EVALUATING INVESTMENT IN REAL ESTATE PROJECTS

By

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ABSTRACT

This study demonstrates the application of a financial model to evaluate the expected return from investing in real estate projects. Based on the analytical framework which is widely adopted in the market, the study examines the dynamics of supply and demand in the space and asset markets and its impact on valuation of real assets in Canada. The study presents a financial and market analysis for a hypothetical project using actual data of real estate properties close to Vancouver in British Columbia. The valuation is based on the fact that real estate provides potential future cash flow for investors, similar to any other asset in the capital market. The study also links the empirical results of this valuation with the supply and demand theory in order to understand the boom and bust that happened in real estate during the last few years. The analysis shows that the high increase in property prices in 2003-2007 has led to a sharp reduction in cap rates which has a great impact on lowering investor returns from real estate properties. The study concludes that the current rent level is below the long-term equilibrium and, therefore, holding a property for rent does not meet the expected return criteria.

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INTRODUCTION

In recent times, real estate and its contribution to recent financial crisis have been in focus. In most of the countries, the savings of the society is embedded in real estate values and fluctuations in its prices contribute to economic crisis and distress at the household level. Thus real estate economics has direct implications at the macro and micro levels. On the individual level, home ownership is the major investment that most people make though their entire life's. Real estate is a store of wealth in the form of assets that can be used by its owners. The term real estate embodies both the housing and commercial property market. Individuals/households can use this wealth to set up a small business, pay school and university fees for their children or enjoy their retirement. Therefore, the wealth of home ownership plays an important role in the financial wellbeing of homeowners. (King, 2009).

The second implication of real estate is its influence on the whole economy. Real estate contributes a significant amount of any economy's output and is the sector with the largest linkages – forward and backward. A decline in real estate values has amplified impact on wealth and economy. Since the economy in many developed countries is largely driven by consumption, a reduction in consumer spending (arising out of shocks to real estate prices) could contribute to a downward spiral in the economy. Therefore, real estate prices are the focus of public policy as well. Governments take many measures to stabilize the economy through housing regulations and real estate laws. These regulations may include setting the interest rates that affect mortgages in addition to controlling the rent standards. (Amadeo, 2010).

The literature on real estate analysis is dominated with hedonic models which explain real estate prices in terms of their characteristics (like size of dwelling, number of bedrooms,

location, number of bathrooms etc). But within the real estate economics there are two branches which are relatively less researched or studied, viz., urban economics and financial economics. Urban economics is the branch that studies cities, including the spatial and social relations that affect real estate. It studies the theories of how cities form, grow, and decline. It also focuses on the factors determining land rent and land value at different locations within the city in addition to the dynamics of supply and demand in the space and asset markets. (Geltner et al., 2001). On the other hand, financial economics in real estate is the branch that studies the property as a capital asset and evaluates the return from investment in real estate. Just like evaluating return from any other asset in the capital market, the fundamental element in this evaluation is the potential cash flow that the real estate asset can generate in the future. The nature of this cash flow, its magnitude, timing and risk is mainly determined in the rental market, which is where urban economics interacts with financial economics. (Geltner et al., 2001). The main aim of this study is to contribute to this literature by examining dynamics of supply and demand for the space market and its impact on development cost and rent, the dynamic links between space, asset and development markets.

The main objective of this study is to demonstrate the application of a financial model to evaluate the expected return from investing in real estate projects using actual data on real estate variables from an active real estate property close to Vancouver in British Columbia. The study will focus more on the financial economics side, viz., the valuation of real estate as a potential future cash flow for investors.

To achieve these objectives, the study progresses from the basic principles of urban economics to more specific application of financial economics. More specifically, chapter 2 begins with a literature review of the analytical framework. This includes identification of

the three elements of real estate: space market, asset market and the development industry. It also examines the mechanism of supply and demand for space and asset markets through the 4-quadrant model and its application on the cyclicality of real estate. Chapter 3 introduces the data source and methodology through a financial and market study of a hypothetical real estate project that includes two investment options. The method used in this study is the base for evaluating the expected return from real estate investment. Chapter 4 examines the empirical results – scenario's - obtained from the financial and market study based on the required investment criteria. It also links the results of the two investment options with the theoretical framework. Finally, chapter 5 gives the conclusion of the whole financial and market study and presents the best investment option that includes the best return for the investor.

