Reference value of commercial real estate

ABSTRACT

Cyclical movements in market values and bubble-tendencies on the real estate markets have, in different kind of situations, created a demand for a value concept that is more stable than market value, e.g. in lending situations or in financial reports. This is also related to some criticism of the efficient market theory and how well this theory works in practice. The current market value may then not be the only value concept of interest. If one believes that strong cyclical movements and/or "bubble-tendencies" might be harmful to the economy as a whole, it should be important to find ways of counteracting these phenomena. One way to do this could be to increase transparency in valuations and/or financial reports.

The purpose of the paper is primarily to discuss a value concept called reference value, defined as the value that the property would have if the future would be like that past. The reference value concept does not claim to be a "true" or "correct" value, which makes it different from alternative value concepts of this type that have been presented, e.g. long run market value and mortgage lending value. The reference value, based on historical data for the market/property, is supposed to be presented as comparative information to the current market value, with the purpose to create transparency and increase the possibilities of making reflections about probably causes in cases where there are differences between market value and reference value. The paper presents three different approaches for calculating the reference value - using the Gross Income Multiplier (GIM), capitalization of net operating income and a cash-flow method. Illustrations using Swedish data are also presented.

The conclusion in this essay is that the reference value concept seems to be possible to apply and that the reference value should give useful information. However, there are some difficulties to overcome when making reference value assessments, and the outcomes of this study should be regarded as a first attempt trying to explain and apply this concept. For instance there are problems connected to how to decide the proper levels of different parameters when evaluating the reference-net operating income and furthermore there are problems when evaluating historical income return levels, which in turn is supposed to result in a long-term cap-rate or discount rate that is suitable for the purpose of calculating reference value. The proper length of historical data series is also difficult to evaluate for reference value calculation-purposes. The appearance of the problems mentioned above might emphasize the use of simple tools like the gross-income multiplier (GIM) when calculating the reference value. The GIM concept includes few of the difficult issues mentioned above.

Contents

1. INTRODUCTION

1.1 Background

The current capital value of an asset is of great importance to different stakeholders in a number of situations. This raises the issue of what kind of capital value that is appropriate in different situations? Does, for instance, the market value of an asset give the relevant information required? This may be questionable in some situations.

"Through history there has on a number of occasions arisen a demand for something more stable than market value of a property."[1] This demand relates to, for instance, bubble-tendencies on the market and cyclical movements in market values.

In this context it is interesting to note that in later years, the use of market value as a basis in accounting has become increasingly important. Furthermore, this development can be of importance for such matters as dividend policy and/or bonus and incentive systems, especially in real estate companies.[2]

Cyclical movements in market values are of course also very important for lending, where property is the security for the loan (mortgage etc)[3].

One example of cyclical movements on the real estate market in Sweden is shown in figure 1.1 below. The figure shows real price development for office premises in cental locations in the cities Stockholm, Gothenburg and Malmö from 1981 to 2003.

Figure 1.1

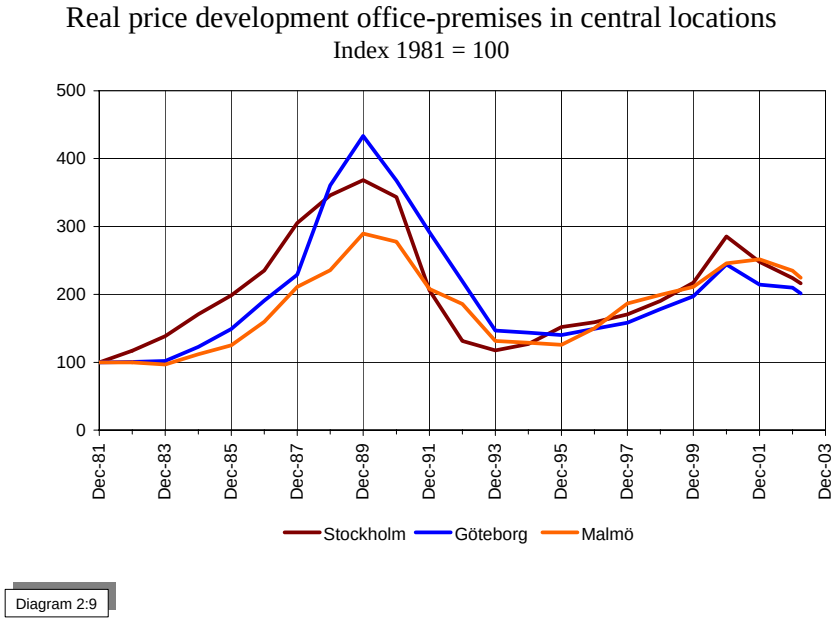


Figure 1.1 above shows the cyclical movements in real prices regarding office premises centrally located in the tree biggest cities of Sweden 1981-2003. Source: www.riksbank.se, 2003

[1] Lind, 2003 p 2

[2] See for example Nordlund & Persson, 2003; Nordlund, 2003

[3] See for example Crosby, French & Oughton, 2000; Champness, 1999

Another example of strong cyclical movements in the real estate market in Sweden is shown in figure 1.2 below. The figure shows the real price of residential property in the same geographic markets in Sweden from 1987 until 2003. Interesting in this context is that many experts believed that residential property had been hugely overvalued/"overpriced" in the late 1980's.

Figure 1.2

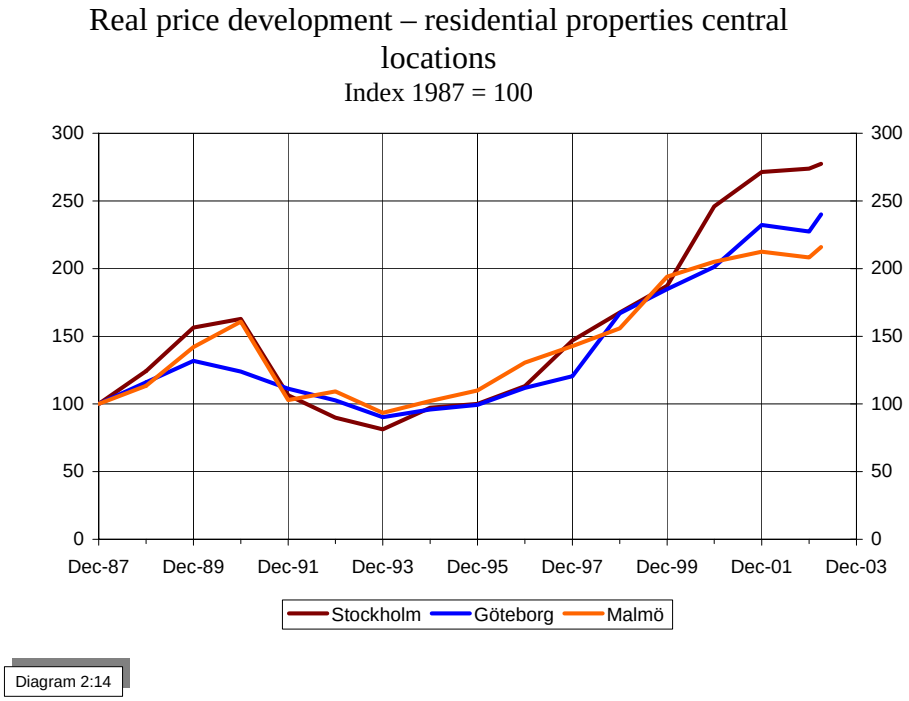


Figure 1.2 above shows the real price growth in centrally located residential properties in Stockholm, Gothenburg and Malmö during the period 1987-2003. Source: www.riksbank.se, 2003

Cyclical movements on the property market in Sweden are also shown, for instance, by Turner (2000)[4]. He presents a real price index showing the price development concerning residential and /or other commercial property from year 1970 until year 1998. During this period, from a real point of view, the prices has been as low as approximately 40 % below the start year index and as high as approximately 10 % higher than the start year index.

1.2 Formulation of problem and purpose

In the dominating economic paradigm, the hypothesis of efficient markets plays an important role. This hypothesis says that the current market value of an asset reflects all available information in a rational way. However, there are those who are critical against this hypothesis. The criticism is connected to the cyclical movements referred to in the background above, but also to the occurrence of bubble-tendencies in e.g. property markets and stock markets.

If we believe that the markets always are right, we may come up to the conclusion that cyclical movements and bubble-tendencies is just what happens sometimes and

[4] Lindh, red, 2000

that there is nothing to do about it. Another view is that strong cyclical movements and bubble-tendencies could be harmful to the economy as a whole[5], and that it should be in everybody's interest to try to reduce these fluctuations, e.g. by making the market more transparent. The effects of better transparency should then hopefully be to weaken the strengths in cyclical movements and/or bubble-tendencies.

In a number of situations there is a desire for a value that is more stable than market value, for[6]:

- Valuations for lending purposes
- Use of market values in financial reports
- Supervision regarding financial stability

Example of economic actors that could have interest in a more stable reference point of a capital value than current market value are, for instance;

- Banks. Banks may have to make assessments of how the security for a loan looks like in a long-term perspective.
- Auditors. Auditors may have to decide how to handle a proposition for dividends to shareholders that may include unrealized gains.
- Central banks and Financial Supervisory Authorities. For instance the "Riksbank"/Swedish Central Bank performs measurements and presentations of the state of financial stability in the current Swedish economy at different points in time.

The question is then if it is possible to find a value concept beside market value that fulfill these needs, without being too subjective. Earlier attempts to present alternative value concepts to current market value have been heavily criticized, which will be further discussed later in this essay.

The purpose of this paper is to discuss a value concept called *reference value*. In the paper I will discuss the usefulness of the concept and problems connected with the concept, for instance getting access to the information needed for calculating reference value. I will also discuss methods that may be used to calculate the reference value. There will also, in this context, be discussions of what the concept of reference value is not, related to other alternative value concepts that will briefly be presented and discussed. The relevance of the reference value concept will also be tested in an empirical part, where historical data is used to make illustrations of how to calculate and use the concept.

Maybe many actors have some kind of reference value based approach in their minds when discussing issues regarding property values. According to some authors there should be a long-term connection between "the size of the rationally economical justified capital value and market value", and also between capital value and the phase of the life cycle and condition that property is in [7]. In Bejrum et al (1992) the authors suggest that long-term persistent demands for yields regarding residential property

[5] Shiller (2002) argues that the stock market boom during the 1990's and then the crash after 2000 must have generated real and substantial misallocation of resources.

[6] See also for example discussions in Nordlund, 2003

[7] See for example discussions on this topic in Bejrum et al, 1992; Hoesli & MacGregor, 2000; Baum & McElhinney, 1997; Bejrum, 1995; Lundström, 1997; Burton, 1982

should come up to figures of around 5-7 % (probably they are reasoning from a general point of view). According to a report written in the beginning of the 1990's, the findings are summarized as: It is not profitable to build residential property without Government subsidizes if the production costs exceeds approximately 10 times the rent for one year for newly built residential property[8]. From this perspective, it is quite interesting to note that some of the companies that was listed on the Stockholm Stock Exchange in year 2002, and who's property holdings mainly consisted of residential property, disclosed market values of their properties in their annual financial reports, that was close to approximately 10 times rental income for one year. But these holdings, at least in two of the companies, was built with about 30 to 40 year old buildings (weighted)[9]. The holdings of the referred companies property was to a great extent situated in the regions of Stockholm, Gothenburg and Öresund (where Malmö is situated) (96 % av the rental area and 92% of the capital value) [10]. This should be related to the development of prices for residential properties shown in Figure 1.2. If it is believed that residential properties were overvalued/"overpriced" residential properties in the late 1980's, how should we look at the present situation? Could this be an indication of a bubble on the real estate market?

2. CRITICISMS OF THE EFFICIENT MARKET HYPOTHESIS

"The efficient market hypothesis basically says that the current price of an asset will reflect all available information. Prices change when there are new information, e.g. about the future stream of net incomes."[11] However, some authors argue that the efficient market hypothesis, consensus views of the future of a market, and assumptions of perfectly rational actors on the market can be questioned. The doubts regarding the efficient market hypothesis are mainly related to the question whether all the assumptions that the hypothesis is based on really are correct in reality[12]. Actually, there are many examples of complications when there have been attempts to prove that the hypothesis really works[13].

