CF_t}{(1+r)^t} - CI$$

Fig. 4.2. Source: Goddard and Marcum, 2012

When the current value is higher than the initial invested amount, this implies that the expected return is greater than the rate used for discounting. If the discount rate corresponds with the minimum acceptable return, the investment project should be considered. In the same logic, a positive NPV signifies that the return on investment will exceed the minimum amount acceptable. On the contrary a NPV less than zero means that the project won't meet the expected profit.

In the analysis of cash flows, monetary flows are the differences, each time, between revenues (rental or sales) and the cost of construction and management (in the case of rent). The flows may be considered net and /or gross of both the financial costs and of taxes (Manganelli, 2015).

Even in a context of certainty, where the cash flows aren't exposed to any risk about their quantity and time, the problem persists in the choice of discount rate. Thus, the NPV changes in value as the discount rates used or usable for the specific investment vary.

Summarizing, the profitability of an investment is to be considered acceptable if the NPV is positive, that is when revenues exceed costs and both of them are discounted.

We are going to calculate the Net Present Value of the project further in our analysis.

4.2. The Internal Rate of Return

The difficulty of selecting the rate could be seemingly avoided through another indicator of profitability: the Internal Rate of Return.

In fact the IRR is another primary method of valuation in property investing. This method is common among real estate investors because the final result is quite simply benchmarked with other properties and investment options.

The IRR is the discount rate that makes the net present value of all cash flows (both positive and negative) equal to zero, that is the discount rate that equalises the positive and negative flows for a particular investment (Manganelli, 2015).

Specifically, the IRR is "the rate that equates the present value of the cash inflows with the present value of the cash outflows. Once a projected income stream has been determined, the resultant IRR can then be compared to the required rate of return for the investor to determine whether the project should be pursued" (Goddard and Marcum, 2012). In practice, the IRR is calculated by zeroing the NPV and solving the below equation with respect to the discount rate (Fig. 4.1).

$$\text{NPV }(r) = \sum_{t=1}^{N} \frac{CF_t}{(1 + IRR)^t} - CI = 0$$

Fig. 4.3. Source: Goddard and Marcum, 2012

If the IRR is greater or equal to the required rate of return, then the NPV would be positive and the project should be taken. On the contrary, if the IRR is smaller than the required rate of return, then the NPV would be negative and the project would be rejected. The cash flow of the period zero is negative as the investor is required to pay that amount in initial equity in order to participate in the project.

The IRR measures the return on invested capital. Though the solution on itself doesn't indicate whether it is appropriate to realize the project or not, because the decision of the investor is contingent to the comparison between the IRR determined as described above, and

a rate that corresponds to the minimum expected return from that particular subject in relation to the specific transaction (Manganelli, 2015).

Generally, for the determination of the IRR, the function to be solved is the following:

$$F(r) = 0,$$

Fig. 4.4 Source: Goddard and Marcum, 2012

where F indicates the difference between the present value of the revenues and costs of the investment. The solutions of F(r) are those that are financially acceptable but clearly complex or imaginary solutions can't be accepted. If the investment cash flows correspond with a series of initial costs, tailed by a series of revenue and where these discounted costs are lower than these revenues discounted, then the curve that represents the NPV function of assay intersects once the x-axis and F(r) admits only one positive real solution (Goddard and Marcum, 2012).
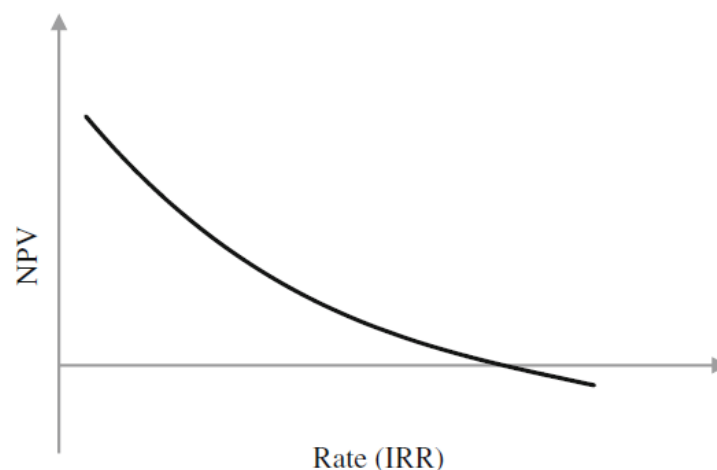
Fig. 4.4 Source: Goddard and Marcum (2012)

4.2.1. IRR Computation

Following the formula above (Fig 4.3), the first step for calculating the IRR to total capital investors is to compute the operating free cash flow.

Free cash flow equals the cash flow generated by the company's operations, less any reinvestment back into the business. Thus, free cash flow is the cash flow available to all investors (equity holders, debt holders, and any other non-equity investors) and it is independent of capital structure.

From a technical point of view, free cash flow *(FCF)* is the cash flow generated by the core operations of the business after deducting investments in new capital:

$$FCF = NOPLAT - Net\ Investment$$

where *Net operating profit less adjusted taxes (NOPLAT)* represents the profits generated from the company's core operations after subtracting the income taxes related to the core operations (Koller, 2010).

Instead the *Net investment* is the increase in invested capital from one year to the next, where *Invested capital* represents the cumulative amount the business has invested in its core operations (primarily property, plant, and equipment and working capital):

$$Net\ Investment = Invested\ Capital_{t+1} - Invested\ Capital_t$$

We calculate the free cash flow generated in our case of study:

FREE CASH FLOW	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
NOPLAT	(362,976)	26,783.32	71,119.71	75,123.68	79,362.74	77,210.14
minus Capex	(2,040,850)	-	-	-	-	3,611,793.27
plus Amortization	-	-	-	-	-	-
minus Change in Working Capital	-	-	-	-	-	-
Free Cash Flow	(2,403,826)	26,783	71,119.71	75,123.68	79,362.74	3,689,003.41
Free Cash Flow to Equity Holders	(50,000)	-	-	-	-	425,973

Fig. 4.5 Cash Flow Computation

In the year 0, the Invested Capital (corresponded to *CI* in the Fig. 4.3) is computed. The total amount is composed by the capital invested for the acquisitions of the properties and the set-up costs faced by the Company, that we have categorized as a negative NOPLAT.

Simply using the Excel program, we use the IRR formula using the Free Cash Flow and Invested Capital calculated above for calculating internal rate of return to total capital (IRR$_{TC}$):

IRR TO TOTAL INVESTORS   10.75%

The Internal Rate of Return to Total Capital Investors is equal to 10.75%.

The internal rate of return on equity (IRR_E) is the time adjusted yield that represents an expected rate of return to the equity investor (Goddard and Marcum, 2012). In practice, the IRR_E is the expected rate of return on equity of an investment, which is then compared to the equity holders' required rate of return (discount rate) to establish the desirability of the property investment.

The formula used for computing the IRR_E is the same as the formula we have used above. However in this case the Invested Capital corresponds to the equity used for financing the project and the Cash Flow is the cash flow received by the equity holders after the debt holders have been paid.