Chapter 2

THE ANALYTICAL FRAMEWORK

Real estate could be studied academically from several different perspectives that illustrate the various disciplines involved in this sector. As indicated earlier, two major branches of economics are involved in the analysis of investment in real estate – urban economics and financial economics. The analytical framework on real estate evaluation is well documented in the writings of Geltner, Miller, Clayton and Eichholtz (2001) "Commercial Real Estate Analysis & Investment". This chapter provides an analytical overview, based on this book, by introducing the main three component of the real estate system. These three components are the space market (section 2.1), the asset market (section 2.2) and the development industry (section 2.3). This chapter also focus (in sections 1.4, 1.5 and 1.6) on the relation between these elements and the way this relation affects the supply and demand in the space and asset markets.

2.1 Space Market

The space market could be defined as the market for usage or rent of real property. It is also referred to as the usage market or rental market. The price of the right to use space (rent) could be quoted in annual terms, per square foot (SF) (like the rent of an office space) or in monthly terms, per unit (like the rent of an apartment). The rental price of a certain space gives an indication of the value of the built space and the current balance of supply and demand for that space (Geltner et al., 2001).

2.1.1 Segmentation of Space Market

As indicated by Geltner et al. (2001), the demand side of the space market is highly dominated by the type of built space and location. Users in the space market normally require

specific type of space in a specific location. For example an engineering firm, that requires an office space, is not willing to rent a space specified for a retail shop or a warehouse. This firm may also need this office to be located in downtown Vancouver. Therefore, an office space in downtown Price George or even in downtown Burnaby will not be suitable.

On the other hand, the supply side of the space market is also dominated by the type and location due to the fact that buildings cannot be moved. Therefore, the vacant office building in downtown Price George may be the perfect fit for the Vancouver engineering firm but it is not where the firm wants to be. Also, converting the type of the building from one usage to another is not easy. Although some attempts to change the usage of buildings (i.e. a warehouse to an apartment building) were successful, this approach is generally rare and associated with high cost.

Because both supply and demand are dominated by the type of built space and location, the real estate space market is highly segmented. This attribute gives space market a local function and makes it specialized around certain building usage. This is in contrast to any other commodity market, like the one for oil, lumber or financial capital where the commodities are homogeneous and could be moved from one place to another. High segmentation in space market has also an important implication on the rental prices. Same type of built spaces may have different rents based on their locations and built spaces in the same location may have different rents based on their type of usage (Geltner et al., 2001).

2.1.2 Supply and Demand in the Space Market

In order to understand the mechanism of supply and demand and market equilibrium in the space market, Geltner et al. (2001) assume the market for class A office space in downtown City X during a period of 20 years (1970 – 1990).

Due to the increasing numbers of office jobs, there was a significant growth in office usage demand. The number of office workers in class A office buildings has significantly increased from 24,000 in 1970 to 30,000 by the mid-1980s. These 30,000 workers were occupying some 5 million square feet (SF) of space in several office towers with an average rent of $16/SF (per year). The growth in demand is illustrated in Figure 1. Notice that if the growth continues to 36,000 workers, the demand in the market will increase to 6 million SF at the same $16 rent. The demand function shown in Figure 1 is similar to the classical demand functions of economic theory.