Reality is complex and the market consists, directly or indirectly, of human beings. Human beings have limitations in their cognitive capacity, which in practice lead to the fact that there is limitations in the capacity to make perfectly rational choices in different situations. Furthermore the preferences are not always stable or consistent.[14]

Lind (2003) argues, for instance, that in reality there are no consensus views of the development of a market and that valuations based on forecasts of the future are very uncertain. When looking at a complex system like an economy as a whole, or even a specific real estate market, predictions beyond say 6 months are highly uncertain. This can be seen in evaluations of business cycle forecasts. Lind argues that a rational person knows that actions must be based on guesses of the future and that it is important to have a clear view of the nature of these guesses concerning the future. It

[8] Bejrum & Lundström, 1993

[9] Annual reports Heba, Wallenstam, Mandamus year 2002

[10] Leimdörfer, 2003

[11] Lind & Persson, 1998, p 5

[12] See for example Lind & Persson, 1998; Lind, 2003

[13] See for example Shiller, 2002; Royston, 2003

[14] Sjöstrand, 1987

may perhaps be possible to identify two different views among economists on this point. Using very general and simplified labels Lind calls them the "mainstream view" and the "Austrian view". According to the "mainstream view" we should all come to have roughly the same (rational) expectations about the future when we look at all available information, whereas the "Austrian view" pictures the actors on the market as individuals that see different opportunities in the same situation.[15]

It is in this context interesting to note the views of Shiller (2001): "No one person can be at once a historian, political scientist, economist, and psycholigist rolled into one. It has been shown in a number of psychological studies that people suffer a wishful thinking bias, that is they overestimate the probability of success of entities that they feel associated with. Wishful thinking bias appears to play a role in the propagation of a speculative bubble. After a bubble has continued for a while, there are many people who have committed themselves to the investments, emotionally as well as financially."[16] Julius Caesar once said, "Men willingly believe what they wish". Experiments that have been carried out reveal that investors have been affected by past price increases, and that people in general tend to pay attention to what others are paying attention to. Not surprisingly, speculative assets whose price has gone up a lot recently gets a great deal of attention. People are more likely to buy assets that have come to their attention just because they are thinking about them more. Major speculative bubbles are always supported by some superficially plausible popular theory that justifies them - a theory that is widely viewed as sanctioned by some authorative figures. These theories may be called new-era theories. This discussion is related to Shiller´s argument that there was a speculative bubble on the stock market around the year 2000. [17]

However, speculative bubbles in asset markets are not a new phenomenon. More spectacular bubbles have occurred in history for instance in 1929, see below, and in 1989-90 (real estate markets) both resulting in world wide economic crisis and depressions. In the 1920's, before the Stock market crash on Wall Street, it seems that people acted irrational. The Stock market was exposed to serious strain as early as year 1927. However, at that point in time the market entered the most sensational phase. When prices on securities increased furiously, even the most sceptical surrendered and changed to the optimistic interpretation that the market shouldn't weaken – during "the new era" there would no more occur any serious depressions.[18]

Furthermore, during the speculation-mania in year 1929, a point was reached where it was of less importance for profitable speculations what actors actually believed about the future returns from different assets. The important thing was instead what was assumed about other people beliefs about the future. The psychology became more important than the investment analysis. [19]

An interesting example in this context is what happened in the USA before the stock market crash in 1929. In the early 1920's there was also a large speculation in real

[15] Lind, 2003; see also discussions about Austrian school of economics in, for instance, Bon, 1989

[16] Shiller, 2001 p 6-7

[17] Shiller, 2001

[18] Dillard, 1984; see also discussions on this topic in Galbraith, 2002

[19] Dillard, 1984

estate located in Florida. However, the expectations about future gains from owning property in Florida were to a large extent due to a fantasy-world created by people. We live in a world of human beings that want an excuse to believe in something. They don't need to be persuaded for this purpose. Regarding Florida, people wanted to believe that this entire peninsula very soon should be full of inhabitants and full of people spending their holidays there. The expectations failed.[20]

Both the crises on the stock market in 1929 and in 2000, were preceded by a crisis some years before. In 1920-21 there was a crisis in England and in the USA (following speculation in securities, ships and raw materials) and in Sweden in 1921-22 (following inflation and a speculation boom due to, among other things, shortage in commodities and credit expansion). As mentioned above there was a global crisis in real estate markets in 1989-90 preceding the heavy fall in the stock markets in 2000-2002. In the asset markets there has, hence, occurred "double-bubble"-tendencies on more than one occasion in history. More examples of this kind could be found, at least on a smaller scale.[21]

This short overview has shown that the efficient market hypothesis seems to have certain limitations.

In discussions concerning the efficient market theory and behavioural finance, Shiller (2002), concludes: "Indeed, we have to distance ourselves from the presumption that financial markets always work well, and that price changes always reflect genuine information."[22]

Studies of, for example, real estate prices and/or real office rents have also shown that if the price or the rent is above trend, then this leads to expectations that they will fall, and vice versa if they are below trend. Thus real estate prices and/or real rents tend to return towards a stable real value trend, a long run average (mean reversion).[23] This means that historical outcomes can be useful for predicting future outcomes. These ideas about mean-reversion can also be used to question the efficient market hypothesis.

In this context it is also of interest to note that investigations show that the same information can be interpreted in different ways and give rise to different preference orders between prospects, depending upon the manner in which the information and the alternatives are presented [24]. Hence, the way in which information is presented can be of great importance for how people act on the market.

[20] Galbraith, 2002

[21] See for example Lybeck, 1993 and Eklund, 1992

[22] Shiller, 2002 p 32

[23] See for instance Cho, 1996; Hendershott & MacGregor, 2003

[24] Royston, 2003

3. THE CONCEPT OF REFERENCE VALUE

3.1 Why reference value?

As discussed in section 2 above, there are some doubts about the efficient market hypothesis. If the market sometimes acts irrational, it could be of some help to develop tools to evaluate whether this irrational-phenomenon has occurred or not in a specific situation. The idea here is that a reference value benchmark could be useful when evaluating if, for instance, bubble-tendencies have affected the current market value of a property. The question is then what's inherent in the reference value concept, on what fundamentals the concept relies.

3.2 What reference value is

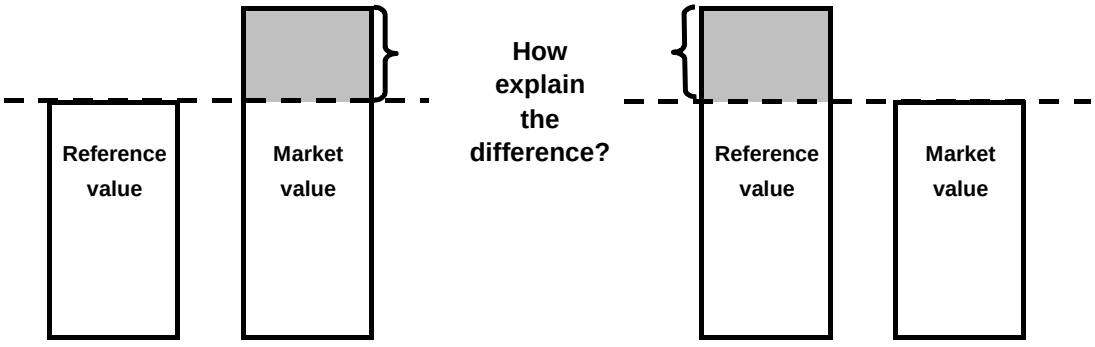
The reference value is defined as the value that a rational investor should come to if he/she assumed that the future would look like the past:

- Future cash-flows (rental income, operating and maintenance expenses etc) would be like those of the past.
- Cap-rates and discount rates would be like average cap-rates and/or discount rates in the past.

One crucial issue is to decide the relevant length of the historical period to be used when calculating the reference value. This will be further discussed in section 3.5.7 below.

When calculating the reference value it is possible that the situation below appears. The market value is higher than the reference value (or it could be the reverse situation, reference value is higher than market value). The idea behind the concept of reference value is that such a situation would need an explicit discussion and an explanation and/or interpretation of why the situation looks like this. Why is not the two values equal?

Figure 3.1



The figure above show two different situations. One (left) where the market value is above the reference value and one (right) where the reference value is higher than market value.

The usefulness of the concept of reference value is based on the idea that it would need stronger arguments to believe that the future will be different from the past, than it would take to believe that the future would look very much like the past. If presentations make differences between market value and reference value explicit, this could lead to more clearer arguments about probable causes of the differences and

to more rational prices. These discussions would increase the transparency of, for instance, valuations and/or financial reports.

The historical performance can be expected to have some relevance when making assessments of future outcomes. For instance, auditors seem, to some extent, to have based their opinion on whether there is need for impairment of property in the financial reports, on historical cash flows.[25]

3.3 What reference value is not

The reference value does not claim to be the "true" or "correct" value. It is just a point of reference when making comparisons with something else, for instance a market value. Lind (2003) argues that one should not try to find out what is "sustainable value" or what is the "efficient price" – instead we should look at historical averages and patterns of different parameters such as, for instance, asset values, rents och discount rates.

It could be perfectly rational to believe that the market value should be a different figure than the reference value. For instance, fundamental facts of the market may have changed; Population, that affects the demand for dwellings, or the number of companies demanding offices, may differ from the situation in the past. In other cases the historical development of rents may diverge from what could be expected in the future depending on some rational well-grounded facts, e.g. institutional changes.

3.4 Reference value in relation to other value concepts

On several occasions in the past, as mentioned in the introduction, there have been calls for other value concepts than market value. Some of the arguments have been that market value is not long term oriented, or that the market value doesn't express the "correct/justified" value of the asset[26].

Market Value is defined as:[27]

"The estimated amount for which a property should exchange on the date of valuation 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."

Below I will briefly present and discuss some of the alternative value concepts that have been discussed in the literature.

A long-run market value[28]

It has been argued that there is a "normal" or "natural" value of a commodity that the economic forces tend to bring about in the long run. This value should be the value which economic forces would bring about if the general conditions of life were stationary for a run of time long enough to enable them to all work out their full effect. The idea is furthermore that this long run value, for reproducible commodities,

[25] Nordlund, 2003

[26] See for example Lind & Persson, 1998

[27] IVSC, 2003

[28] See discussions in Lind & Persson, 1998

equals productions costs including a normal rate of return on equity capital[29]. But land is not a reproducible resource, which means that it cannot be argued that the long run value is equal to production cost. Lind & Persson (1998) also argues that it seems a rather hopeless enterprise to interpret such formulations as "the general conditions of life were stationary for a run of time long enough…", because we would then have to make estimations of e.g. the long run urban structure. The authors also discuss problems connected to gaps between price and cost in the real estate market compared to other goods. From a supply and demand perspective, it takes a much longer time to close the gap between price and cost in the real estate market compared to markets for most other goods. It could also be argued that some declining areas probably never close the gap between values and production costs. The authors conclude, as many others before them, that the concept of long run value, as defined above, is not useful as an alternative to current market value for real estate.[30] Paul F. Wendt also argued that there is no support for the view that cost and market prices will be equal at any point in time when discussing the real estate market[31].

Mortgage Lending Value (MLV)[32]

The EC-Directive (98/32/EC) is dealing with solvency ratios for commercial property lending and financial leases. The Directive refers to the following bases of valuation, Market Value and Mortgage Lending Value.

Mortgage Lending Value is defined in the Directive as follows:

Mortgage Lending Value shall mean the value of the property as determined by a valuer making a prudent assessment of the future marketability of the property by taking into account long term sustainable aspects of the property, the normal and local market conditions, the current use and alternative appropriate uses of the property. Speculative elements may not be taken into account in the assessment of the Mortgage Lending Value. The Mortgage Lending Value shall be documented in a transparent and clear manner.

According to The European Mortgage Federations definition of MLV, it shall be a value derived from long-term market trends, and with a high degree of certainty indicate the realizable value of the property at a future point in time.[33]

MLV introduces a notion that could be described as "smoothing" of market trends. Volatile markets introduce the need for sophisticated analytical tools and clear and detailed interpretation.[34]

Crosby, French & Oughton (2000) are critical of the concept MLV. Some of the key words used in the definition of MLV are fraught with ambiguity. Despite the conceptual questions surrounding Market Value, both the concept and the details of definition enable a specific target to be identified; the estimated exchange price in the

[29] See also discussions by James C. Bonbright who supports this view in the source Burton, 1982 p 80-81

[30] Lind & Persson, 1998

[31] Burton, 1982, see page 117

[32] Crosby, French & Oughton, 2000; Champness, 1999

[33] Champness, 1999

[34] Champness, 1999

market at a particular point in time. The same level of objectivity cannot be identified for MLV. The ambiguity and lack of clarification of the words used in definitions and principles of MLV, primarily "long run sustainable" and "speculative", are also an open invitation for banks to sue valuers where their lending decisions have failed.[35]

Market Worth (MW)

Market Worth is defined as the price at which an investment would trade on a market where buyers and sellers were using all available information in an efficient manner. Market price and market worth need not be equal and the same holds for valuations and market worth. MW calculations should be based on consensus views on the situation on the market and proper forecasts of the future. There are different possible explanations to why market value and market worth are not equal, but the explanations relate to problems connected to the ability of real estate markets to act perfectly rational and efficient due to lack of information. [36]

Lind (2003) is critical to both the concepts of MLV and MW. Lind argues that the concept of MW also will be very subjective, as the appraiser should speculate about what the price would have been if everybody were using information in an efficient manner. One of the conclusions in his paper is that both the concepts MLV and MW should be put aside, as there is no way for a valuer to estimate them in any objective way. He also argues that one can only be an expert of the past and considers that proper forecasts of the future are impossible given the dynamic view of an economy and a market. Predictions beyond say 6 months are highly uncertain and it does not exist any single consensus view of the future of the real estate market. Different kinds of actors are likely to identify different opportunities in similar/identical situations.[37]

Lind (2003) concludes: "One important aspect of acting rationally is acting from knowledge of the past, and perhaps we should make that easier by including historical information in valuation reports."[38]

Other value concepts

Lind & Persson (1998) also discuss the usefulness and need of some other value concepts for property than market value and long-run market value, discussed above. [39] They discuss :

- A hypothetical market value related to a "normal" situation
- A future market value.