In our real case, the equity holders invest £50,000 in year 0, and then they are going to receive the money the fifth year, after the properties sale and the debtors repayment. The result is the following:

The Internal Rate of Return to Equity Investors is equal to 53.49%.

How should an investor translate this data? The IRRs don't give a true sense of the value that the project will add to the Company. It just provides a benchmark number for understanding if a project should be accepted based on the firm's cost of capital. Indeed, since the cost of capital represents a threshold rate that a company must overcome before it can generate value, the internal rate on return must be greater than WACC if the Company wants to make a profit.

4.3. The comparison between IRR and WACC

In this section the leverage concept has to be recalled. We remind that "if the addition of the mortgage increases the return on equity, the addition of the mortgage has resulted in a positive leverage. If the addition of the mortgage decreases the return to the equity, the addition of the mortgage has resulted in negative leverage" (Fisher, Martin and Mosbaugh, 1991).

In the third chapter we have analysed the leverage effect through the basic indices of ROR, ROE and mortgage constant. Now we face the question in a more sophisticated way, taking into consideration the holding period in its entirety and the time value of money.

In this case we are going to compare the IRR to total investors with the Weighted Average Cost of Capital (WACC). If the IRR is higher than the cost of capital, then the project should be accepted and if the cost of equity is higher than the IRR to total investors, the project has a positive leverage.

4.3.1. WACC and Net Present Value Computation

Consequently the computation of the WACC is required. We calculate it basing on Grabowski's paper data and process (2016). The WACC is calculated through the computation of the required return on equity debt and the required return on debt, suitable for the level of debt (that means levered) and using the appropriate weights to each.

It's important to specify that the rate of return on debt capital is the rate that a debt investors wants for the investment and usually it is an after-tax interest rate because of the tax deductibility of interest on debt payments.

The required return on equity capital is usually computed through the Capital Asset Pricing Model (CAPM). CAPM, for example, is calculated by adding that product to the risk-free rate a risk premium multiplying an estimated beta by the (market) equity risk premium. Other premiums can also be added, resulting in a modified CAPM result, as appropriate. In our case we add a project specific risk premium equal to 3%.

The beta used in estimating the cost of equity capital in the CAPM must be levered based on the appropriate debt-to-equity ratio because real estate transactions are financed with a mixture of debt and equity (Grabowski, 2016). And precisely the debt-to-equity ratio needs a particular attention.

The WACC is an essential notion in corporate finance. The elementary explanation of the cost of capital coming from the equity and the debt value average, seems simple. However, as a matter of fact, its practical implementation yields several questions, mostly linked to the distinction between book values and market values (Farber, Gillet, Szafarz, 2005).

In the paper "A general formula for WACC" (2005) it is clarified that, from the investors' perspective, the value of the levered firm is the sum of the market value of equity, E, and the market value of debt, D:

$$V = E + D$$

In our case, with the implementation of the project, the market value of debt remains constant while the equity market value change over the holding period.

Therefore for the computation of the WACC we have decided to calculate the average value of equity, through the computation of the mean between the initial equity market value and the equity market value in the fifth year.

For this purpose we proceed with the estimation of the Enterprise Value in the year zero and in the last years through the APV method and successively subtracting the debt value and adding the excess cash for finding the market equity value for the boundaries years.

In the adjusted present value (APV) approach, we begin with the value of the firm without debt, discounting the FCF to total investors at the unleveraged cost of equity and summing up all the discounted flows.

As we add debt to the firm, we study the net effect on value by considering the benefits of borrowing. To do this, we assume that the primary benefit of borrowing is a tax benefit, so we discount the annual interest tax shields at the unlevered cost of equity too (Damodaran, 2002).

Finally, we calculate the equity market value for the year zero subtracting the debt market value and summing up the excess cash holding at the beginning of the period. But why do we add cash in the enterprise value formula? Cash gets subtracted when calculating Enterprise Value because cash is considered a non-operating asset and it is already implicitly accounted for within equity value, so we have to add it back to taking it into consideration. Note that when we subtract cash, to be precise, we should say excess cash. However, appraisers typically make the assumption that a company's cash balance (including cash equivalents such as marketable securities or short-term investments) equals excess cash (http://www.ibankingfaq.com//).

Then we have subtract to the Free Cash Flow and Interest Tax Shield of the last year the debt principal repayment and we have add the cash that is left in the Company before the property sale for the computation of the equity market value in the fifth year.

Enterprise Value time 0

	Ku=4,68%	FCF	PV(FCF)	ITShield	PV(ITShield)	EV year 0
YEAR 1	1.0768	26,783.32	24,873.07	45,500.00	42,254.83	
YEAR 2	1.1595	71,119.71	61,336.63	45,500.00	39,241.11	
YEAR 3	1.2485	75,123.68	60,168.85	45,500.00	36,442.34	
YEAR 4	1.3444	79,362.74	59,030.50	45,500.00	33,843.18	
YEAR 5	1.4477	3,689,003.41	2,548,201.83	45,500.00	31,429.41	
						2,936,821.74

```
Year 0
EV0                    2,936,821.74
Debt time 0            3,500,000.00
Cash in balance 0      1,146,174.08
Equity time 0            582,995.82
```

Enterprise Value time 5

	FCF	ITShield	EV year 5
YEAR 5	3,689,003.41	45,500	
			3,734,503.41

```
Year 5
EV5                    3,734,503.41
Debt time 5            3,500,000.00
Cash in balance 5        555,118.91
Equity time 5            789,622.32
```

Average equity value   686,309.07
Debt/Equity Ratio   510%

Fig. 4.6. Equity Market Value Computation

When the two equity market values are computed, we calculate the mean of the values for finding the average equity value for the holding period.

Finally we relate the debt market value with the average equity market value.

The entire process is shown in the figure 4.6.

As risk free rate the long term 20-years UK Government bond yield is the most appropriate to use. Instead the Equity Risk Premium and the Real Estate Beta are provided by Grabowski's paper (2016).

It's important to specify that the Beta levered is computed by leveraging the Beta unlevered for the capital structure of the Company using the debt to equity ratio calculated with the average equity market value.

Now that we have all the components for computing the WACC, we can proceed with the calculation of the weighting average cost of capital. We summarize all the data in the figure 4.7. The WACC of the Company turns out to be 8.04%.

Now that the weighted average cost of capital is available, we can compare it and the unlevered cost of equity (K_u) with the Internal Rate of Return to total investors (IRR_{TC}).

The IRR_{TC} is equal to 10.75% so the minimum rate of return required for all the investors is higher than both the WACC and K_u those are two different costs of capital. This

means that the project has a positive leverage and it has confirmed also by the fact that the Internal Rate of Return to Equity Holders (IRR_E) is higher than IRR_{TC}, meaning that the leverage works in favour of equity investors (Pyhrr, 1982).

From this point of view the project should be accepted because the return on the capital invested is higher than the cost of the same capital.