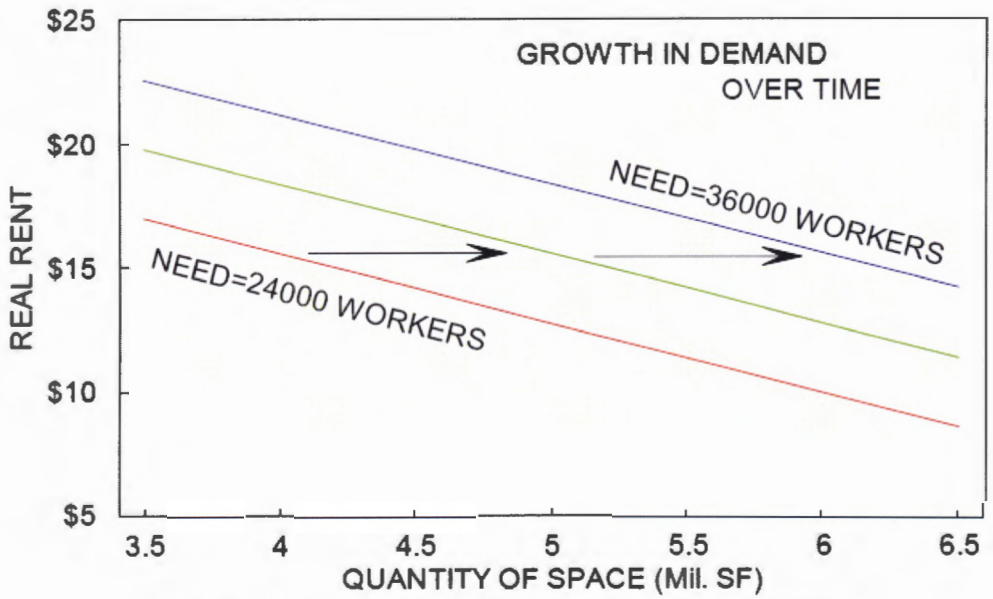

Figure 1: Office Demand as a Function of Employment
(Geltner, Miller, Clayton, Eichholtz. 2001. P. 6)

The supply side, however, is not similar to the upward-sloping continuous line depicted in the classical supply/demand diagram. Instead, the supply function as shown in Figure 2 is kinked or has a corner. This supply function starts as strait vertical line at the current quantity of space available in the market (5 million) which reflects the fact that the supply in the space market is inelastic. This is due to the long life of built space which makes

it different than any other product. In fact, many buildings last for 50 years or more. This attribute implies that if the demand for built space falls, the supply cannot be reduced. It is unlikely for any building to be torn down with less than 20-30 year from the date of construction (Geltner et al., 2001).

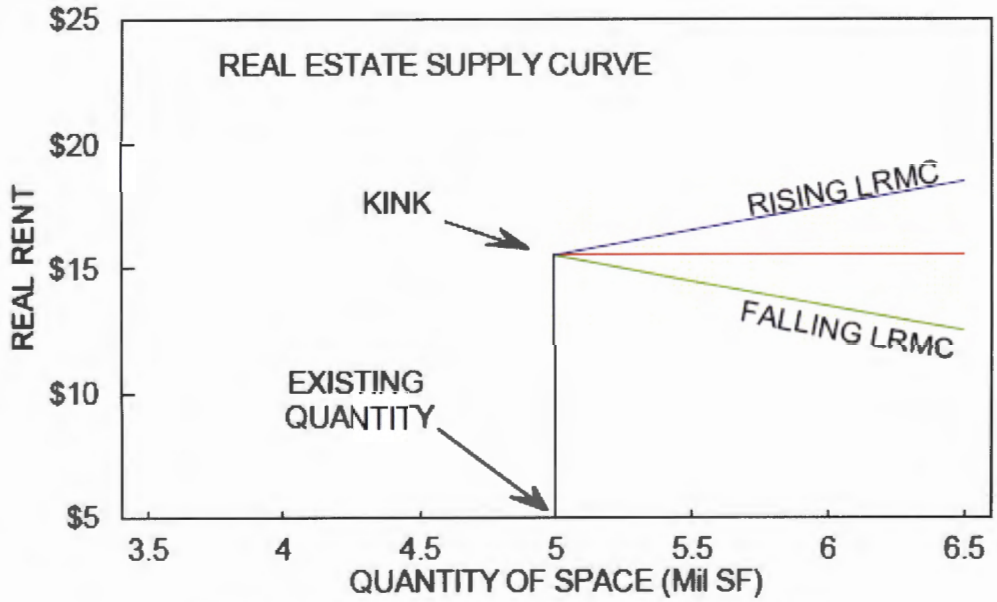

Figure 2: Real Estate Space Market Supply Function
(Geltner, Miller, Clayton, Eichholtz. 2001. P. 7)

The kink or corner in the supply function occurs at the level of rent that corresponds to the long-run marginal cost of supplying additional space to the market. This marginal cost is the cost of developing new buildings which account for the site acquisition cost, the construction cost and the developer's profit.

"The level of rent that is just sufficient to stimulate profitable new development in the market is called the replacement cost level of rent, and this tends to be the long-run equilibrium rent in the market" (Geltner, et al., 2001). Therefore, if the rent level is below the replacement cost, constructing new built space is unprofitable for developers. As soon as the

rent rise above the replacement cost, developers start undertaking new developments which force rents down to the long-run equilibrium level within few years.