The authors argue that those value concepts are unsuitable because they are vague and in practice they cannot be assessed in a properly objective way.

All of those alternative value concepts (excluding market value), presented briefly above, have one thing in common. The concepts are "normative" and claims to represent the "correct/justified" value from a specific point of views. The market value is assumed to be wrong or unproper in various situations.

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[35] Crosby, French & Oughton, 2000

[36] Baum, Crosby & MacGregor, 1996; Hutchinson & Nanthakumaran, 2000

[37] Lind, 2003

[38] Lind, 2003 s 10

[39] Lind & Persson, 1998

As mentioned above, the reference value does not claim to be a true or correct value, so from this point of view this value concept is fundamentally different from those alternative concepts that have been briefly presented above.

3.5 General issues regarding how to calculate and use the reference value

3.5.1 Calculation of reference value at different levels

The reference value could be calculated at different levels – for instance:

- From the view of a specific property
- From the view of average figures for specific kind of properties (residential, offices, retail etc) and/or for specific geographical areas

The relevant level for calculating the reference value would in turn influence how data is collected– historical data from the actual property or statistical average figures for the relevant markets.

3.5.2 Relevant time horizons when calculating the reference value

The reference value could also be calculated on the basis of different time horizons. The starting point when evaluating the proper time horizon and need for historical data should be based on aspects as:

- The need to capture the long-term development of key variables such as rents, vacancies, operating expenses, life-cycle patterns of maintenance expenses, cap-rates/discount rates and so on. This points in the direction of long time series of historical data.
- The knowledge that patterns of development change over time. For instance, key facts such as rents, vacancies, cap-rates etc from long ago may be unsuitable due to fundamental changes in the market environment. This points in direction of a short time series.

In this general description above one can identify two dimensions of problems that need to be handled When making assessments of reference values it is also necessary to handle:

- The business cycle perspective (cyclical movements in values)
- The life cycle perspective for a built property (different capacity to deliver returns at different stages in building life cycle)

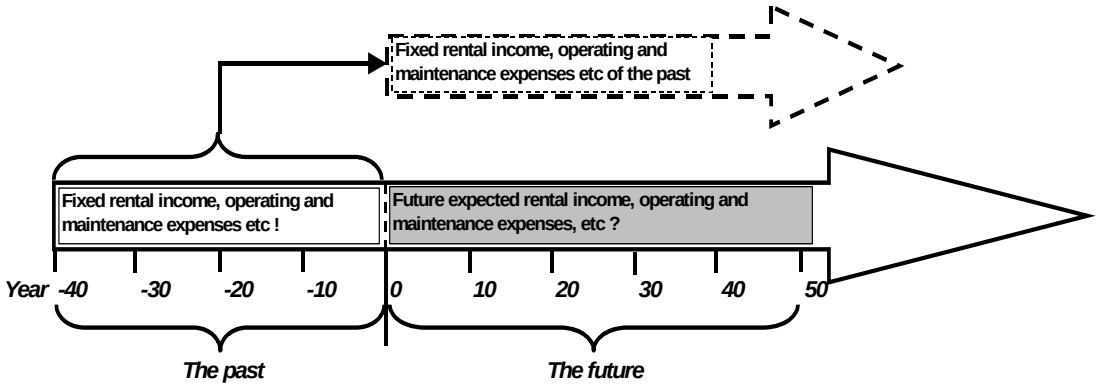
However, the dimensions above are general problems in value assessments and should be paid attention to regardless of if the valuation is for purposes of market value assessments, investment value assessments or reference value assessments. Though this essay will mostly discuss reference value from the view of movements in the business cycles, the life cycle perspective will be touched upon in the part below about reference value assessments applying cash flow methods.

In figure 3.2 below it is illustrated how actual outcomes from the past is supposed to give inputs to the calculation of reference value when using cash flow methods. As will be noticed in the figure, the fundamental idea about the reference value concept includes a long-term oriented approach. However, from a practical point of view, the

[40] Nordlund, 2003

lengths of data series for analysis would probably not exceed a time horizon of say 10-15 years.

Figure 3.2



In figure 3.2 above it is shown how cash flows from the past is used as if they were the future cash flows.

Due to cyclical movements on the market (and maybe other circumstances), the performance of the property/properties would need to be measured for a long period of time. However, the proper length of the series of historical data is a very hard task to determine. From a macroeconomics point of view (national level) there have been, at least according to some economists, cycles of 2-4 years (due to changes in inventories/stocks), 7-11 years (due to changes in investments), and crises with intervals of 20 and 40 years and long waves of 40-60 years (for instance Kondratiev).[41] Even from a microeconomics point of view, firms are affected differently by cyclical movements in the local economy, for instance in vacancies in a certain sub-market. From a general point of view, a business cycle is defined in relation to from the starting-point of differences between the potential gross domestic product (GDP) and actual GDP, the so-called "output-gap". One business cycle could thus be defined as the period between two closed "output-gaps", or as the period between two "highs" or "lows" in the output gap. A common view in practice is that a "normal" business cycle extend over a period of 4-6 years[42]

If convincing circumstances don't point in another direction, the proper length of the data series for calculating a reference value should then be two "normal" business cycles (say 8-12 years) in the entire economy. My view is that this seems to represent a reasonable balance between different factors discussed above.

One of the largest problems with this model of calculating a value figure is perhaps to get access to relevant historical data/outcomes regarding a certain property.

[41] See for example discussions in Johansson, 1997 and Nordlund, 2004

[42] See for instance Jonnerhag, 2004

3.5.3 Reference value calculation with different methods

Reference value calculations can be performed using different methods:

Area method

Applying an area method, the reference value is calculated from historical figures of selling prices/market values in relation to the rentable area of the property (-ies)

Gross income multiplier method

The reference value can be calculated using a gross income multiplier (GIM) method. This is done by dividing historical selling prices/market values with the historical gross incomes from the property.

Capitalization of net operating income method

Capitalization of net operating income (NOI) can be applied when calculating the reference value. This means that the historical NOI from the property (-ies) is divided by a historically observed cap-rate (yield) to arrive at a reference value.

Discounted cash flow method

Discounted cash flow method (DCF) can also be applied when calculating the reference value. This means that the historical cash flows from the property (-ies) are discounted by observed discount rates to arrive at a reference value.

The choice of method should not affect the result of the valuation process. For instance the outcome of a capitalization by NOI-method should give the same result as an application of DCF-method. In practice there will normally be some minor differences in outcomes but substantially the same result should be expected.

3.5.4 Relevant cap-rates and/or discount rates when using methods based on capitalization of net operating income (NOI) or discounted cash flows

Since two of the methods introduced above use cap-rates or discount rates a discussion of some issues regarding cap-rates (yields) and discount rates will follow, before we look at the specific methods. This discussion is important because the two types of rates are related to each other, as will be further described below. Furthermore, the cap rates and/or discount rates used for reference value calculation purposes, have to be decided/evaluated from another view than the cap-rates/discount rates that are used when calculating the current market values of properties.

In a study performed by Hendershott & MacGregor (2003), they link property capitalization rates to those in the bond and stock markets. Hendershott & MacGregor argues that cap-rates demanded in the United Kingdom (UK) property market indicate that there are rational expectations and that cap-rates continually tend to their long-run equilibrium value. Using rents as a long-term explanatory variable they conclude that in periods when rents were above their long term real mean, UK investors expected them to fall, and when rents were below it, they were expected to rise. The authors argue that use of mean reversion concepts could be useful when evaluating current rent levels.

When evaluating the proper cap-rate or discount rate for the purpose of reference value calculations it is very relevant how the actual outcomes regarding income return figures look like in a long-term historical perspective for different kinds of property

investments. However, as discussed further below, it seems to be a hard task to find such figures in many cases.

Alternatively one could build up a cap-rate/discount rate in a normative way using different components as illustrated in table 3.3. below.

Assume that the following conditions hold:

Real rate, no risk	3 % (Swedish Government Bonds No 3001 maturity year 2014, 27/6-2003; listed at 2.3 % in 25/8-2004)
"Normal" risk premium	
Real estate	2 % (See for example Hutchinson & Nanthakumaran, 2000)
Real change in value	2 % (See for example Baum & McElhinney, 1997; Bejrum, 1995)
Inflation rate	2 %

From the assumptions above the relation between cap-rates (yields) and discount rates is described below[43]:

Table 3.3

Nominal cash flow calculation

Nominal discount rate:	**Percent**	
Realrate, no risk	**3**	***Discount rate used to discount future cash-flows does not include any compensation for real change in value. Real change in value is supposed to be expressed in growth or decline in future cash-flows.***
Risk-premium	**2**	
Compensation of inflation	**2**	
Discount rate, nominal	**7**	

Cap-rate/ Yield	**Percent**		
(including components of inflation)			***Cap-rate (yield) also have to include the future expected change in value and cash-flow since there is only a cash-flow from a single year in the calculation.***
Realrate, no risk	**3**	**p=7**	
Risk-premium	**2**		
Compensation of inflation	**2**		
Real change in value	**-2**	**g=0**	***p-g = 7-0 = 7 %***
Inflation	**2**		
Cap-rate/Yield (p-g)	**7**		***If components of inflation excluded: 5-(-2) = 7***

Real cash-flow calculation

Real discount rate	**Percent**	
Realrate, no risk	**3**	
Risk	**2**	
Compensation of inflation	**0**	***Includes no compensation of inflation because cash-flows are calculated in real terms. Expressed as cap-rate, see below/above: p-g = 5-(-2) = 7***
Discount rate, real	**5**	

The relations described in the table above are simplified, but they are acceptable when applied to figures of the size in the table. The correct way to make the calculations is to apply Fischer's formula, further described in Persson (2003) page 383.

In relation to the discussions about real depreciation, one would first have to make clear that if an investor believes that the real net operating income (NOI) will be at the same level in perpetuity without investment efforts, the required compensation of real depreciation in the cap-rate would of course be nil. However if the investor believes that the future real NOI's will depreciate or that investments would be required in the

[43] Persson, 2003; Nordlund, 2004

future to keep the real NOIs, the rational investor would require a compensation for this fact in the cap-rate.

The expected real change in value is the same as the expected real depreciation. Depreciation can roughly be divided into three subgroups: physical deterioration, functional obsolescence and external obsolescence. Physical deterioration and functional obsolescence can be curable or incurable in nature. Simply put, these two subgroups of depreciation are possible to counterbalance if it is economically feasible to cure them. External obsolescence is related to factors outside of the subject property. This can be an economic factor, such as oversupplied market or a location factor such as poor siting or proximity to a negative environmental influence.[44]

A conclusion from the paragraph above should perhaps be that markets with low external obsolescence would show a much lower need for compensation of real depreciation in the yields observed on the market, because the risk of suffering from incurable physical deterioration and/or functional obsolescence is much lower than in a market with high influence of external obsolescence. However, to complete disregard the need for compensation of real depreciation in the yield would not be rational, because external obsolescence might occur in the future.

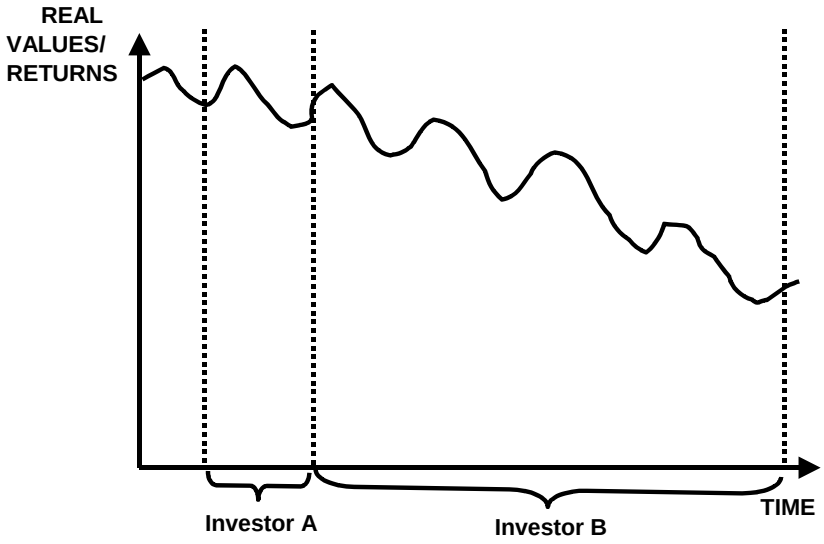
The return to be used in the reference value calculations should most likely also be related to the expected holding period. If there is a presumption of a short holding period, the risk compensation should be higher on a volatile market. If there is a very long holding period, the risk component would instead be affected by the expected real change in value during the holding period, which in this case would be connected to the occurrence of curable and/or incurable depreciation. What has been said above could be summarized as follows:

If there is no indication of external obsolescence, in a situation where it will most likely be feasible to cure physical deterioration and functional obsolescence, and the holding period is most likely very long; the rationally required yield could be very low. It could be, for instance, risk free real rate and risk compensation related to elements that's impossible to disregard (for instance, there may always be some risk of a forced sale even in situations where this in not intended). Then there would probably be some kind of need for compensation for the risk of incurable physical deterioration and physical obsolescence, see discussion above, as a building could probably not be expected to last forever even if investment efforts are made.