Long Term 20-yr UK Government Bond Yield (Rf)	1.18%
Equity Risk Premium (Erp)	5.00%
Real Property Beta (Bu)	0.70
Specific Risk Premium	3.00%
Cost of Equity Unlevered	**7.68%**
Bonds Interest Rate	6.50%
Income Tax Rate	20%
Cost of Debt	5.20%
Debt to Equity Ratio	510%
Beta Levered (Bl)	4.27
Cost of Equity Levered	**23%**
WACC	**8.04%**

Fig. 4.7. WACC Calculation

Furthermore we remind that if the IRR_{TC} is greater or equal to the required rate of return, then the NPV would be positive and the project should be taken. On the contrary, if the IRR is smaller than the required rate of return, then the NPV would be negative and the project would be rejected. The cash flow of the period zero is negative as the investor is required to pay that amount in initial equity in order to participate in the project.

We calculate the Net Present Value of the project subtracting the initial investment from the Enterprise Value at time 0 and as shown in the formula 4.2.

NPV= Enterprise Value - Initial Investment =
   $= 2,936,821.74 – 2,403,826 = £\,532,995.74$

The real estate project as a positive Net Present Value, so it could be implemented.

4.3.2. WACC or Unlevered IRR? Frequent Misunderstanding

The implementation of the IRR and WACC as explained above is clear. However in real business world some misunderstandings could arise. In an interesting recent article, Grabowski (2016) reports the problem of term misunderstanding between business valuation practioners and real estate appraisers. In his article, he addresses the conflicting use of "unlevered IRR" by real estate and business appraisers.

In a business valuation environment, the term "levered" means in some way the inclusion of debt. For example, when people speak about leveraged cost of equity, this means that the impact of debt is incorporated, because equity is subject to two kinds of risk, such as operating risk and financial risk.

The term "levered" is used in the business valuation context also for the cash flow. Levered free cash flows are the flows that are impacted by debt obligations of the firm. Usually, Grabowski explains, "the more debt used to finance a company, the less cash flow there is available for equity holders (i.e. levered free cash flow)". On the contrary, the "unlevered free cash flow" is the cash flow that don't comprise the interests on debt, interest tax shields and debt principal repayment.

The author uses as a reference for real estate appraisals the *PwC Real Estate Investor Surveys,* which are quarterly surveys published by PricewaterhouseCoopers, and that are largely used by real estate professions.

The discount rate that they calculate for each classification is the Internal Rate of Return ("IRR") on "unleveraged, all-cash transactions": here the misunderstand raises. What the PwC survey means with the word "unleveraged" it's not that the transactions are unleveraged themselves, but that the cash flows used for calculating the IRR are unlevered. This could be misunderstanding by a business valuator, who could interpret it as the discount rate itself is an unlevered discount rate (i.e. that this rate is equivalent to the rate without debt in the financial structure or the risk of debt has been eliminated).

However, real estate transactions are rarely financed with 100% equity and for this reason, the author explains, the discounts rates reported by PwC are weighted average discount rates applied to unlevered cash flows.

Summarizing, the IRR from the PwC survey can be considered as a Weighted Average Cost of Capital (WACC), as it is usually used by business valuators, and not as the unlevered cost of equity. This is because the discount rates reported in the PwC surveys are "in fact weighted average discount rates applied to unlevered cash flows".

What we have said above is important because it clarifies also the way for calculating the Required Return on Equity Capital in an appropriate mode.

The required return on equity capital is often estimated by the Capital Asset Pricing Model or build-up method.

The CAPM model, however, is calculated by multiplying an estimated beta by the equity risk premium and adding that to the risk-free rate. The investor must to be careful with the choice of the beta. As we have already said, the real estate transactions are usually financed with a mixture of debt and equity, even if the PwC refers to the discount rate as unleveraged. Thus the beta used for the estimation of the cost of equity capital in CAPM must be levered based on the appropriate debt-to-equity ratio.

In practice, the article conclusion is that when a WACC is calculated using similar inputs as the PwC surveys, the WACC, calculated as the business evaluators use to, and the "unleveraged IRR", as intended by real estate appraiser, are essentially the same.

4.3.3. Weaknesses in the Internal Rate of Return Model

One of the primary limitations in the IRR model is that the formula is an nth degree polynomial given the denominator equal to $(1 + IRR)^n$.

When the expected cash flows change from positive to negative and back to positive during the holding period, more than one IRR can result. Surely for a real estate transaction in the initial period the cash flow would be negative in most cases, but also in the subsequent periods the annual cash flow could be negative, for example when during the "Yes era" some financial institutions approved loans for new construction without tenants in place but in most cases tenants do not start paying rent until they occupy the property.

Summarizing, when in the DCF there is an alternation of positive and negative cash flows, problems could arise in the calculation of the IRR, because of the presence of multiple IRR, that means the curve of NPV has more intersections with the x-axis, or because of the indeterminacy of the IRR, that is the curve hasn't any intersections. If one of these situations happens, it is still possible to fix the problem through a process able to assure a result. Fortunately, in our real case we have found a real solution.

4.4. Risk Analysis

The Discounted Cash Flow model offers information that the basic financial feasibility model doesn't, because it takes into consideration the changes in inputs such as rents, expenses and property value over time, an eventual equity build up due to loan amortization,

income taxation and interest tax shields, the expecting holding period and finally the time value of money.

However, the Discounted Cash Flow doesn't measure adequately the probability that the expected net income and cash flows will not be received. In fact financial ratios that we have used in the previous chapter provide some information about the risk profile of the investment, but they don't offer data about the probable deviations from the most likely values used in the analysis.

The risk management is one of the most important issue that the investor has to face. The risk of an investment is caused by many variables, many of them are also idiosyncratic in nature. For this reason it is difficult for the analyst incorporating the risk factors in the valuation of convenience. The analyst has to take into consideration the correlations between the specific goals of the investment and the estimated probability of returns.

The risk theme is also a problem for an investment evaluation because of the volatility of the financial markets and the increasing competitiveness, which occur both in mature sectors and in those characterized by strong technological innovation (Manganelli, 2015).

As we all know, risk exist because it is impossible to make a perfect forecast. Many economists make a distinction between risk and uncertainty. One basis for this distinction is whether or not the probability distribution of outcomes is known or can be estimated (Pyhrr, 1982). This means that if the distribution is known or can be estimated, risk exists; if it's not possible to estimate the distribution, investors face uncertainty. So, from a simply formal point of view, the conception of uncertainty is different from that of risk. An investment is judged risky even when the outcomes produced by it can't be determined with certainty but various assumptions about its future results can be made, a given probability value is associated at these results, and investor can build the entire probability distribution of event.

A good investor should always try, as far as possible, to convert the elements of uncertainty in risk factors, pushing the analyst to a continuous process of research and preparation of data for producing and incorporate in the analysis new arrangements of probability. In real world the terms risk and uncertainty are used interchangeably.

Risk can be defined in many different ways that we can summary in five popular definitions (Pyhrr, 1982):

1. The probability of loss;

2. The probability of not receiving what is expected;

3. The difference (or potential variance) between expectations and realizations;

4.   The possible variance of returns relative to the expected or most likely return;

5.   The chance or probability that the investor will not receive the expected or required rate of return that is desired on the investment.