2.1.3 Supply, Development Cost and Rent

Getting back to the Class A office building example, Assuming that in the mid-1980s it would have cost $200/SF to develop a new class A office building including all the associated costs in addition to the developer's profit. Then, the marginal cost for adding new office space to the market is $200/SF.

Geltner et al. (2001) explains that if any developer can sell the new office building for $200/SF then adding new buildings would be feasible. But the price investors are willing to pay for a building depends on how much return the building is expected to generate in the future and how much the investors are willing to pay for each dollar of this return. If we assume that investors are willing to pay $12.50 for every dollar on annual net rent and that the annual building rent is $16/SF then the building value is $200/SF (16 X 12.5 = 200). In real estate terminology, the building is selling at 8% cap rate (16 / 200 = 8%). In this case, $16/SF is the rent level that corresponds to the marginal value of adding new supply and, therefore, it is the replacement cost rent level.

The second part of the supply function is the line moving out to the right after the kink or the corner. There are three possibilities for this line, rising, level or falling. If the cost of developing the next building is higher than the current cost, then the supply line should be rising. If the cost is less, then the supply line should be falling. If the cost is the same, then the function is level (Geltner et al., 2001).

2.1.4 Direction of Rent

The direction of future rent in the market is an important aspect that any developer should have the ability to predict. The level of real rent is largely determined by the shape of the supply function. The kink in the supply function implies that if the growth in demand is maintained, it is unlikely to have any change in the rent level.

However, the kink also implies that if the demand for space falls, there will be a severe decline in market rent due to the inelasticity of supply reduction. Geltner et al. (2001) argues that the kink in the supply function is one of the reasons for the cyclicality trend in the space market where a period of excess supply is followed by a period of tight market. This idea could be applied to the office market in City X. After a ten-year period of continuous growth, developers may anticipate that the same trend of demand will continue for the next ten years. Therefore, they may continue adding more office space by building an extra 1 million SF which expands the supply from 5 million to 6 million SF. This change in supply is shown of Figure 3 by the movement of the supply function from S_1 to S_2. If the demand continues to grow from D_1 to D_2, this increase in supply would be justified and the rent level would remain in the long-run equilibrium level of \$16/SF. However, if the growth in demand does not happen and the market continues on D_1 level, there will be a decline in market rent to a level of around \$13/SF. Furthermore, a third scenario could happen if a recession happens in the next period and the demand falls to D_0 level. In this case the market rent will sharply decline to a level of \$10/SF.

With a demand of D_1 or D_0 and a supply of S_2 the market rent is below the long-run equilibrium. This implies that the rent level does not motivate developers to add new office space to the market. In this situation, any increase in demand will be in the favour of

landlords as it increases the market rent significantly until it rises back to the long-run equilibrium where new developments starts to take place (Geltner et al., 2001).