If the presumption is a shorter holding period, the element of risk compensation should most likely be higher if the market is volatile and, thus, a lower element of real depreciation in the yield required by a rational investor. This is assumed due to cyclical movements in the property values over time, discussed in the introduction of this essay. This issue is illustrated in the figure 3.3 below.

[44] Appraisal Institute, 1996

Figure 3.3



In figure 3.3 above it is shown how investor A has a, short holding period, where the real values/returns is expected to be at the same level when A acquires the property as when A plans to sell the property to a new owner. The interesting thing for investor A should thus be how volatile the market is, what is the risk level in the price/return movements during the short holding period assumed. However, from investor B's (long term oriented) perspective the long-term real change in values/returns is of greater interest than the short-term cyclical movement in prices. Thus, the required cap-rates/discount rates of investor A and investor B may be at the same level, but are determined by different risk factors.

The profile of the actual investor should thus determine the yield used and of which components the cap-rate/yield is built up. For reference value calculation purposes the cap-rate and/or discount rates should fulfill the conditions discussed in part 3.5.2 above. The rates should be an average containing a period of at least two normal business cycles, if convincing facts don't point in another direction.

One study of some relevance in this context is performed by Björklund & Söderberg (2000). They have analyzed 136 income properties that were purchased during the -period 1934-1978. The study concerns a property portfolio that has been held by one institutional investor over a long period. For each property they have included data of original purchase price (including transaction costs), the annual net operating income and reinvestments each year, and finally estimated market values at the end of each year during the time period 1979-1997. They have measured the real internal rate of return (IRR) in these property investments during the period 1979-1997. The IRR is measured from a real total return perspective. The data set in their study consists of fully developed income properties mostly with a mix of residential and commercial space. The properties are all centrally located in the two largest cities in Sweden (Stockholm and Gothenburg). The average annual IRR in their study turn out to be:

- 100 % Residential properties: Approximately 3,5-4,0 %
- 100 % Commercial properties: Approximately 6,5-7,0 %

When evaluating historical performance including net operating income, investment efforts and value changes, the effect of value appreciations is included in the measurement. Of course, if measured IRR figures above are supposed to be useful for reference value calculation purposes, one would have to adapt the real IRR in some

way to a cap-rate. To adapt the real IRR for this purpose, one would have to evaluate how the real changes in assessed values have affected the real total return (IRR) and to what extent costs classified as investments has led to a value appreciation of the property. To be able to make an assumption so that these long term real IRR-figures could be adapted to a cap-rate, one would probably have to make assumptions which relies heavily on the presumption that deterioration and obsolescence[45] have been counterbalanced due to continuous reinvestments in the properties, and that the site value haven't changed in real terms. This may be questionable assumptions. However the outcomes from Björklund & Söderberg's study could give some information regarding levels of rational requirements of a real discount rate for the kinds of properties included in their study. For instance, if 3,5 – 4,0 % real total IRR is what has been received owning centrally located residential properties in Stockholm and Gothenburg during a period of 18 years, a rational investor may conclude that he/she will have to buy at a price level that equals the present value of the future cash flows discounted with a requirement of 3,5 – 4,0 % real rate.

Swedish Property Index/IPD measures income return och real total return for properties included in the property portfolios of the companies included in the index. One problem, however, is to what extent it is possible to know if apportionments between maintenance expenses and investments have affected the reported income returns in a theoretically sound way. This will be further discussed in parts 6.3 and 7.1 below. Other problems are how costs for administration and property attendance have affected the income returns. Are these costs representative for the "normal" investor or not? However, the same problems can probably be found in the material used in the study performed by Björklund & Söderberg, referred to above.

If cap-rates/discount rates are built up from components like risk-free real rates (e.g. real rate bonds), risk-premium, real depreciation one would have to know the size of each component for the specific property or level of aggregated properties that is going to be analyzed.

[45] About property deterioration and obsolescence, see for instance Hoesli & MacGregor, 2000; Appraisal Institute, 1996

4. CALCULATION OF REFERENCE VALUE APPLYING AREAMETHOD

4.1 Theory – area method

Area method is a method related to physical parameters of a property. In applying the area method the selling price is divided by the area[46] (usually the rentable area).

4.2 Empirical studies – area method

Applying the area method seems to be one of the most important methods among valuers (in Sweden) when they evaluate comparable sales in the valuation process. After finding a number of similar properties transaction prices are related to the area of the property.[47]

4.3 The need of and accessibility of data

Applying the area method one will need access to data such as selling prices and rentable area. It is also important to have more knowledge of the compared properties, such as[48]:

- quality of construction
- age and condition
- functional utility, amenities
- site/location
- relevant market position (geographical and type of property)
- gross income and net operating income
- lease terms

This information is useful for evaluating how similar the properties really are - an aspect that is important whatever method chosen for valuation purposes. The less knowledge of these facts about the compared properties, the more questionable is beliefs about to what extent the compared properties actually are comparable.

In this study there will be no explicit application of the area method, but implicitly this method will have some influence on the approaches in different applications presented in section 8, since figures are presented as outcomes per square meter (sqm).

5. CALCULATION OF REFERENCE VALUE APPLYING GROSS INCOME MULTIPLIER METHOD

5.1 Theory – Gross income multiplier method

Gross-income multiplier (GIM) is the market value and/or transfer price of a property divided with gross (rental) income for one year.

The term gross income multiplier is used because some of the gross income from a property or type of property, may come from sources other than rental income. A

[46] Persson, 2003

[47] Nordlund, 2004

[48] Appraisal Institute, 1996; Persson, 2003; Nordlund, 2004

gross rent multiplier applies to rental income only. The GIM concept can be defined in different ways and applied in different ways:[49]

- Potential gross income multiplier (sale price divided with potential gross income)
- Effective gross income multiplier (sale price divided with effective gross income)
- Potential gross income (PGI) is the total income attributable to the property at full occupancy before operating expenses are deducted
- Effective gross income (EGI) is the actual income from all operations of the property, i.e. potential income adjusted for vacancy and collection losses.

Potential GIM refers to a situation that is hypothetical (buildings are very often vacant to some extent), and therefore the potential GIM may be easier to manipulate and less interesting from a reference value perspective. In this study I find the effective GIM to be the most relevant basis when measuring *ex post* the actual outcomes of income in relation to actual outcomes regarding selling prices and/or market value assessments. In some cases the sources of historical data are constructed using market rents. In that case the concept of potential GIM will be applied. I will also use the term gross income multiplier, though the discussions in this essay mostly will be based on rental income only.

5.2 Empirical studies – Gross income multiplier method

The textbooks usually discard the GIM-concept with a brief comment about its usefulness for first approximations of value, but with warnings about its unreliability related to the differences among properties in their operating ratios (ratio of operating expenses to revenues). However, tests with samples containing residential properties gave no evidence that net income basis produced more reliable predictions of selling price than did the gross. If properly employed in the process of predicting market value, the gross income multiplier (GIM) is as reliable as it is simple and direct.[51] This is true when the presumption is that there are well-suited comparable objects available.

In a study performed by Nordlund (2004) it was found out that the use of GIM was not very common among Swedish real estate appraisers when they performed valuations of office properties.

The GIM-factor has, in fact, been on different levels for a given set of properties during different periods in time, as shown in the illustration below, showing cyclical movements in values.

[49] Appraisal Institute, 1996

[50] Appraisal Institute, 1996

[51] Ratcliff, 1971

Figure 5.1

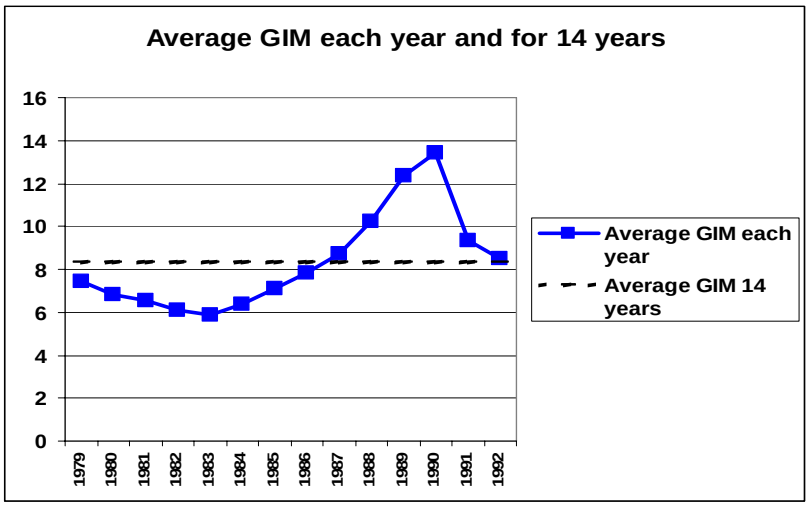


Figure 5.1 above shows the average annual GIM from a portfolio of 139 commercial properties (residential and other commercial, but predominantly residential) centrally located in Stockholm and Gothenbeburg 1979-1992. Source: Recalculated data from Björklund & Söderberg in Lindh red. (2000). The average GIM during a period of 14 years is 8.3 as in the graph illustrated above.

Björklund & Söderberg (2000) made a study of effective GIM for the period 1979-1992, se figure 5.1 above. One of their conclusions was that simple analysis of GIM would give much valuable information when making analysis of the rental market and real estate market.[52]

However, using the concept of GIM, one should be aware of the fact that different properties can have different GIM- levels. In many cases it is difficult to determine how investors determine an appropriate GIM for an individual property. For instance, studies have shown that properties in similar locations of the same type have been sold at prices that give different GIM-factors. The differences in GIM-factors, could however according to the referred studies, be explained by key property features like parking space, view and micro-location. It was also shown that the multiplier was lower for properties with higher rental incomes, and this might be a consequence of a smaller market for the big properties that generate the higher incomes .[53]

5.3 The need of and accessibility of data

If we accept the effective GIM-approach (actually received rental incomes) to be the most relevant, we would need data series of actually received rental income for a long period of time. We would also need market values/actual transaction prices for the same period. What have the owners actually received in rental incomes in relation to transaction prices and/or assessed market values? That's what's important in these calculations.

In other situations, for instance when real rent indexes are constructed from a market rent point of view, the concept of potential GIM must be applied. In these cases we

[52] Lindh, red. (2000)

[53] Janssen, 2003

will need access to market rents at different points in time, *ex post*, and market values/transaction prices for the same period.

6. CALCULATION OF REFERENCE VALUE APPLYING CAPITALIZATION OF NET OPERATING INCOME METHOD

6.1 Theory – Capitalization of net operating income (NOI) method

In capitalization of net operating income (NOI) method, a value assessment is based on calculations with the starting point in one year's net operating income for the property/ies that is going to be appraised.

The capitalization of net operating income method is principally based on an "eternity capitalization" applied to a first year's calculated NOI. Expected growth or decline in the future returns is supposed to be reflected in the required return. There might be a need for corrections in the NOI if the figures used come from a year that diverge from "normal" figures. The NOI of the property consists of the annual surplus that is left after deducting for operating and maintenance costs (including property tax and ground lease, if any) from the gross income. Outflows related to investments, stamp duty and other acquisitions costs shall not be taken into account when NOI is calculated.[54]

NOI-methods are utilized mainly for assessments of market value in property appraisals. The formula is identical to the one utilized for market value assessments based on market-based ratios between NOI and actually paid prices on the market, the so-called net capitalization factor, income return or yield.[55]

6.2 Empirical studies – Capitalization of net operating income method

Swedish real estate appraisers tend to use stereotyped inputs for vacancy rates, operating cost and maintenance cost levels. This means that it is very difficult, almost impossible, to find data of the actually received yields for the properties used in appraisals.[56]

However, The Swedish Property Index presents annual reports of what the actually received income returns are for different kinds of properties for the companies that are included in the index[57]. However, one problem with the reported figures from this index is that the figures are only valid for the properties included in the index and may not be relevant for other kinds of properties located differently than the properties in the index.

Regarding cap-rates/yields there is an interesting study performed by Hendershott & MacGregor (2003) referred to in part 3.5.4 above. Their findings should be of some interest even for reference value calculation purposes, as they argue that cap-rates tend to their long-term equilibrium (mean reversion) in the UK property markets.