The last of these is an operational definition that we are going to use later for our risk analysis.

4.4.1. Classification of Risks

Risk can be classified in different ways. Pyhrr (1982) shows a clear basic classification.

The first distinction is between business and financial risk. Business risk can be static or dynamic; financial risk can be internal or external.
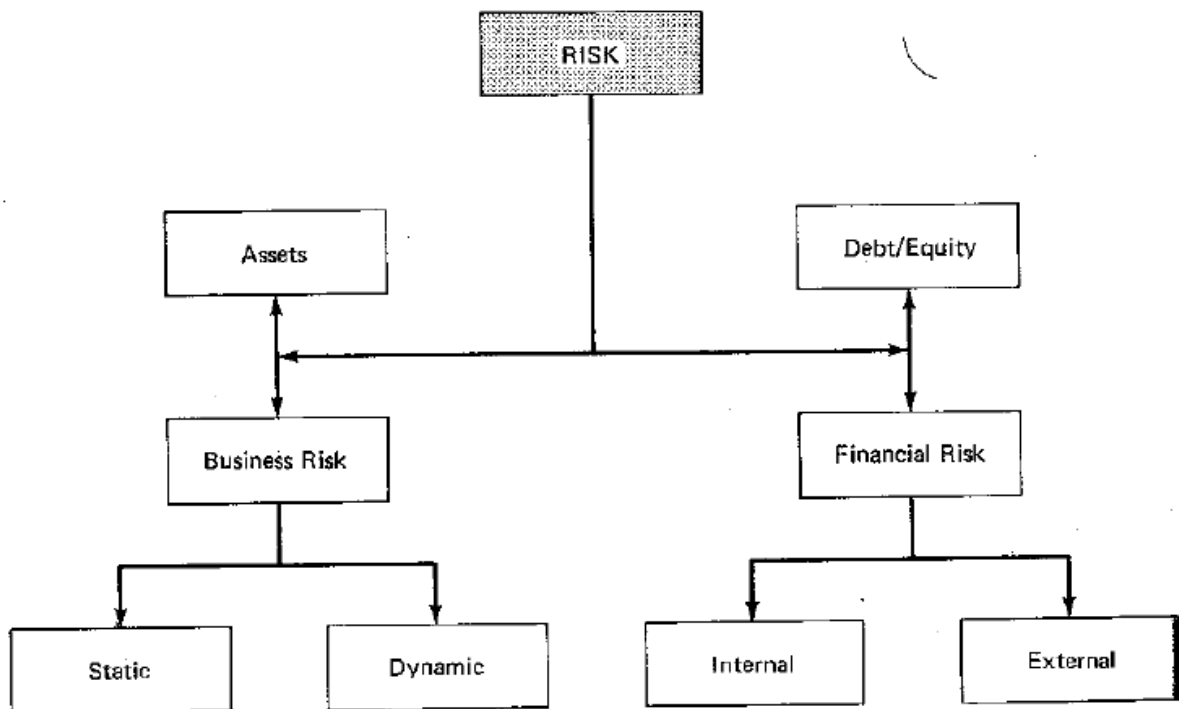
Source: Pyhrr, 1982

4.4.1.1. Business Risk

Business risk is the underlying asset risk, that is the probability that the expected level and pattern of productivity returns will not be received, or the uncertainty of the prediction of productivity; in other words it is the probability that the expected or required rate of return on total capital (IRR_{TC}) will not be realized.

Business risk can change over time following five variables: capital expenditures, gross possible income, vacancy rate, operating expenses and property value. The greater the potential variance in these variables, the greater the business risk is.

Business risk can be distinguished into static and dynamic categories. With the name static risk we refer to physical cause and effect that occurs at random and the investor can't control it (Graaskamp, 1977). It always results in a loss, but these risks (such as fire, storm or flood) can be insured against because they are foreseeable in the long run.

Dynamic risk can results both in a profit or a loss, because it is related to changes in general business condition and the physical condition of the property. Some factors those cause this risk are the market demand and supply conditions, the age of the property, tax reforms and so on. Changes in these factors may change the purchase price, net operating income, the value of the property and the tax benefits. In other words, these factors can change the IRR_{TC} (Kelting, 1980).

It is recognized that the real estate market is not efficient at all. Consequently, most skilled property investors have the chance to take advantage of these inefficiencies and realize particular profits without being troubled with an equivalent amount of extra risks. Diversification guarantees risk reduction only if the investors chose the properties in a way to avoid correlations between the patterns of the profitability of the various real estates.

For example, if it is possible, it is important to diversify even geographically for reducing the impact of economic crises that affect specific market areas. Unluckily, diversification presumes the accessibility of a large amount of capital so it is an unfeasible way for all those investors, that don't have a high enough budget.

4.4.1.2. Financial Risk

Financial risk can be considered as the extra risks to the investor created by debt financing. It is added to the business risks and it amplify when the amount of debt service (or related) increase. From another point of view, Pyhrr (1982) refers to financial risk as "the probability of not receiving the expected or required rate of return on equity (IRR_E) owing to the investor's inability to meet fixed financial obligations created by debt financing.

As in the case of business risk, financial risk can be classified in two types. Internal financial risk relates to the ability of the project to generate enough cash to pay the monthly or yearly debt service.

The second type of financial risk is the external financial risk. It is related to the investor's ability to obtain cash in the money markets or from other external sources such as bank loans or additionally equity cash.

4.4.1.3. Relationship Between IRR and Business and Financial Risk

Pyhrr (1982) interestingly analyses the influence of the risks on the investors' IRR. We have already seen the relation between business risk and the IRR on total capital (IRR_{TC}). However the relationship between financial risk isn't so easy. It's not correct to say that the financial risk is the probability to not receiving the expected IRR_E, because the IRR_E depends both on basic productivity factors (that means the factors liked with the IRR_{TC}) and on financing factors. Thus the IRR_E is directly related to both business and financial risk. Consequently we can consider the variations of IRR_E as a measure of total project risk, while the variations in the IRR_{TC} quantify business risk only.

Another relationship between business and financial risk should be noted. Business risk should be the major factor to determine the amount of debt financing used. The level of business risk that is intrinsic in a project and the amount of financial risk sustained by the investor in financing the project should be inversely related. For example, if an investment is characterized by a high business risk (high vacancy rates, instable neighbourhood, etc.), the investor should use a low degree of leverage financing so the total debt service will remain relatively low. In this manner, it reduces the probability of insolvency in any year of the holding period and so it will decrease financial risk. In situations in which there is less business risk, the investor could justify an higher degrees of leverage financing.

4.5. Levels of Risk Analysis

The attention on risk analysis in real estate is increased due to the recent crisis while it has become of significant interest to the business world in the last few decades because of unfavourable cyclical phases during which not all projects have automatically reached success (Manganelli, 2015).

When it was clear that real estate investing is not exempt to the possibilities of failure, literature has been improved by works on sophisticated techniques of risk control, traditionally implemented in other areas of the economy. However these methods are often insufficient for real estate world because the greatest benefits that such analyses granted don't align with the cost and time needed to obtain them. For this reason in the case of moderate-sized projects, and where the results are predictable, it is better to use a less complex analysis.