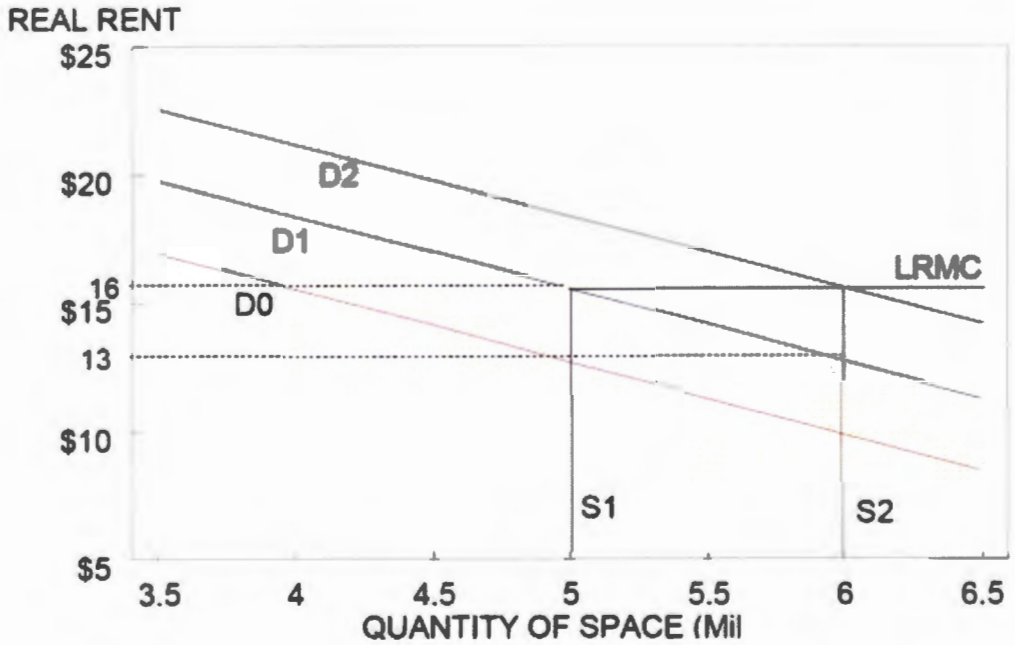

Figure 3: Change in supply and Demand and Rent over Time
(Geltner, Miller, Clayton, Eichholtz. 2001. P. 9)

2.2 Asset Market

The asset market is the market for ownership of real estate assets which could also referred to as property market. This market includes trading of assets that have claims to future cash flows (rent) and therefore could be compared to other products in the capital market like stocks and bonds. Therefore, the real estate asset market must be viewed as part of the larger capital market (Geltner et al., 2001).

2.2.1 Real Estate Asset Pricing

The supply side of the asset market includes property owners who want to sell their properties while the demand side includes investors who want to buy or increase their holdings of real estate assets. The real estate asset values are determined by the level of supply and demand compared to other capital assets. Within this context, the value of any

property or building is determined by the potential cash flow that this property can generate in the future with the level of risk involved in this cash flow.

Since properties have wide range of characteristics that can determine their prices (i.e. size, location, etc.), it is quite common to relate property value to the dollar amount of current net rent or income. With this approach, the comparison between different properties would be easier and more practical. As explained by Geltner et al. (2001), the measure used in this approach is called the **capitalization rate** or **cap rate** which is simply the property operating earnings divided by the property asset price or value. Therefore, property value could be calculated by dividing earnings (net rent) by the cap rate.

2.2.2 Factors Determining Cap Rate

Supply and demand of capital investment is the main determinant of cap rate which is largely based on three major factors (Geltner et al., 2001). These factors are:

1. Opportunity Cost of Capital: The prevailing return from other types of investments in the capital market (e.g., stocks, bonds, money market investment) are a major determinant of how much investors are willing to pay for each dollar of income from any property. As indicated earlier, real estate assets are part of the capital market and they tend to compete with all other types of assets for investors dollars. If the interest rate and yields on bonds and stocks are low, investors will tend to invest more on real estate. This will raise the property price and reduce the cap rate.
2. Growth Expectation: Investors are forward looking. They don't look only at the current return from the property, but rather on the long-run growth in the cash flow (net rent) that the property can generate in the future. Since the growth in net rent is mainly determined by the supply and demand in the space market, investors must

forecast the future space market in which the property is located. The greater the growth in the future net rent, the more investors are willing to pay for each dollar of the current net rent which will also reduce the cap rate. As indicated earlier, forecasting the future net rent may include comparing the current rent with the long run equilibrium, forecasting the future demand function and the long-run supply function in the market. Furthermore, investors should investigate if there are any unique attributes relates to the specific property they are intending to buy such as existing lease or required capital improvement.

3. Risk: Investors are risk aversion. If they perceive the potential net income from the property as less risky then they will be willing to pay more for each dollar of income from this property. In general, cash flows from real estate assets are perceived as more certain than any other investment due to the fact that space market is relatively stable and easy to forecast. The more the investors like the level of risk that property income provides, the more they will pay for it and the lower the cap rate will be.

2.3 Development Industry

Geltner et al. (2001) shows that in addition to the short-run relationship between the space market and the asset market translated by the conversion of potential cash flow into asset value, these two markets are connected on the medium to the long run through the real estate development industry. This industry is the main source for supply to the space market as it applies financial resources to construct new built space. Development is a complex and creative function that includes considerable risk-taking by the developer. It also requires intense interaction and coordination between government officials in the public sector and sources of capital in the private sector.

Although thousand of firms are involved in the real estate development industry, large scale commercial developments are dominated by a few national firms and a number of local firms. Generally, most development firms are private companies which have specialized expertise in local space markets. Joint ventures are common in the development industry, especially for large projects, connecting the market knowledge and expertise of development companies with those of financial institutions or local expertise with those of large national firms.