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[54] Persson, 2003, see p 377

[55] Persson, 2003, see p 378

[56] See Svenskt Fastighetsindex, 2003b; Nordlund, 2004

[57] See for instance Svenskt Fastighetsindex, 2003a

6.3 The need of and accessibility of data

To be able to calculate the reference value, it is necessary to have access to the historical performance from the chosen market level or the actual property. The historical performance should be evaluated by performance indicators such as (concerning actual outcomes *ex post* in all cases):

- Rental income
- Operating expenses/outflows
- Maintenance expenses/outflows
- Property tax (and ground lease if any) expenses/outflows
- Average, long-term, cap-rates
- Property values/ transfer prices

The historical performance related to rental income, or net operating income, could be analyzed from accounting data regarding the actual property if there are no other sources that could present better information. If the reference value concept will come into use in the future there will probably gradually be established data sources for this purpose.

Of course there will also be a problem in practice to get access to longer series of data for the actual object. This could be due to shift in ownerships or other causes, e.g. that the bookkeeping only has to be stored for 10 years. On the other hand historical information dated more than 10 years back may on many occasions be of more limited interest, see discussions in part 3.5.2 above.

There are also a number of difficult questions when finding out the levels of such parameters as[58]:

- "Normal" operating expense/outflow level
- "Normal" maintenance expense/outflow level

Some problems connected to these topics are described below:

Organization related expenses such as administration and property attendance, should be evaluated from an analysis regarding "normal" staff dimensioning to get the necessary work done and market related cost of wages.

Maintenance expenses and investments: Maintenance expenses should be charged the NOI while investments should not. Furthermore, defining the boundaries between maintenance expenses and investments would most likely involve an analysis of to what extent replacing of components in the building will lead to a higher capital value (market value), in which stage of the life cycle the object currently is and so on.[59]

Two different approaches are possible when using the concept of eternity-capitalization by net operating income. One is to calculate the reference value from mean net operating income for a certain number of years, and divide with average cap-rates/yields for this kind of investments. The other approach is to apply the average cap-rate/yield to one year's normalized net operating income. As discussed below there is sometimes also a need to use an eternity-capitalization by net operating income to get a residual value when applying cash flow calculations. In this study I

[58] See for example discussions in Nordlund, 2004

[59] Nordlund, 2004

will use the approach based on average NOI and average cap-rates/yields for a longer period of time, because I find this approach to be the most relevant and transparent. This approach also catches cyclical movements in the variables used, an issue discussed in 3.5.2 above.

7. CALCULATION OF REFERENCE VALUE APPLYING DISCOUNTED CASH FLOW METHOD

7.1 Theory – Discounted cash flow (DCF) method

Initially it is important to note that the concept of reference value, calculated with a DCF-method, does not include the value of different kinds of real options that may be inherent in the property and which may be expected to increase future benefits.[60]

Discounted cash flow method is based on streams of in- and outflows generated from the property (-ies). It has been argued that that the economic development of the object is better described with a DCF-method than in a method of capitalization of NOI. Furthermore, DCF-methods can give a more realistic description of liquidity circumstances over time. Cash flow models also give flexibility and can, used as intended, catch changing conditions over the calculation period. Cash flow methods are possible to use for different purposes, for instance[61]:

A. Assessments of market value (market-simulation) or calculations of reference value
B. Analysis of consequences of an appraised market value – for instance when calculating a reference value applying a cash flow method and then comparing this value with a market value
C. Assessments of individual investment values

For a DCF-calculation to be correctly interpreted by users it's absolutely necessary that it is clarified which of the purposes above the calculation has. Differences could, for instance, appear in the choice of magnitude of different parameters that are put into the calculations such as rent, operating and maintenance costs, discount rate etc. It is important that the cash flow calculation is based on actual data derived from the object to be appraised, or on data for similar properties. In the cash flow calculation a series of historical outcomes containing in- and outflows during the calculation period is used to make the cash flow calculation, se also figure 3.2 above. A residual value is assessed at the end of the calculation period. In the same way as in capital investment appraisals a present value is calculated from the expected cash flows, see formula below.[62] Outflows assigned to capital (rate of interest and amortization/sinking fund) are not included in the cash flows.

[60] For further discussions on this topic, see Gunnelin, 1996

[61] Persson, 2003, also adapted here to the concept of reference value

[62] Basis for cash flow calculations – See Persson, 2003, s 379-380, here this concept is also adapted to the reference value concept

$$V = \sum_{t=1}^{n} \frac{(R - O - M - T - G - I)_t}{(1+p)^t} + \frac{R_n}{(1+p)^n}$$

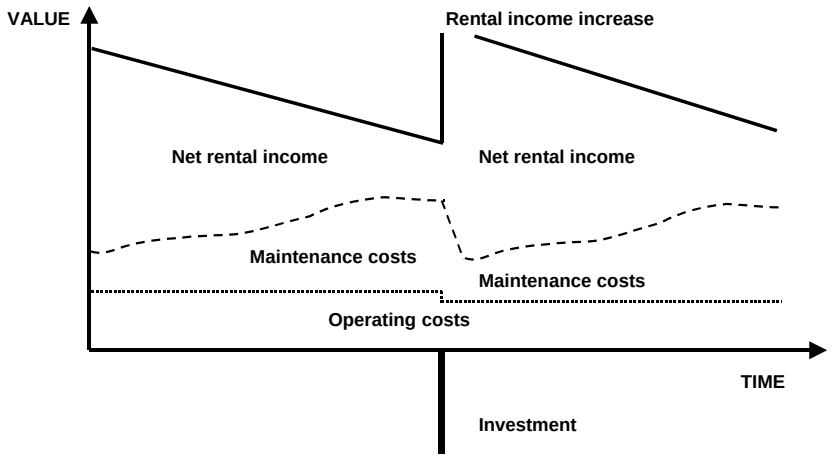
Där: V = Present value

R = Rental income	I = Investments in the property
O = Operating costs	R = Residual value
M = Maintenance costs	n = Period of calculation
T = Property tax	t = Time variable
G = Ground lease	p = Discount rate

In cash flow calculations rental income, operating and maintenance costs as well as investments in the property will be included. The illustration below is from a principle point of view and shows the effects, in real terms, on cash flows when radically renovating or putting other investment efforts into a building. When renovating/investing in the building the net operating income will be expected to rise due to increase in rental income and decrease in operating and maintenance costs.[63]

However the value appreciation due to the renovation (the investment) will be largely dependent on the conditions on the relevant market in which the property is located. Hence, the apportionment between maintenance costs/expenses and investments will most likely be different in different relevant markets, for instance, due to differences in required returns, even in situations when identical efforts has been put into the property.[64] It is also probable that the rent appreciation due to identical refurbishment or other investment efforts will be different in various relevant property markets (geographical and/or type of property), see also discussions in part 6.3 above.

Figure 7.1



The illustration above shows the expected effects when investment efforts are put into a property Net operating income and market value increases due to increase in rental income and decrease in operating and maintenance costs: Source Lundström, 1997 p 48.

[63] Lundström, 1997

[64] See discussions in Appraisal Institute p 370-371, 1996; Nordlund, 2004

7.2 Empirical studies – Discounted cash flow method

Valuations of properties included in the Swedish Property index are to a great extent claimed to have been performed applying DCF-methods. However findings in Nordlund (2004) points out that the DCF-methods used in Swedish real estate appraisals in reality often are just a somewhat developed version of a capitalization by NOI-method.

In section 6.2 above there was also a discussion of issues regarding the use of stereotyped inputs in property valuations. This makes it difficult to evaluate the discount rate if one intends to use discount rates used in valuations for reference value calculation purposes.

There was also a discussion in section 6.2 about the usefulness, for a broad spectrum of properties, regarding the reported outcomes of actually received income returns from properties included in the Swedish Property index, when trying to evaluate demand for cap-rates/discount rates in reference value calculations.

7.3 The need of and accessibility of data

To calculate the reference value applying cash flow method, following historical data/outcomes will be required for the chosen period:

- Rental income
- Operating expenses/outflows
- Maintenance expenses/outflows
- Investment outflows
- Property tax (& ground lease if any) expenses/outflows
- Average, long-term, discount rates
- Property values/ transfer prices (for instance as residual values)

One example of a problem is that some sources of historical data/outcomes do not show the level of investment outflows, only maintenance expenses are expressed (e.g SCB).

If we assume that we are in the end of year 2001 and that we want to calculate a reference value for a property. We have access to the outcome of the last ten years cash flows and we are supposed to calculate the reference value with a cash-flow technique. My suggestion is that the nominal outcome for each year is recalculated to the value of money in year 2001. Then there is a calculation of the discounted value of cash flows with a real discount rate - after eventual adjustments to the cash flow given that the property now is older. At the end of the period (in this case the 10 years) a residual value is assessed from NOI at the end of the period (year No 11), if not market value/transfer price that can be used as residual value is available, and the residual value is discounted in the same way as the annual cash flows.

One of the findings in Nordlund (2004) was that it was usual that valuations of property claimed to have been performed with cash flow methods in reality seemed to be capitalization by net-operating income methods in many cases. The capitalization of the net operating income was in turn strongly related to price indices derived from transactions on the real estate market. In other words the cash flow valuations should

have a very strong relationship to the level of transfer prices of similar properties. Applying a cash flow technique would consequently usually not result in a significantly different figure than a more direct comparable-sales method. Hence, if there were bubbletendencies on the market, that fact would most likely affect the valuation levels also of a DCF-valuation. However this is not strange, a market value is a market value.

8. APPLICATIONS OF THE CONCEPT OF REFERENCE VALUE

8.1 Calculation of reference value – residential property

Below I will present results from calculations of reference value for residential properties. The calculations are made from a principle point of view just to show how reference value calculations can be performed with different methods. You may also notice that the length of data series used in the calculations vary and may not always fulfill the requirements earlier discussed in section 3.5.2 (data for at least two normal business cycles). The reason for this is that I have used the data sources that have been possible to get access to. If reference value calculations will be undertaken on a larger scale one would have to check that the different kinds of conditions discussed in this study are fulfilled.

8.1.1 Reference value calculated by GIM-method

In appendix 1 and 2 it is shown how a reference value may be calculated for residential property by using the gross-income multiplier (GIM).

Appendix 1 shows calculations concerning residential property for the whole of Sweden (privately owned properties) using data from SCB covering data for the years 1984 until 2002. The GIM is calculated from rental income and transfer prices during the analyzed period. The average effective GIM during this period of 19 years is 7.6. Recalculated to rentable area, the reference value, year 2002, is 780 SEK x 7.6 = 5.900 SEK/sqm using the long-term average figure for 19 years. The average transfer price in year 2002 was 6.425 SEK/sqm (see appendix 1).

Appendix 2 shows calculations regarding GIM for one property company owning predominantly residential properties in Stockholm (mostly suburbs) for the whole period analyzed, 1994-2003. The analyzed company is listed on the Stockholm Stock Exchange. The GIM-factor in appendix 2 is calculated as outcomes regarding rental income and disclosed market values in the financial reports. The long term average effective GIM for these properties during the analyzed period is 8.8 (10 years).

The fact that the company to a large extent owns residential property located in Stockholm is interesting. In contrast to the properties in the study performed by Björklund & Söderberg, see section 5.2 above, it should be notified that the company's holdings only are centrally located to an extent of approximately 10 % of the rentable area and about 15 % of the total market value[65]. However, if we compare with figure 5.1 (Björklund & Söderberg, in Lindh red 2000) and make the reflection that the data set in that study contains predominantly residential properties that are centrally located in Stockholm and Gothenburg, something quite interesting shows up. The long-term average GIM in Björklund & Söderbergs study was about 8.3 for a

[65] Annual report 2002, Heba

period of 14 years (1979-1992). The average GIM for the company studied is, as mentioned above, 8.8 (10 years). The average GIM for the whole country is about 7.6 for a period of 19 years (1984-2002). The current GIM-factor of properties, predominantly located in Stockholm, according to the company's financial report year 2003 is about 11,0. If this is related to the real price index for residential property (located in Stockholm, Gothenburg and Malmö) presented in the introduction, see figure 1.2, and the development of GIM-factors described by Björklund & Söderberg, there actually could be an indication of overvalued/overpriced residential properties in some areas. Maybe the high GIM-values could be explained by fundamental factors, but the interesting thing is that a reference value of the company's holdings probably would be somewhere around 8-9 times the rental income. With the disclosure of a reference value in, for instance property valuations and/or financial reports, the difference between the two values would probably raise some questions.

8.1.2 Reference value calculated by capitalization of net operating income (NOI)

As discussed in section 6 above, one way to assess reference value is to make a capitalization of NOI.

In appendix 3 an example is presented of how to calculate reference value by a capitalization by NOI-method. Using data for privately owned residential properties for the whole country (Sweden) from SCB, the average real NOI for the period 1992-2001 is 361 SEK/sqm. If capitalizing this NOI with average received income return according to Svenskt Fastighetsindex (2003a), 6,2 %, we get a reference value of approximately 5.800 SEK/ sqm. One could always ask, of course, if the received income return from residential properties included in the Swedish property index is valid for the population included in SCB's survey, but this is done as an illustration, so we disregard this question here.

8.1.3 Reference value calculated by discounted cash flow method

Another possible way to calculate reference value is by discounting cash flows for a longer period of time, as discussed in section 7 above.