In the contest of risk management, there are many levels of risk analysis that can be done by the investor.

The investor should start utilizing simple one-year cash flow techniques and then apply more rigorous forms of analysis as the investment analysis proceeds. Pyhrr (1982) defines five levels of risk analysis.

4.5.1. The Basic Financial Feasibility Model and DCF Most-Likely Output

The first and the second levels are respectively The Basic Financial Feasibility Model and DCF Most-Likely Output.

We have deeply faced those steps of risk analysis in the previous chapter.

In the Basic Financial Feasibility Model any effort is made to analyse different rate-of-return outcomes. They are just basic measures of total project risk.

During the DCF Most-Likely Output, annual data on debt coverage ratios and break-even points has been calculated. By viewing these ratios over time, investors can then analyse the level of risk and their trends.

In this chapter a further step has been made by comparing IRR on total capital (IRR_{TC}) and IRR on equity (IRR_E) and evaluating the long-run, after-tax, positive/negative leverage situations. If $IRR_E > IRR_{TC}$, and $IRR_{TC} > WACC$ a long-run, positive leverage situation is achieved.

4.5.2. Third Level: IRR Partitioning

Analysts have to make assumptions, and obviously these assumptions have an impact on analysts' conclusions and recommendations.

Donald Valchi (1978) claims that having an IRR and knowing its amount is not enough. In fact the individual components of the IRR contain information very useful to the investors, and for this reason Valchi says that portioning the IRR clarified "the appropriateness of the type of return, given the investor's investment strategy".

In another article, Robert Zerbst (1980) suggests that investors are interested in what fraction of their return is determined on near-term performance and its associated assumptions, and what fraction is dependent on long-term performance and their riskier assumptions.

The idea is that there is a continuum of strategies that may be characterized at one extreme as investing and at the other speculating.

Fig. 4.8. Source: Manganelli, 2015

Investments those depend more weightily on the final sales price, rather than on the income from operations annually received during the holding period, are by definition more speculative. An investor looking for lower investment risk should think about how much of the present value of the cash flows is expected from the annual income given by the property relative to the amount which is expected from the future sale of the investment. Goddard and Marcum (2012) clarify the concept explaining that the higher the percentage of the cash flows from the sale relative to the total net cash flows over the holding period, the more inherent risk is in the projected income stream. By looking at the cash flows from this point of view, an investor is capable to "partition" the net cash flows from operations from those that are from the expected sale. Partitioning the IRR allows the investor to quantify the risk inherent in an income stream.

In his article, Brown (1998) presents a method of using a tool of corporate finance in real estate setting, for assisting the investors and the analysts in evaluating where a project exist in a risk range.

The goal of the procedure is to indicate the sensitivity of the IRR's partitioned components to assumptions made about the income stream.

The initial portioning provides baseline information about certain elements of the IRR to equity holders and the relative weights of those elements so all the flows are discounted by the IRR to equity holders, that is simply the rate that equates the cash inflows with the cash outflows. Thus for each project, the discount factor is based on the calculated IRR (Brown, 1998).

Figure 4.9. provides the partitioning data for the investment. By reviewing the table above, a few things should be apparent. The investment has 52% of the net cash flows dependent on the future sale of the property, while it is dependent on operating cash flows for 26% and on tax savings due to debt for 21%. The data confirm us again that the investment is a speculative one because the most part of the inflows comes from the appreciation of the properties and their sale.

			Present Value of Components of Operating Flows					
YEAR	PV @ 50,9583%	Annual CF	1st Year CF Level	PV Year 1 CF Level	Growth in CF	PV Growth in CF	Tax Shelter	PV Tax Shelter
1	1.534909	26,783.32	26,783.32	17,449.45			45,500.00	29,643.46
2	2.355944	71,119.71	26,783.32	11,368.40	44,336.39	18,818.95	45,500.00	19,312.85
3	3.616159	75,123.68	26,783.32	7,406.56	48,340.36	13,367.87	45,500.00	12,582.41
4	5.550474	79,362.74	26,783.32	4,825.41	52,579.43	9,472.96	45,500.00	8,197.50
5	8.519469	77,210.14	26,783.32	3,143.78	50,426.83	5,919.01	45,500.00	5,340.71
Total				44,193.61		47,578.79		75,076.93

Present Value of Proceeds from Sale		
	Amount	PV @ 50,9583%
Net Property Gain	1,570,943.27	184,394.50

Partition Table		
Components of final return		
Year 1 level of cash flow:	44,193.61	13%
Growth in cash flow:	47,578.79	14%
Total cash flow:		26%
Tax savings:	75,076.93	21%
Total cash proceeds from sale:	184,394.50	52%
Total return:	351,243.83	100%

Fig. 4.9. IRR Portioning

4.5.2.1. Speculative Investments vs Value Investment

From a financial point of view, the different valuation techniques that we are discussing in this chapter allow an investor to determine if the expected net operating income received during the holding period[12] of the investment improves the wealth of the investor. The holding period is dependent on the investment strategy of the investor.

In this section, we will have a brief overview on the various forms of investment strategy linked to the holding period of the investment.

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[12] The holding period of the investor is comparable with the "investment horizon" concept for stock investing.

If the investor buys a property at a low price point, and then sells at a higher price point after improvements and/or a market recovery has occurred, this particular strategy would typically involve shorter investment holding periods (Goddard and Marcum, 2012).

Arbitrage investing is another kind of investment strategy, which often leads to a short holding period for the investor. This method of investing is used to take advantage of differences in prices paid in different geographic areas for analogous investment real estates by purchasing a large property in the private market, and then taking it public through a real estate investment trust (REIT). When a suitable level of profit has occurred, the investment could be sold. In any case, the holding periods for this form of investment are shorter than for other investment strategies.

A third form of investing that require a shorter holding periods is opportunistic investing. This type of investing consist in changing or modifying the use of a property for a profit opportunity unpredicted by other investors. Investors in search of properties in foreclosure can be included in this form of investment strategy. The holding period in this case can be from very short (such as less than 2 years) to moderate (from 3 to 5 years), varying on the volume of improvements necessary for making a profit from an investment, but the reason for the investment is not to buy and to hold it.

Other forms of investment strategies lead to longer holding periods. In fact, Goddard and Marcum (2012) explain that: "Investors that are utilizing a growth strategy may be inclined to a longer holding period given that their investment horizon is longer. An investment strategy which generates a longer holding period is value investing". Value investing, that is close to fundamental analysis in stocks, search for properties which produce an income stream that has strong quantity, quality, and durability. This kind of strategy tends to involve longer holding periods (from 7 to 10 years).

Other forms of investment strategy are not as easy to categorize by the length of the holding period. For example, contrarian investing, which means investing in properties that are currently disliked, could need either shorter or longer holding periods, depending on the amount of time that it takes for the property type to return to favour (Rothchild 1998). After the "Yes era", many investors have involuntary fallen in this category of investment strategy. As a bear market is defined as a 20% drop in prices over a 2 month period, many markets met this classification in 2010–2011 (Vanguard 1997; 2011a). It all depends on how long recovery will take.