Since the built space is an extremely long-lived commodity, addition of new built space is only required by economic growth or by structural changes in the economy. It is only the demand for new built space that supports the development industry. Therefore, development is the most cyclical of all sectors of the economy.

2.4 The Real Estate System

The space market, the asset market and the development industry are the three main components of the real estate system. Figure 4 present a diagram of this system including the major elements and linkages among these three elements. It also shows the relation of this system with the national and local macroeconomics and the capital market.

The three large boxes represent the three main elements of the real estate system: the space market, the asset market and the development industry. Within the space market, the interaction of space demand with the existing physical supply determines the level of rent in the space market. The demand side is connected with the local and national economies which have a significant influence on the demand for space. The supply side is connected with the past and current activities of the development industry.

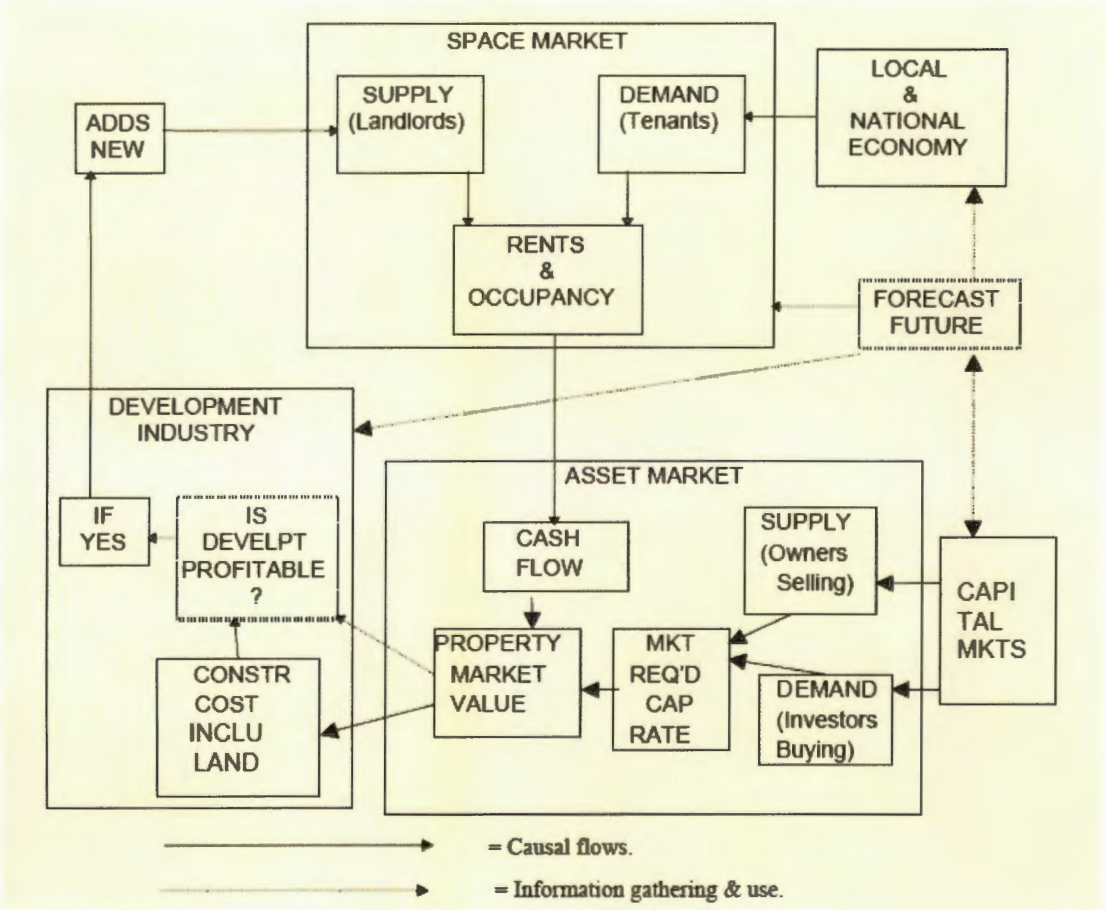

Figure 4: The Real Estate System
(Geltner, Miller, Clayton, Eichholtz. 2001. P. 23)

The space market is connected with the asset market by determining the cash flow produced by the real estate assets. This cash flow interacts with cap rate required by investors to determine the market value of properties. The supply and demand in the asset market consists of investors who want to sell or buy assets. These investors compare the risk and return of real estate assets with other type of investments in the capital market to determine the required cap rate on real estate assets. Investors also forecast the future demand and supply of the space market to predict the future rent level. Therefore, the interaction between the space market and the asset market produces the values of the real estate assets. These

values represent a key signal to the development industry, the third component in the real estate system.