In appendix 4 there is an illustration of a reference value calculation based on this method. The result from this calculation is shown in the table below, table 8.1. The calculation is a result from a general outline, showed in appendix 4, including cash flows for the major part of a "normal" economic life of a residential building expressed in the value of money for year 2001. The figures are supposed to express cash flows for a residential property covering years 1-37 (from new building to 37 year old building). A comparison between outcomes of reference value calculations if applying a capitalization by NOI-method and a discounted cash flow method is also presented. The reference value calculation in appendix 4 is based on figures collected one single year (2001) for residential properties at different stages in the buildings life cycle and therefore one limitation is that there are no impacts from cyclical movement (business cycles). Of course there is also a simplification regarding the assumptions that this approach should give a good approximation of what will happen in real terms with the cash flows (here NOI's) during the period of years 1-37. The purpose of the calculation is to show a general outline of how to use long-term data series for reference value purposes and to describe the life cycle patterns. The outcomes of the calculations should therefore be interpreted carefully.

Table 8.1

Values calculated by yield	**6,56%**	**on one years net operating income:**	
Initial value	**11 100**	**SEK/sqm**	**Year 2001 net operating income**
Residual value	**4 881**	**SEK/sqm**	**Year 1965 net operating income**
Values calculated by discountrate	**5,00%**	**on 37 years NOI and residual value:**	
Present value of discounted cash flows		**9 420**	**SEK/sqm**

Real rate, no risk	**3,00 %**
Risk-compensation	**2,00 %**
Annual real change in value	**1,56 %**
Cap-rate (yield)	**6,56 %**
Real discount rate	**5,00 %**

During a period of 36 years:	
Annual real change in value	**1,56%**

Regarding reinvestments that may be required during the calculation period, see discussions in section 7.1 above. There are no investment outflows in the cash flows in the appendix 4 illustrations because these figures are not reported in the sources used for the calculations. However, referring to the figures used in the example in appendix 4 it should be noted in what current state the average Swedish residential holdings are. According to Boverket (2003) and SOU 2000:44, the Swedish residential property holdings are to a large extent in need of radical renovation. Hence the illustrations used in this essay, show figures for net operating incomes for ageing property holdings with most of the required significant reinvestments still to be done. ”The number of dwellings in the existing stock was in 1998 approximately 4.2 millions. The need of maintenance efforts in these dwellings is much larger than the efforts spend in them today. As an example it could be mentioned that 95 percent of dwellings from the million-programme in residential properties containing multiple-dwelling houses haven’t changed water pipe lines and waste pipe systems yet, although the houses are about 30-40 years old.”[66]

It is interesting to note the difference between capitalization of NOI first year and the discounted value of cash flows in the beginning of the life cycle. It appears that there is a faster decrease in real property value and real net operating income in the beginning of the building life cycle than in the later stages. Baum & McElhinney (1997) also conclude that regarding office buildings located in London, the depreciation for older property is lower than depreciation on new property. See further the illustrations and findings presented in Bejrum (1995) on this topic. Is there a risk that the NOI-method does not give the “correct” value? At least there seems to exist a risk that reference values in the beginning of the building life cycle is overstated if the cap-rate used in reference value calculations is constructed on the basis of the average life cycle depreciation.

Appendix 3 shows calculations of reference value from average net operating income for the whole country of residential property for the years 1992-2001. To make the calculations in appendix 3 compatible with the outcomes presented in *Table 8.1* above

[66] SOU 2000:44 p 52-53; see also descriptions on this topic in Boverket, 2003

(appendix 4), one will have to note that the property holdings included in *appendix 3* should most likely be found to be approximately 25-30 years old (weighted)[67]. The discounted cash-flows in *appendix 5* from building age 26 years (1975) to 37 years of age (1965), including the residual value, shows very similar results in comparison with the results of the calculation in *appendix 3.* The result from the calculation performed in appendix 5 is shown below in table 8.2. However, one should notice the same simplifications and limitations regarding this outcome as those discussed above regarding the calculations in appendix 4.

Table 8.2

Values calculated by yield	**6,16%**	**on one years net operating income:**	
Initial value	**5 877**	**SEK/sqm**	**Year 1975 net operating income**
Residual value	**5 195**	**SEK/sqm**	**Year 1965 net operating income**
Values calculated by discountrate	**5,00%**	**on 11 years NOI and residual value:**	
Present value of discounted cash flows		**5 887**	**SEK/sqm**

Calculated value when built property is approximately 25 years of age:		
Real rate, no risk	**3,00**	**%**
Risk-compensation	**2,00**	**%**
Annual real change in value	**1,16**	**%**
Cap-rate (yield)	**6,16**	**%**
Real discount rate	**5,00**	**%**
During a period of 10 years:		
Annual real change in value	**1,16%**	

The reference value calculated by capitalization by NOI-method in appendix 3 showed a reference value of about 5.800 SEK/sqm. The calculation above using data for approximately the same stage in the life cycle, but applying the discounted cash flow method results in a reference value of approximately 5.900 SEK/sqm. Interesting to note is also that the GIM-method applied in section 8.1.1 above gave a reference value of approximately 5.900 SEK/sqm using data for residential buildings of approximately the same age.

[67] SABO, 2002; In year 2001, average "value-year" of dwellings in holdings of SABO-member companies is 1970 (approx 30 years of age at that point in time). See also 'www.svefast.se for a description of the age-structure of privately owned properties. Analyzing data for the period of 1992-2001, the "middle of the class" should probably be approximately 25-30 years of age since newly built. See also comments in SOU 2000:44 and Boverket, 2003.

8.2 Calculation of reference value – office property

In my opinion the fundamental principles are the same when calculating reference values for residential properties or office properties, it is just to replace the figures collected from residential property with data from, for instance, office property.

The issues discussed in the introduction to section 8.1 above will also have to be borne in mind when illustrations are performed for office properties (length of historical data series in calculations etc). The data used for calculations of office properties in this essay is aggregated data for a number of office properties located in Stockholm CBD and the data sources are specified in the relevant appendix containing the calculations.

Below I will give a brief presentation of the results from the calculation of reference values applying different methods for these office properties.

8.2.1 Reference value calculated by GIM-method

As shown in appendix 6 a reference value calculation applying GIM have been performed for the relevant office properties in Stockholm CBD. To be able to use the GIM one would need access to long-term series of rental income and market values/transfer prices for the relevant kind of property. Since the data sources for the applied real rental index and real market value index, *ex post*, are constructed from a market rent point of view, the potential GIM has to be applied. The market rent level refers to the hypothetical situation were all rentable area is let out to the current market rent level.

As shown in appendix 6 the long-term average potential GIM (23 years) is 12.2 for the properties. The reference value calculated by potential GIM is 176 MSEK, which can be compared with the actual market value, which is assessed to be 164 MSEK in 2003.

8.2.2 Reference value calculated by capitalization of net operating income (NOI)

In appendix 7 there is a reference value calculation for these office properties applying a capitalization by NOI method. The average NOI for the properties over 7 years are capitalized by a cap-rate of 4.8 %, which in turn is the average received yield for the 7 years I have access to. Furthermore it could be of some interest to know that the cap-rate used in this calculation is very close to the average outcome of the received income return for offices in Stockholm CBD over 20 years according to the source SFI/IPD (2004b).

The calculated reference value with a NOI-method is 164 MSEK, which can be compared to the assessed market value in 2003 of 164 MSEK.

8.2.3 Reference value calculated by discounted cash flow method

In appendix 8 there is a reference value calculated by DCF-method. The real discount rate demanded in the calculation is 4.8 % (the same as the received average income return for 7 years and with a notification that this average is very close to the received average income return for 20 years, see 8.2.2 above). In turn this could be interpreted as a demand for a real risk free rate of 3 % and a compensation for risk of 1.8 % (see the discussions in part 3.5.3 above). In this context it should be noted that the required/received yields per definition includes a compensation for the future real

depreciation of the building. This would in turn normally lead to a demand for a lower real discount rate since the real depreciation is supposed to show up over time in real decreases of the cash flows. However, in this illustration I use, as mentioned above, the same real discount rate as the outcome regarding received yields, since I cannot know for sure how large the component of expected real depreciation is in the yield outcomes (income returns received).

The market value for 2003 is used as residual value in the cash flow calculation.

The calculated reference value with a DCF-method is 157 MSEK (167 MSEK if applying a real discount rate of 3.8 %, interpreted as demand for 3 % risk free real rate and 0.8 % risk compensation, in line with discussions in paragraph above). This can be compared to the assessed market value in 2003 of 164 MSEK. The use of 3.8 % discount rate, as mentioned above, could for example be justified if there was a possible way to show that the market almost for sure was calculating with 1 % real depreciation expectations when transactions were carried out.

9. CONCLUSIONS

The immediate reaction on the presentation of a new value concept may be: The market is always right, why complicate things with other value concepts? The occurrence of bubble-tendencies and cyclical movements on the asset markets, which was briefly referred to earlier in this paper, does however say something else. The concept of reference value is probably not the final solution of those phenomenon's, but it may contribute to a more transparent process in property appraisal and also in evaluation of property company performance by analyzing financial reports.

When using the technique of capitalization of net operating income in reference value calculations, there seems to be a risk of overestimating the reference value for a newly built property, if the cap-rate is built up by the risk-free real rate, risk compensation and average real depreciation over the whole life cycle. This issue was discussed in section 8.1.3 above. For a newly built property there was a material difference between capitalization of net operating income the first year and the discounted value of cash flows in the beginning of the life cycle. It appears that there is a faster decrease in real property value and real net operating income in the beginning of the building's life cycle than in the later stages, which affected the calculated reference value in the case that was illustrated. Consequently there would be a need for a higher cap rate in the beginning of the life cycle.

It could be questioned to what extent a valuer, making market value assessments, should be required to argue about possible causes, if differences show up between market value and a calculated reference value. However, the presentation of a reference value in a valuation would improve transparency and hence make it easier for the user of the valuation to make reflections about why there is a difference.

The primary findings in this paper are that the concept of reference value seems to be useful, but that there are a number of points where difficulties probably will show up in the practical work. The results in this study should be interpreted as a first attempt to present, discuss and apply this value concept. Finding the proper cap-rates/discount

rates for individual properties (or chosen level of properties as discussed in section 3.5.1) and the measurement of proper long-term return-benchmarks from the property market are examples of issues that need to be further discussed. It is also a hard task to get access to historical data such as rental incomes, operating and maintenance costs and how the boundaries between maintenance expenses and investments have been drawn when making calculations of proper net operating income/cash flow levels. Other problems related to the net operating income/cash flow level are, for instance, to know the proper level of organization-related costs, such as administration and property attendance. Also setting the proper length of time series of historical data when evaluating the reference value may cause problems in various situations. For instance, how do we know for sure that we covered one or two "normal business cycles"? If we use data without checking the business cycle we may have a series with overrepresentation of "good years" or vice versa. The problems listed above may point in the direction of using easier tools, such as the GIM-factor, when estimating the reference value.

One could also make some reflections from the outcomes of the calculations that have been performed, even if they were made primarily for illustrative purposes. For the office properties in the CBD the reference value calculations indicates that the current market value (2003-12-31) is close to the reference value. However, for residential properties in Stockholm, the current market value seems to be significantly higher than the calculated reference value. For residential property in the country as a whole, there seems to be quite a good conformity between the current average transfer price and the calculated reference values.

The use of different methods, like net-capitalization, discounted cash flows or gross-income multiplier, have given almost the same results in this essay. It may be otherwise with other data sets, and further studies on this topic will be needed before this observation can be generalized. One should also notice the fact mentioned above, that there are serious problems in some parts when evaluating the "correct" level of net-operating income (for instance, proper levels of administration-, property attendance- and maintenance costs) even from a historical perspective. These problems are due to how things have been classified in the data sources employed for analysis. Hence there are also some problems connected to measurements of the long-term returns, for instance income returns.

Need of further research
To make the concept of reference value work well in practice there is a need for systematic studies of historical outcomes at different market levels for different types of properties. Furthermore there is probably a need for a more detailed evaluation of the impacts from business cycles for reference value calculation purposes.

If applying a GIM method the study performed by Janssen (2003) could give some input related to how to handle possible differences in GIM between different kinds of properties.

If applying, for instance, a capitalization by NOI-method one would need relevant cap-rates for different sub-markets. One possible way of finding out the cap-rate for different markets may be to link cap-rates for different locations, different kind of properties and at different points in time to key parameters of these markets. The cap-

rates or property prices used should of course be extracted from transparent property markets with high liquidity. Then, as a next step, it might be possible using multiple regression analysis to find out which key factors from the different markets that are able to explain variations in cap-rates between different markets. From this regression analysis it may be possible to extract a formula to calculate cap-rates. One example of a study on a similar topic is Turner (2000)[68]. In Turner's study regression analysis is used to find the most significant variables explaining price differences between different properties.

If applying a DCF-method one would have to deal with the problem how to extract the discount rate from cap-rates, see discussion in section 3.5.4 above, if applying the method described in the paragraph above to analyze cap-rates.