4.5.3. Fourth Level: Scenario Analysis

Scenario analysis is a technique that attempts to test the impact of uncertainties on investment decision (Pyhrr 1982).

Investors can easily make a scenario analysis by varying the values of the input data in the basic financial feasibility model and DCF model to see how this variables affect the property value, the IRR, the ROE and other output data.

If, using the sensitivity analysis, it comes out that certain variables have values that are uncertain but don't impact in a strongly way the rate of return or other outcomes, the property investor doesn't need to worry about those variables. Often equity investors often aren't conscious about what are the variables are important and which are not, because it is difficult to foresee the outcomes of the interaction among many complex economic and market interrelationships.

Applying the scenario analysis at our real case, we have simulated three different scenarios. The first scenario, called "Most Probable", reflects data that we have used since now so it corresponds to the initial assumptions.

The other two scenarios, called "Best Scenario" and "Worse Scenario", represent respectively the case when the variables assume especially good values and the case when they assume extremely bad ones.

The variables inputs are: growth rate of gross possible income, growth rate of property value, expected occupancy level and tax rate.

We have analysed the variations of the main values and indices due to the variation of the inputs with the aim of identify the variables to control the most and forestall unexpected revenues and losses.

IRR on equity investment vary considerably and this is due to the fact that the 52% of its value derives from the property values, as demonstrated through the IRR portioning.

On the contrary, the IRR_{TC} doesn't change significantly. This different behaviour between IRR_E and IRR_{TC} is due to the leverage effect.

The debt coverage ratio, calculated taking into consideration the cash available in the Company used for covering the losses in the years, doesn't change particularly. It is due to the presence of this liquidity, that doesn't come from the operating activities and so it is not particularly influenced by the variable inputs.

A. INPUT VARIABLE ASSUMPTIONS

1. Growth rate of gross possible income	5%	3%	2%
2. Growth rate of property value	7.5%	5.5%	2.5%
3. Expected vacancy rate	3%	4.80%	7%
4. Taxes	15%	20%	25%

B. IRR ON EQUITY INVESTMENT

Year 5	63.41%	53.49%	40.71%

C. IRR ON TOTAL CAPITAL INVESTMENT

Year 5	12.33%	10.75%	10.32%

D. NET OPERATING INCOME

Year 1	37,854.95	33,479.15	28,130.95
Year 3	109,670.26	93,904.59	82,658.84
Year 5	125,036.71	96,512.68	79,321.76

E. SALE OF PROPERTIES

Year 5	3,684,029.13	3,611,793.27	3,503,439.47

F. DEBT COVERAGE RATIO

Year 1	5.20	5.19	5.16
Year 3	4.12	3.99	3.88
Year 5	1.18	1.14	1.10

Fig. 4.10 Scenario Analysis

4.5.4. Fifth Level: Monte Carlo Risk Simulation.

Scenario analysis isn't actually a complete form of risk analysis. It can deliver a range of possible returns but it doesn't use the probability that the different returns will actually occur. A risk analysis simulation model tries to overwhelm this problem.

Today the Monte Carlo simulation technique is also applied to forecast future cash flows to the purpose of improve long-term decisions in real estate (French and Gabrielli, 2004).

The Monte Carlo simulation measures the probability of various rates of return and liquidity positions being achieved if we can measure the probability distributions for uncertain variables. Pyhrr (1982) describes this process step by step.

The first step is assign the control variables (single-value estimates) and the state variables (probability distribution estimates) through a risk simulation model. The state variables are assigned probability distributions by the analyst.

Given the values of the control variables and the probability distributions for the state variables, the simulation is used to calculate cash flows, DCF rates of return and other statistical data.

In the third step the process randomly chooses a value for each of the uncertain variables from the respective distributions and it combines them with the values of control variables.

After that annual cash flows and the rates of return on total capital and equity are computed for that particular combination of input values.

Monte Carlo simulation is for sure one of the most used methods of simulation. Monte Carlo simulation technique selects random values of the variables used in the valuation (from a selected range of values) and carries out the valuation, repeating this exercise until the requested amount of simulations achieved (Ville Suhonen, 2014). This exercise produces a wide enough range of results to be analyzed statistically (to produce an average, standard deviation etc.). These results can be graphically projected in the form of a discrete distribution or continuum projection.

In practice, the use of the Monte Carlo simulation technique is quite limited, probably partly due to the mathematical and statistical dimension of this approach.

In fact in real estate the use of MCS seems to be fairly limited supposedly due to its demand for mathematical and statistical understanding (Hoesli, Jani, Bender, 2006). It is estimated that, for this reason, only the 2% of real estate investors use a stochastic model to value a real estate asset investments, preferring the deterministic ones.

The successful development of the risk simulation models in the practical world of real estate evaluation depends on acceptance of the model for planning and decision making and on the investor's ability to forecast and estimate probability distributions for uncertain variables. However it may take significant time before such model evolves in real estate area basically because there is a lack of historic data often due to the few transactions in every local market and the unicity of every property that prevent the generalization of the information and causes high costs necessary for this kind of research.

Conclusions

The real estate market is an imperfect market because of a strong segmentation (due, amongst others, to location and destination of the property) that forms many submarkets with different characteristics, and a slow but continuous change in the market conditions that influences both the value of the properties and the rent level. The success of a good investment is based on an adequate market research because the peculiarities of the real estate market and, in particular, the large possibility of differentiation of investment properties, compel to increase efforts in the research market, surely greater than those required in other sectors of the economy. Thus a detailed market research is fundamental for the final decision. The main goal of these studies is to forecast the potential demand and the supply's conditions today and tomorrow not only for entrepreneurs but also for other subjects involved in this sector such as banking institutions interested in assessing the risk of interventions, or the Public Administrations.

During the decision making process, variables that can have an effect on the final decision are defined, measured or estimated. In this sense, it is crucial to construct a valuation model that permit the identification of critical parameters, that are relevant to decision-making, elaborating the information and finally interpreting the results to which it leads.

The first step for investing in real estate is to develop a strategy to delineate the level of the returns and risks and their nature and how they can be achieved by the investor through the purchase of real estate.

Strategy is implemented firstly fixing investment goals, setting objectives for investor's organization taking into consideration external and internal forces, preparing specific policies to achieve objectives, and ensuring their proper implementation so that the basic purposes and objectives of the investor will be achieved.

In the economic evaluations framework, a feasibility analysis of the investment has not to be confused with the practice of the estimate. The estimation, in fact, is used for the determination of the property value and the evaluator does not take into consideration the ordinary use for which the property is intended. A real estate Company has to know the different valuation property technics and the strictly regulation that standardizes the evaluation process and the transcription of the data in the financial statement.

Usually an investor in real estate sector commissions the completion of an appraisal to an independent appraiser for the evaluation of the property. The appraiser must follow many

shared standard rules concerning the methodology for the estimation and the operational phases for real estate evaluation knowing as International Standards for Real Estate Valuation.