The development industry makes a comparison between the development cost, land cost and construction cost in addition to developer's profit, and the asset values. If assets values equal or exceed development cost then the developer starts with adding new space to the current space market. Since the development process needs time, the developer should be forward-looking as the success of any development only happens if the newly completed built space value exceeds the development cost at the time when the project is completed.

The most important implication within the real estate system, as explained by Geltner et al. (2001), is the **negative feedback loops**. This is the mechanism that keeps the whole system self-regulating. If either supply or demand goes out of balance in the space market, the result will be reflected in the property cash flow which gives a certain response in the asset market. For example if a potential new development is perceived to increase the supply significantly, investors will predict lower future rent which will consequently reduce the current asset value. This reduction will make the new development unprofitable. On the contrary, if demand for space grows without new addition to supply, current rent will rise and push assets values up. This will give a signal to the development industry to start with new space supply which will reduce the rent to the long-run equilibrium level.

2.5 Four-Quadrant Model

The four-quadrant (4Q) model was developed by DiPasquale and Wheaton in order to perform a basic analysis of the real estate system. As shown on figure 5, this model consists of four quadrants that explain the relationship between the space market, the asset market and the development industry (Geltner et al., 2001).

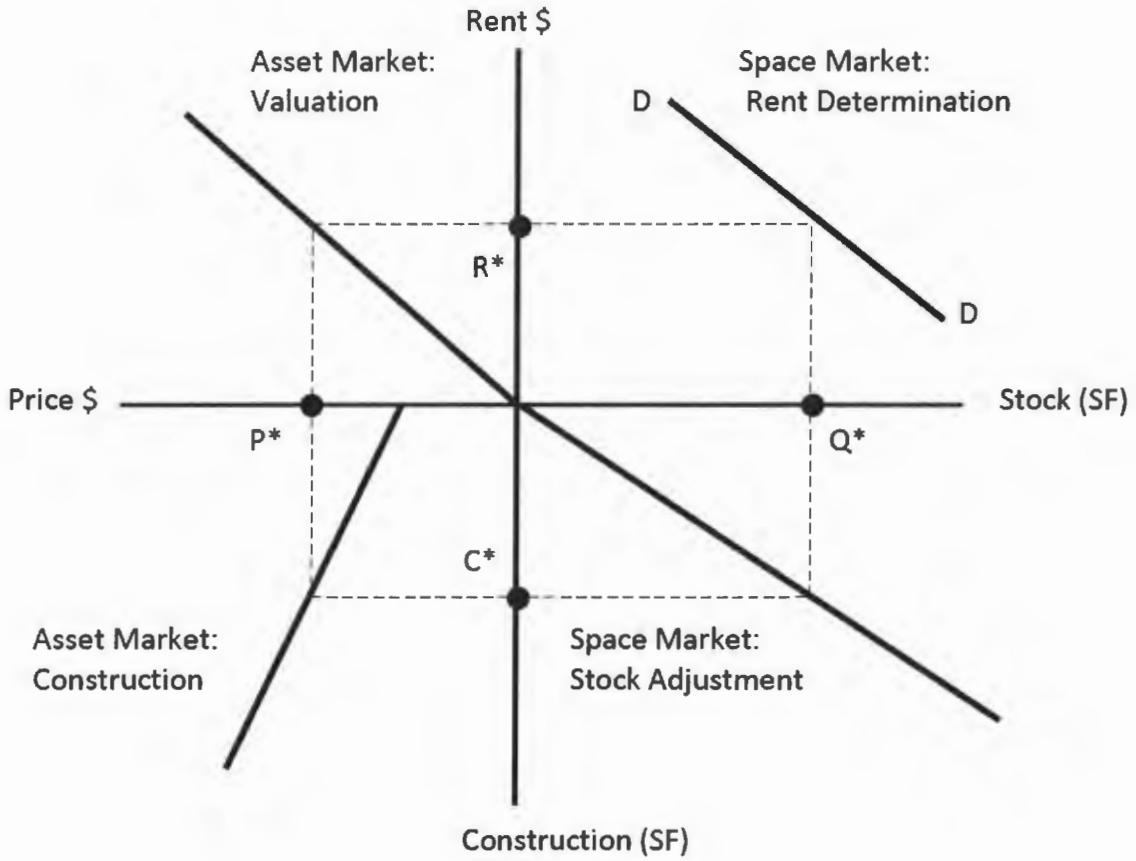

Figure 5: The DiPasquale-Wheaton Four-Quadrant Diagram
(Geltner, Miller, Clayton, Eichholtz. 2001. P. 26)

The concept of long-run equilibrium in real estate involves allowing sufficient time for the new supply of built space to adjust for the demand. The doted rectangle represents this long-run equilibrium which intersects with the 4 axes that represent the stock of built space, Rent, asset Price and the rate of new construction. The four intersection points between the rectangle and each of the axis, Q*, R*, P* and C*, are the long-run equilibrium levels of prices and quantities. The northeast quadrant represents the space market which is similar to the classical price/quantity diagram. The horizontal axis is the existing built space in the market, the vertical axis is the rent and the downward-slopping line DD is the demand function. If a vertical line is drawn from the point of the existing quantity of space (Q*), the

point where this line intersects with the demand function can give us the current equilibrium rent. Point (R*) is the equilibrium rent for the (Q*) amount of space.

The northwest quadrant represents the asset market valuation which relates the equilibrium rent (on the vertical axis) to the asset price (on the horizontal axis). The inclined line in this quadrant is the cap rate which has a slope that corresponding to the division of rent by the price. If the horizontal line from the rent point (R*) is continued to the cap rate line and then a vertical line from the intersection point is drawn to the price axis, the asset price can be determined. Point (P*) is the property price that correspond to the rent level (R*). The two northern quadrants show the short-run interaction between the space market and the asset market.