[68] Lindh red. (2000)

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Verbal sources:
Martin Verhage, SCB; see also the source BO 41 SM0301 at www.scb.se where Verhage collected data for year 2002 on average selling prices for residential properties in SEK/sqm. There are equal written sources as this for the years 1993-2001 at SCB.

Appendix 1:1

Residential property - property tax typecode 320:

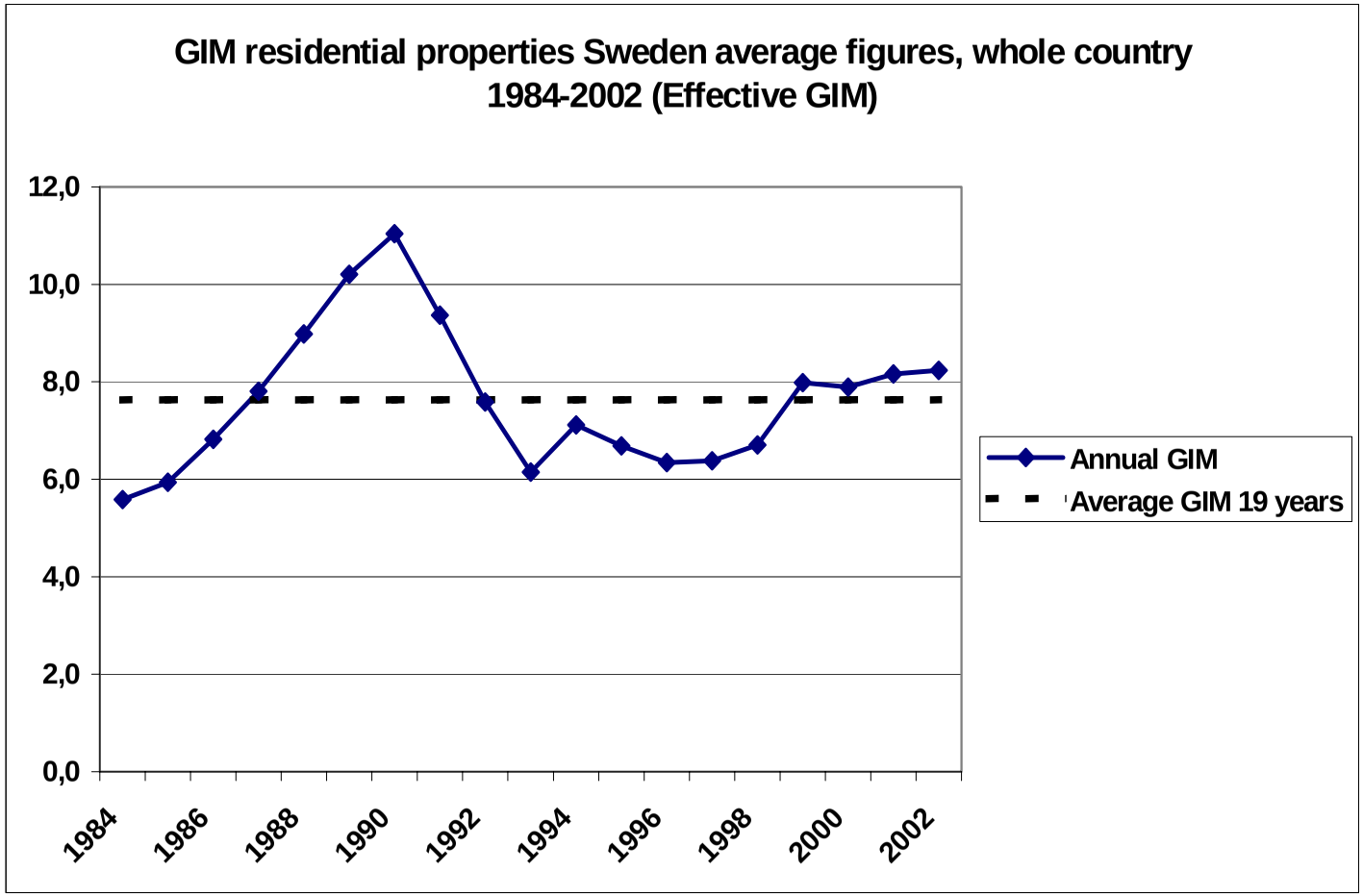
Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Nominal amounts:										
Transfer prices per sqm typecode 320	1 455	1 647	2 014	2 438	3 016	3 733	4 624	4 740	4 499	3 793
Rental income per sqm	260,5	277,4	295,4	312,2	335,8	365,7	419	506	593	617
GIM (effective)	5,6	5,9	6,8	7,8	9,0	10,2	11,0	9,4	7,6	6,1
Consumer Price Index - year mean	143,2	153,8	160,3	167	176,7	188,1	207,6	227,2	232,3	243,2
Real amounts in value of money year 2002:										
Real transfer prices per sqm	2 773	2 922	3 429	3 984	4 658	5 416	6 078	5 693	5 285	4 256
Real rental income per sqm	496	492	503	510	519	531	551	608	697	692
GIM (effective)	5,6	5,9	6,8	7,8	9,0	10,2	11,0	9,4	7,6	6,1

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002
Nominal amounts:									
Transfer prices per sqm typecode 320	4 511	4 313	4 369	4 493	4 840	5 836	5 921	6 195	6 425
Rental income per sqm	634	645	689	704	722	731	750	759	780
GIM (effective)	7,1	6,7	6,3	6,4	6,7	8,0	7,9	8,2	8,2
Consumer Price Index - year mean	248,5	254,8	256	257,3	257	258,1	260,7	267,1	272,9
Real amounts in value of money year 2002:									
Real transfer prices per sqm	4 954	4 619	4 657	4 765	5 139	6 171	6 198	6 330	6 425
Real rental income per sqm	696	691	734	747	767	773	785	775	780
GIM (effective)	7,1	6,7	6,3	6,4	6,7	8,0	7,9	8,2	8,2
	1,79	1,67	1,68	1,72	1,85	2,23	2,24	2,28	2,32
	1,24	1,16	1,17	1,20	1,29	1,55	1,56	1,59	1,61

Average GIM (effective) 1984-2002	7,6
Average GIM (effective) 1992-2002	7,2

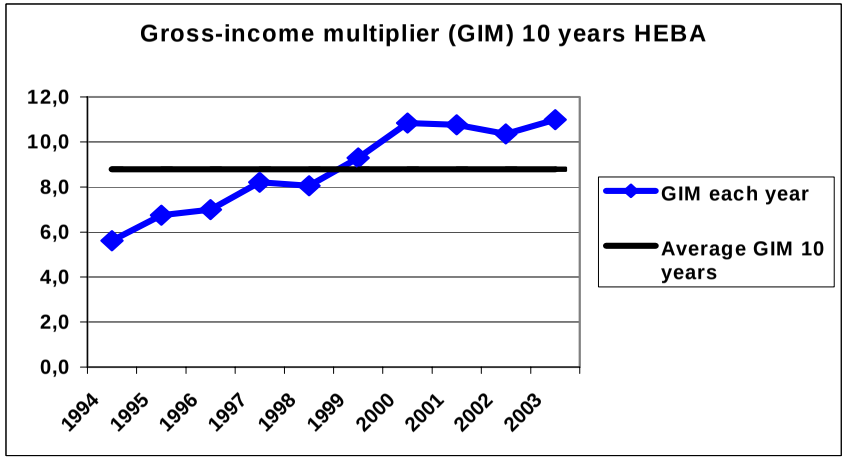
Sources: SCB, 2004; SCB, 1995a and SCB interview with Martin Verhage. The transfer prices for year 1993 until 2002 are from the interview with Verhage.
Transfer prices 1984 until 1992 is calculated from data from source SCB, 1996 as K/T ratio times tax value (for property tax purposes).
All values are indexed with consumer price index (year average) for each year. Rental income 1998-2002 is from source www.scb.se, 2004.
Other rental incomes are from sources SCB, 1995a, SCB, 1995b, SCB, 1996.

Appendix 1:2


GIM residential properties Sweden average figures, whole country
1984-2002 (Effective GIM)
12,0
10,0
8,0
6,0
4,0
2,0
0,0
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
Annual GIM
Average GIM 19 years

Appendix 2

HEBA Fastighets AB 1994-2003 Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Figures in KSEK:										
Rental income, less vacancies	111 080	109 282	124 573	131 612	148 124	152 140	166 998	171 482	194 684	196 400
Market value	623 000	737 000	872 000	1 080 000	1 193 000	1 414 000	1 810 000	1 846 000	2 016 000	2 158 700
Rentable area, sqm	168 880	168 880	190 293	189 204	210 086	225 036	225 984	216 022	234 743	235 000
Consumer Price Index, year mean	248,5	254,8	256	257,3	257	258,1	260,7	267,1	272,9	278,1
Rental income per sqm	658	647	655	696	705	676	739	794	829	836
Market value per sqm	3 689	4 364	4 582	5 708	5 679	6 283	8 009	8 545	8 588	9 186
Real figures expressed in the value of money year 2003										
Real market values/ sqm	4 128	4 763	4 978	6 170	6 145	6 770	8 544	8 897	8 752	9 186
Real rental income/ sqm	736	706	711	752	763	728	788	827	845	836
GIM (effective)	5,6	6,7	7,0	8,2	8,1	9,3	10,8	10,8	10,4	11,0
GIM average 10 years (effective)	8,8	8,8	8,8	8,8	8,8	8,8	8,8	8,8	8,8	8,8



Sources:
Annual reports
HEBA Fastighets AB
1994-2003

Appendix 3

Table of data from Statistical Central Bureau (SCB) of Sweden regarding Income and expenses - residential property situated in Sweden (all locations) private owners

SEK/sqm Year:	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Rental income less vacancies	593	617	634	645	689	704	722	731	750	759
Operating expenses	-172	-179	-182	-185	-208	-209	-211	-217	-223	-238
Property tax	-28	-21	-23	-25	-36	-41	-42	-39	-38	-27
Maintenance expenses	-87	-86	-101	-101	-106	-116	-116	-119	-122	-117
Net operating income	306	331	328	334	339	338	353	356	367	377
Consumer price index (CPI) year-mean	232,3	243,2	248,5	254,8	256,0	257,3	257,0	258,1	260,7	267,1

Figures from table above expressed in value of money year 2001

SEK/sqm Year:	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Rental income less vacancies	682	678	681	676	719	731	750	756	768	759
Operating expenses	-198	-197	-196	-194	-217	-217	-219	-225	-228	-238
Property tax	-32	-23	-25	-26	-38	-43	-44	-40	-39	-27
Maintenance expenses	-100	-94	-109	-106	-111	-120	-121	-123	-125	-117
Net operating income	352	364	353	350	354	351	367	368	376	377

Average net operating income /sqm expressed in value of money year 2001: 361

Mean yield residential property; IPD Swedish property index 1997-2002: 6,20% (Source: Svenskt Fastighetsindex, 2003a)

"Reference value" residential property:
Value calculated from 6,20% yield; average net operating income 1992-2001: 5 824 SEK/sqm

Sources: SCB, 1995b; SCB, 1996; www.scb.se, 2003b; Svenskt Fastighetsindex, 2003a

Appendix 4

Table of data from Statistical Central Bureau of Sweden and approximately calculated annual figures regarding Income and expenses from residential property situated in Sweden - see conditions for calculated figures each year below.