The principal International Standards for the real estate evaluation are International Valuation Standards (IVS), European Valuation Standards (EVS), Appraisal & Valuation Standards (Royal Institution of Chartered Surveyors RICS) and Uniform Standards of Professional Appraisal Practice (USPAP).

In particular IFRS 13 arranges also the support on the measurement of fair value, saying the fundamentals for the evaluation of the asset in a homogenous way for all the real estate investors.

We can distinguish the international methodologies of real estate evaluation in three different approaches (market approach, income approach and cost approach) those are deeply described.

IFRS 13 also aims to increase consistency and comparability in fair value measurements and related disclosures through a 'fair value hierarchy' that categorizes the inputs used in valuation techniques into three levels and it gives the highest priority to (unadjusted) quoted prices in active markets for identical assets or liabilities and the lowest priority to unobservable inputs.

The second part of this thesis becomes more practical with the application of a real case for better understanding the steps of investment evaluation and risk analysis.

The third chapter is about the feasibility analysis. A proposal is practicable if it is physically implemented, it is legally feasible and it is financially sustainable. It should be structured according to many stages, from a merely definition of goals and constraints to the analysis of the market and estimate of production costs if the property is developing.

We have investigated the last points of a proposal: the financial feasibility issue.

Primarily, the lender has to be sure that the project can generate a cash flow that allows for the return of the loan, and then also that the most likely selling price of the project is sufficient if the investor fail to cover the debt if not yet extinct.

Our first step is on analysing and structuring the basic economics of a project using a one-year cash flow pro forma model.

The first indices is the mortgage constant, defined as the amount of annual debt service that is necessary to pay interest at some stated rate and the entire principal over the amortization period. In our case the mortgage constant is equal to the cost of debt (6.5%) for the initial years because the principal payment entirely happens only the fifth year, when K grows by 100 points percent (106.5%).

Then both the equity investor and the lender can utilize the coverage ratio and break-even point as measures of risk. These ratios clearly shows that the operating incomes (i.e. rents) are not sufficient to face both debt and operating expenses. However, since the Company has a huge amount of cash at bank, it doesn't suffer for lack of liquidity. This is demonstrate by recalculating the debt-coverage ratio substituting NOI with the effective liquidity available for paying costs.

For valuing the debt and equity structure of a project, two important rate-of-return measures are critical.

The first is the rate of return on total capital (ROR) that is quite low for the total investors while it blows up in the fifth year when the properties are sold (154%), highlighting the possibility that the project is a speculative investment based on the future appreciation of the properties.

The second important rate-of-return measure is the rate of return on the investor's initial equity investment (ROE) and it is calculated dividing the cash flow to equity with the equity investment, as is common used in the real estate framework (see Pyhrr, 1982). Even if the equity investors don't receive anything during the holding period, after the properties sale and the debt repayment their return is very optimistic (852%).

Finally the concept of positive and negative leverage is analysed. Since ROE is lower than ROR, the leverage works in favour of debt holder and this happens because the mortgage constant is higher than the rate of return on total investors. The situation create a positive leverage only the last year when ROR>K so ROE>ROR.

However the basic financial feasibility analysis is done year by year, it doesn't count the hole holding period nor the time value of money.

After the feasibility analysis, the investor needs a more sophisticated analysis that measures cash flows for each year over the expected holding period of the investment. Thus the study proceeds with the discount cash flow analysis.

The net present value (NPV) is defined as the increase of wealth which is initially projected and which the operator makes through investment. For this reason the NPV is a key indicator of the profitability of the investment and coincides with the sum of the present values of the incoming and outgoing individual cash flows. However the NPV changes in value as the discount rates used or usable for the specific investment vary.

The difficulty of selecting the rate could be seemingly avoided through another indicator of profitability: the Internal Rate of Return. In fact the IRR is another primary method of valuation in investor real estate. This method is common among real estate

investors because the final result is quite simply benchmarked with other properties and investment options.

After the computation of the Free Cash Flow to Total Investors and the Cash Flow to equity holders, we used them to compute respectively the IRR to total investors (IRR_{TC}=10.75%) and IRR to equity investors (IRR_E=53.49%).

The IRRs don't give a true sense of the value that the project will add to the Company. It just provides a benchmark number for understanding if a project should be accepted based on the firm's cost of capital. Indeed, since the cost of capital represents a threshold rate that a company must overcome before it can generate value, the internal rate on return must be greater than WACC if the Company wants to make a profit.

The computation of WACC is a little bit tricky because our equity market value change during the holding period.

For valuing the average equity market value we have proceed with the estimation of the Enterprise Value in the year zero and in the last year through the APV method and successively subtracting the debt value and adding the excess cash for finding the market equity value for the boundaries years.

The WACC of the Company is 8.04%. As the IRR_{TC} is equal to 10.75% so the minimum rate of return required for all the investors is higher than both the WACC and K_u (7.68%), this means that the project has a positive leverage and it has confirmed also by the fact that the Internal Rate of Return to Equity Holders (IRR_E) is higher than IRR_{TC}, meaning that the leverage works in favour of equity investors.

Furthermore since IRR_{TC} is greater than the required rate of return, then the NPV is positive and the project should be taken. Indeed the Net Present Value of the project is equal to £ 532,995.74. The real estate investment should be implemented.

When an investor is confident about the expected good economic result of the project, the risk management is one of the most important issue that the investor has to face.

Risk can be classified in different ways. The first distinction is between business and financial risk. Business risk can be static or dynamic; financial risk can be internal or external.

Once it was clear that real estate investing is not exempt to the possibilities of failure, literature has been improved by works on sophisticated techniques of risk control, traditionally implemented in other areas of the economy. However these methods are not always appropriate for real estate world because the costs for implementing the risk analysis are often greater than the benefits. For this reason in the case of moderate-sized projects, and where the results are predictable, it is better to use a less complex analysis.

Pyhrr (1982) defines five levels of risk analysis: The Basic Financial Feasibility Model and DCF Most-Likely Output (both already faced in the third chapter), IRR Partitioning, Sensitivity Analysis and Monte Carlo Risk Simulation, those are deeply described in the last chapter with the application of our real case.

IRR partitioning shows that the 52% of the net cash flows is dependent on the future sale of the properties. This signifies that the project places the emphasis on appreciation instead on cash flow. The consequence is a speculating investment, whose risk is principally derived from the appreciation of the properties.

The scenario analysis underlies that IRR_E varies more than IRR_{TC} when the input variable assumptions change, because of the leverage effect that distinguish the two indices. In other words a little variation of the IRR_{TC} produce a higher variation of the IRR_E due to the amount of debt and its cost.

The debt coverage ratio is just slightly influenced by the inputs variation because the amount of liquidity in the Company doesn't come from operating activities and so it's not particularly influenced by the variable inputs. However the Company has to pay attention to the last year, because in a worse scenario case the liquidity is dangerously at the minimum for covering the debt expenses.

The scenario analysis isn't actually a complete form of risk analysis. It can deliver a range of possible returns but it doesn't use the probability that the different returns will actually occur. A risk analysis simulation model tries to overwhelm this problem.