SEK/sqm	37 years												
Approximation of building age YEAR's	1	2	3	4	5	6	7	8	9	10	11	12	13
"Value-year class"	*2001*	*2000*	*1999*	*1998*	*1997*	*1996*	*1995*	*1994*	*1993*	*1992*	*1991*	*1990*	*1989*
Rental income less vacancies	988	973	958	944	930	916	909	897	885	873	861	849	838
Operating expenses	-230	-230	-230	-230	-230	-230	-230	-230	-229	-229	-228	-228	-228
Property tax	0	-4	-8	-12	-16	-20	-23	-24	-25	-25	-26	-27	-28
Maintenance expenses	-30	-35	-40	-46	-52	-60	-67	-71	-75	-79	-83	-87	-92
Net operating income	728	704	681	656	631	605	589	573	556	540	523	507	490
Approximation of building age YEAR's	14	15	16	17	18	19	20	21	22	23	24	25	26
"Value-year class"	*1988*	*1987*	*1986*	*1985*	*1984*	*1983*	*1982*	*1981*	*1980*	*1979*	*1978*	*1977*	*1976*
Rental income less vacancies	827	815	804	786	781	777	772	767	763	758	754	749	745
Operating expenses	-227	-227	-227	-226	-228	-229	-231	-233	-235	-236	-238	-240	-242
Property tax	-29	-30	-31	-31	-30	-30	-29	-29	-28	-28	-27	-27	-26
Maintenance expenses	-97	-102	-108	-106	-106	-107	-107	-107	-107	-108	-108	-108	-109
Net operating income	473	456	439	423	417	411	405	399	392	386	380	374	368
Approximation of building age YEAR's	27	28	29	30	31	32	33	34	35	36	37		
"Value-year class"	*1975*	*1974*	*1973*	*1972*	*1971*	*1970*	*1969*	*1968*	*1967*	*1966*	*1965*		
Rental income less vacancies	739	735	731	727	723	719	715	712	708	704	699		
Operating expenses	-243	-243	-243	-243	-243	-243	-244	-245	-245	-245	-245		
Property tax	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25		
Maintenance expenses	-109	-109	-109	-109	-109	-109	-109	-109	-109	-109	-109		
Net operating income	362	358	354	350	346	342	337	333	329	325	320		
										Residual value			
											4881		

Real rate, no risk	3,00 %	Values calculated by yield	6,56%	on one years net operating income:	
Risk-compensation	2,00 %	Initial value	11 100	SEK/sqm	Year 2001 net operating income
Annual real change in value	1,56 %	Residual value	4 881	SEK/sqm	Year 1965 net operating income
Cap-rate (yield)	6,56 %				
Real discount rate	5,00 %	Values calculated by discountrate	5,00%	on 37 years NOI and residual value:	
		Present value of discounted cash flows		9 420 SEK/sqm	

During a period of 36 years:	
Annual real change in value	1,56%

Figures for the years 2001, 1995, 1985, 1975 and 1965 are collected from SCB[1] and the conditions for calculations are described below. The net operating income performance from properties of different stages in the life cycle is "turned around" so the latest year in the statistics will be used as an approximation for the performance

[1] www.scb.se, 2003a & 2003b

from a new built property. The oldest year in the statistics is used as an approximation for the performance from an older built property, 37 years. The value development captured by calculations in the table above can also be compared to the outcomes of other studies performed on this topic, see for instance Bejrum (1995). The outcomes look quite similar. For a specific property, of course the historical actual outcomes will express the relevant figures.

The residual value 1965 is calculated as if the net operating income for year 1964 was the same as for year 1965. This net operating income is then divided by the cap-rate in the table above.

Data for year 2001 is collected from:
Rental income: www.scb (2003a) Rents for newly built residential property in 2001 less an average vacancy rate for the whole country in 2001, collected from the source www.scb.se (2003b).
Operating expenses: The same as for year 1995, see below.
Maintenance expenses: Approximated value for new residential buildings collected from Bejrum, 1987
Property tax: None (due to property tax regulations for newly built residential property in Sweden).

Data for year 1995 is collected from:
In SCB IKU 2001 (www.scb (2003b) there is a presentation of figures of rental income less vacancies, operating and maintenance expenses and property tax for a range of "value years" 1990-1999. The figures for this class are presented for the year 1995.

Data for the years 1996-2000 are calculated as described below:
The annual average decrease (for example rents) or increase (for example maintenance) for the fixed values in years 2001 and 1995, where values for 2001 is compared to values for 1995, is calculated for each year 2000-1996 and then put into the table.

Data for the other years in the table:
SCB figures for the rest of the table are presented in following ranges:
1960-1969 is presented for year 1965 in the table
1970-1979 is presented for year 1975 in the table
1980-1989 is presented for year 1985 in the table
Data for other years in the table are calculated in the same way as for the period 1996-2000 described above.

Appendix 5

Approximation of building age YEAR's	27	28	29	30	31	32	33	34	35	36	37
"Value-year class"	*1975*	*1974*	*1973*	*1972*	*1971*	*1970*	*1969*	*1968*	*1967*	*1966*	*1965*
Net operating income - NOI	362	358	354	350	346	342	337	333	329	325	320
Value calculated by cap-rate - 6.16%	5 877	5 812	5 747	5 683	5 620	5 556	5 477	5 398	5 336	5 274	5 195
Value calculated by initial value less annual depreciation	5 877	5 808	5 740	5 672	5 604	5 536	5 468	5 399	5 331	5 263	5 195
Annual depreciation	68										

Calculated value when built property is approximately 25 years of age:		
Real rate, no risk	3,00	%
Risk-compensation	2,00	%
Annual real change in value	1,16	%
Cap-rate (yield)	6,16	%
Real discount rate	5,00	%
During a period of 10 years:		
Annual real change in value	1,16%	

Values calculated by yield	6,16%		on one years net operating income:
Initial value	5 877	SEK/sqm	Year 1975 net operating income
Residual value	5 195	SEK/sqm	Year 1965 net operating income
Values calculated by discountrate	5,00%		on 11 years NOI and residual value:
Present value of discounted cash flows	5 887	SEK/sqm	

Figures regarding years 1975 to 1965 above is collected from appendix 4. The figures in the cash flow calculation is an approximation of cash flows from residential properties at the same age as illustrated in appendix 3.

Appendix 6:1

Aggregated data: A number of office properties in Stockholm CBD

Amounts expressed in thousands SEK

Year	1997	1998	1999	2000	2001	2002	2003
Total revenue, rental income	8 673	9 037	9 908	11 631	12 552	13 949	13 704
Operating expenses	-1 300	-1 257	-1 230	-1 356	-1 432	-1 764	-1 845
Maintenance expenses	-582	-541	-652	-702	-757	-818	-982
Property tax	-782	-515	-786	-1 098	-1 199	-1 482	-1 548
Ground lease	-521	-550	-614	-743	-656	-798	-801
Net Operating Income (NOI)	5 488	6 173	6 626	7 733	8 509	9 088	8 529
Investments	-421	-449	-1 141	-908	-830	-1 231	-2 567
Cash-flow, excluding financial items	5 067	5 724	5 485	6 825	7 679	7 857	5 962
Market value	122 756	140 760	156 566	203 674	187 583	174 176	164 274
Average GIM 23 years - potential GIM	**12,2**	**See appendix 6:2**					
Reference value GIM average 23 years calculated from potential rental income, market rent 2003	176 450						
Market rent 2003, potential rental income	14 463						

Sources: SFI/IPD Swedish Property Investors Digest, 2004 and recalculations of potential GIM from index from source www.riksbank.se, 2004

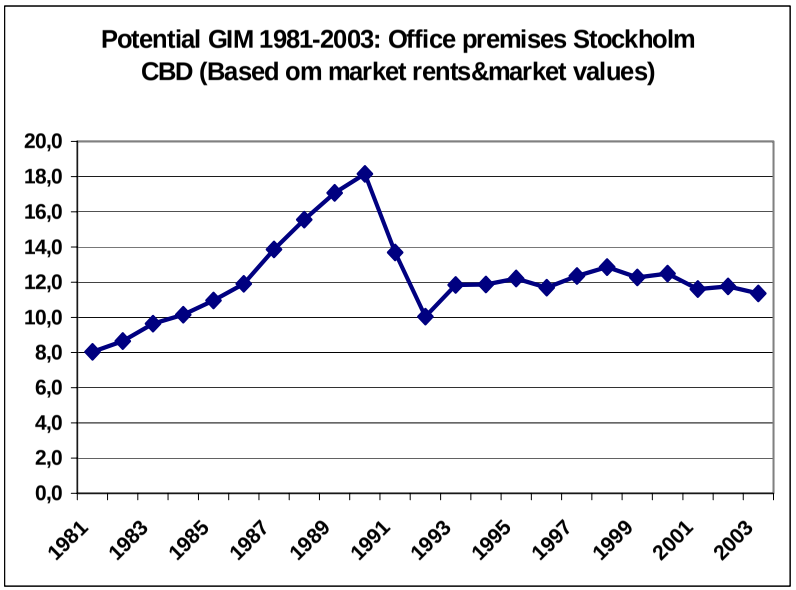
Appendix 6:2

Real prices - Office premises in citylocations
Index 1981 = 100
Sources: NewSec AB and Riksbanken.

Real rents office premises in citylocations
Index 1981 = 100
Sources: NewSec AB and Riksbanken.

Data below is collected from sources: www.riksbank.se, 2004 (index series) and market rents/ markets values from SFI/IPD Swedish Property Investors Digest 2004

Date:	Index: Stockholm	Recalculated market value according to index KSEK	Date:	Index: Stockholm	Recalculated market rent according to index KSEK	**GIM (potential)**
12-31-81	100,00	84 584	12-31-81	100,01	10 525	**8,0**
12-31-82	117,23	99 159	12-31-82	108,87	11 457	**8,7**
12-31-83	138,34	117 010	12-31-83	115,29	12 133	**9,6**
12-31-84	170,80	144 465	12-31-84	135,23	14 231	**10,2**
12-31-85	198,78	168 135	12-31-85	145,79	15 342	**11,0**
12-31-86	235,22	198 958	12-31-86	158,95	16 728	**11,9**
12-31-87	305,11	258 076	12-31-87	176,99	18 626	**13,9**
12-31-88	346,04	292 691	12-31-88	178,81	18 817	**15,6**
12-31-89	368,41	311 612	12-31-89	173,39	18 247	**17,1**
12-31-90	343,29	290 366	12-31-90	152,05	16 001	**18,1**
12-31-91	206,33	174 519	12-31-91	121,12	12 746	**13,7**
12-31-92	131,55	111 270	12-31-92	105,25	11 077	**10,0**
12-31-93	117,33	99 240	12-31-93	79,63	8 380	**11,8**
12-31-94	127,13	107 530	12-31-94	86,13	9 064	**11,9**
12-31-95	151,98	128 552	12-31-95	100,00	10 524	**12,2**
12-31-96	159,23	134 683	12-31-96	109,48	11 522	**11,7**
12-31-97	170,31	144 053	12-31-97	110,91	11 672	**12,3**
12-31-98	190,33	160 991	12-31-98	118,97	12 520	**12,9**
12-31-99	217,16	183 683	12-31-99	142,16	14 960	**12,3**
12-31-00	285,36	241 366	12-31-00	183,75	19 337	**12,5**
12-31-01	248,00	209 765	12-31-01	171,71	18 070	**11,6**
12-31-02	224,14	189 584	12-31-02	153,18	16 120	**11,8**
12-31-03	194,21	164 274	12-31-03	137,43	14 463	**11,4**
03-31-04	186,82		03-31-04	135,55		
			Average GIM - 23 years (potential)			**12,2**



Appendix 7

Aggregated data: A number of office properties in Stockholm CBD

Amounts expressed in thousands SEK

Year	1997	1998	1999	2000	2001	2002	2003
Total revenue, rental income	8 673	9 037	9 908	11 631	12 552	13 949	13 704
Operating expenses	-1 300	-1 257	-1 230	-1 356	-1 432	-1 764	-1 845
Maintenance expenses	-582	-541	-652	-702	-757	-818	-982
Property tax	-782	-515	-786	-1 098	-1 199	-1 482	-1 548
Ground lease	-521	-550	-614	-743	-656	-798	-801
Net Operating Income (NOI)	5 488	6 173	6 626	7 733	8 509	9 088	8 529
Investments	-421	-449	-1 141	-908	-830	-1 231	-2 567
Cash-flow, excluding financial items	5 067	5 724	5 485	6 825	7 679	7 857	5 962
Market value	122 756	140 760	156 566	203 674	187 583	174 176	164 274
Actually received yield percent %		5,0	4,7	4,9	4,2	4,8	4,9
Average received yield percent % - 7 years	4,8%						
Real NOI in value of money year 2003	5 931	6 680	7 140	8 249	8 859	9 261	8 529
Average real NOI - 7 years	7 807						
Average NOI - 7 years divided with average received yield - 7 years	163 816 KSEK						

Sources: SFI/IPD Swedish Property Investors Digest, 2004

Appendix 8

Aggregated data: A number of office properties in Stockholm CBD

Amounts expressed in thousands SEK

Year	1997	1998	1999	2000	2001	2002	2003
Total revenue, rental income	8 673	9 037	9 908	11 631	12 552	13 949	13 704
Operating expenses	-1 300	-1 257	-1 230	-1 356	-1 432	-1 764	-1 845
Maintenance expenses	-582	-541	-652	-702	-757	-818	-982
Property tax	-782	-515	-786	-1 098	-1 199	-1 482	-1 548
Ground lease	-521	-550	-614	-743	-656	-798	-801
Net Operating Income (NOI)	5 488	6 173	6 626	7 733	8 509	9 088	8 529
Investments	-421	-449	-1 141	-908	-830	-1 231	-2 567
Cash-flow, excluding financial items	5 067	5 724	5 485	6 825	7 679	7 857	5 962
Market value	122 756	140 760	156 566	203 674	187 583	174 176	164 274

Present value of discounted cash-flows 7 years	**157 011**	**KSEK**					
Real discount rate	4,8%						
Consumer Price Index - year mean	257,3	257	258,1	260,7	267,1	272,9	278,1
Real cash-flows in value of money year 2003	5 476	6 194	5 910	7 280	7 995	8 007	5 962
Market value year 7 (residual value)	164 274	KSEK					
Real cash-flows 7 years including residual value	5 476	6 194	5 910	7 280	7 995	8 007	170 235

Sources: SFI/IPD Swedish Property Investors Digest, 2004. Calculations in this illustration is performed whith a real discount rate that is equal to the average outcome regarding income returns for 7 years. These 4,8 % should then include risk free real rate, risk-compensation.