However Monte Carlo simulation technique is quite limited, probably partly due to the mathematical and statistical dimension of this approach. It is estimated that, for this reason, only the 2% of real estate investors use a stochastic model to value a real estate asset investments, preferring the deterministic ones.

Nevertheless the main problem for the evolution of this kind of analysis in real estate area is basically the lack of historic data often due to the few transactions in every local market and the unicity of every property that prevent the generalization of the information and this causes high costs necessary for more precise analysis.

APPENDIX A: Assumptions

AVE PROPERTY VALUE		£85,750
AVE PURCHASE PRICE		£60,025
SDLT		0.50%
RSL MGT FEE		6.00%
RENT PROPERTY INDEX*		3.00%
PRE-LET COSTS PER UNIT		£1,000
VACANCY RATE		4.80%
CONTINGENCY RETAINED		3.20%
AVE MONTHLY RENT	Year1	£650
	Year2	670
	Year3	690
	Year4	710
	Year5	732
ANNUAL INSURANCE		£200
ANNUAL MAINTENANCE		£680
INVESTOR RETURN YEAR 1 - 4 (Debt)		6.50%
INVESTOR RETURN YEAR 5 (Debt)		6.50%
LEGAL PURCHASE COST PER PROPERTY		£500
CARDUUS ARRANGEMENT FEE***		1.75%
DIRECTORS FEES		3.25%
Corporate Advisor fee - upfront		£10,000
ISDX ANNUAL FEE		£5,000
Total one off costs July 2015		588,726
TAX RATE		20%
No amortizations included		0
No Working Capital for the period		0

* RPI Forecast based upon mid range forecasts of 1.5% - 4.5%

** House price inflation based upon Savills expectation for Scotland or 5% - 6% average.
** Should Savills expectation be bullish, acquiring at 30% below market value will protect initial investment

*** Carduus Fees covers pre-IPO costs

Source: Welbeck Associates Ltd (2015)

APPENDIX B: Profit and Loss Account

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
	£	£	£	£	£	£
PROFIT AND LOSS ACCOUNT						
Rental income	0	231,431	260,045	267,846	275,881	284,158
Interest received (on deposits)	1,424	17,088	14,905	12,834	10,845	28,647
OPERATING INCOME	1,424	248,520	274,950	280,680	286,726	312,805
Directors fees	9,479	113,750	113,750	113,750	113,750	113,750
Management fees	0	15,286	17,176	17,691	18,222	18,769
Insurance	567	6,800	7,004	7,214	7,431	7,653
Legal costs	0	17,000	0	0	0	0
SDLT	0	10,204	0	0	0	0
Refurbishment costs	0	34,000	0	0	0	0
Set-up costs	362,976	0	0	0	0	0
Annual Maintenance	0	0	23,120	23,120	23,120	23,120
Audit fee	0	0	7,000	7,000	7,000	7,000
Property Selling Costs	0	0	0	0	0	34,000
Corporate Advisor fee	1,000	12,000	12,000	12,000	12,000	12,000
ISDX fee	500	6,000	6,000	6,000	6,000	0
TOTAL OPERATING EXPENSES	374,522	215,040	186,050	186,775	187,523	216,292
NET OPERATING INCOME (NOI)	(373,098)	33,479	88,900	93,905	99,203	96,513
Property sales	0	0	0	0	0	3,611,793
Bond interest	(18,958)	(227,500)	(227,500)	(227,500)	(227,500)	(227,500)
EARNING BEFORE TAXES (EBIT)	(392,056)	(556,997)	(138,600)	(133,595)	(128,297)	3,480,806

Source: Welbeck Associates Ltd (2015)

APPENDIX C: Balance Sheet

BALANCE SHEET	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
	£	£	£	£	£	£
Property	2,915,500	2,915,500	3,075,853	3,245,024	3,423,501	-
Other debtors	1,424	0	0	0	0	0
Cash at bank and in hand	1,146,174	952,153	813,553	679,957	551,661	532,467
ASSETS	4,063,098	3,867,653	3,889,405	3,924,982	3,975,162	532,467
Bond issue	(3,500,000)	(3,500,000)	(3,500,000)	(3,500,000)	(3,500,000)	0
Other creditors	(30,504)	0	0	0	0	0
LIABILITIES	(3,530,504)	(3,500,000)	(3,500,000)	(3,500,000)	(3,500,000)	0
NET ASSETS/(LIABILITIES)	532,594	367,653	389,405	424,982	475,162	532,467
Ordinary shares	50,000	50,000	50,000	50,000	50,000	50,000
Share Premium	0	0	0	0	0	0
Revaluation reserve	874,650	874,650	1,035,003	1,204,174	1,382,651	0
Profit and Loss (Brought Forward)	0	0	0	0	0	0
Profit/(loss) for period	(392,056)	(556,997)	(695,597)	(829,193)	(957,489)	482,467
EQUITY SHAREHOLDERS FUNDS	532,594	367,653	389,405	424,982	475,162	532,467

Source: Welbeck Associates Ltd (2015)

APPENDIX D: Cash Forecast

CASH FORECAST	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
	£	£	£	£	£	£
RECEIPTS INCOME						
Rental income	0	243,100	273,156	281,351	289,791	298,485
Void deduction	0	(11,669)	(13,111)	(13,505)	(13,910)	(14,327)
Interest received	0	17,088	14,905	12,834	10,845	28,647
	0	248,520	274,950	280,680	286,726	312,805
Sale of properties	0	0	0	0	0	3,611,793
Bond proceeds	3,500,000	0	0	0	0	0
Share issue proceeds	50,000	0	0	0	0	0
TOTAL INCOME	3,550,000	248,520	274,950	280,680	286,726	3,924,598
EXPENSE PAYMENTS						
Directors fees	0	113,750	113,750	113,750	113,750	113,750
Management fees	0	15,286	17,176	17,691	18,222	18,769
Insurance	0	6,800	7,004	7,214	7,431	7,653
Legal costs	0	17,000	0	0	0	0
SDLT	0	10,204	0	0	0	0
Refurbishment costs	0	34,000	0	0	0	0
Set-up costs	362,976	0	0	0	0	0
Bond interest	0	227,500	227,500	227,500	227,500	227,500
Annual Maintenance	0	0	23,120	23,120	23,120	23,120
Audit fee	0	0	7,000	7,000	7,000	7,000
Corporate Broker fee	0	12,000	12,000	12,000	12,000	12,000
Property Selling Costs	0	0	0	0	0	34,000
Bond repayment	0	0				3,500,000
ISDX fee	0	6,000	6,000	6,000	6,000	0
Property purchase costs	2,040,850	0	0	0	0	0
TOTAL COSTS	2,403,826	442,540	413,550	414,275	415,023	3,943,792
Cash inflow/outflow						
Net cash inflow/(outflow)	1,146,174	(194,021)	(138,600)	(133,595)	(128,297)	(19,194)
Cash balance brought forward	0	1,146,174	952,153	813,553	679,957	551,661
Cash balance carried forward	1,146,174	952,153	813,553	679,957	551,661	532,467

Source: Welbeck Associates Ltd (2015)

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