The two southern quadrants show the long-run effect of the real estate development industry on the rent and asset price resulted from adding new built space to the market. The southwest quadrant represents the relation between the asset prices (horizontal axis) with the annual amount of construction activities (vertical axis). The slopped line in this quadrant is the construction function line which indicates that higher property prices stimulate greater amount of new construction. This is due to the fact that higher prices enable more costly sites to be developed. The construction function line intersects the asset price axis at a positive certain point rather than the origin because when property prices are below a certain threshold, no developer starts any construction. Therefore, if a vertical line is drawn from the current asset price (P*) to the construction function line and then a horizontal line is drawn from this intersection to the construction axis, we can determine the amount of new construction in the market per year (point C*).

The southeast quadrant indicates the relation between the rate of annual new construction to the total available built space. The slopped line in this quadrant represents the relation between the average annual space constructions to the total stock of space that can be indefinitely maintained in the market. The concept in the southeast quadrant is that, in the long run, there is a certain amount of buildings that needs to be removed from the market because they become old and no more suitable to be used. Therefore, a certain amount of new construction per year is necessary just to maintain the existing stock of built space in the market. The sloped line in the southeast quadrant links the C* level of construction with the Q* amount of stock available in the market (Geltner et al., 2001).

2.6 Boom and Bust in Real Estate Market

The real estate space and assets markets have historically experienced boom and bust periods. Per Geltner et al., (2001), the length of each **real estate market cycle** in many commercial markets has been approximated to be between 10 and 20 years which is longer than the modern macroeconomic business cycle. The four-quadrant model (4Q) indicated in the previous section can help in understanding the famous boom and bust that occurs continuously in real estate.

The modern economic and demographic changes in any urban area imply a trend for natural growth in usage demand for space and real estate assets. While it is clearly understood that this increasing demand would stimulate new construction of space, the question is whether this increase causes not only the rise but also the subsequent fall in the real estate market. Geltner et al. (2001) uses the 4Q diagram in an extended way to answer this question. The analysis first considers the effect of growth in usage demand, holding the capital market constant. Then it considers the effect of a growth in investor demand for real

estate assets, holding space usage demand constant. Finally, the analysis examines the situation when both phenomena happen together.

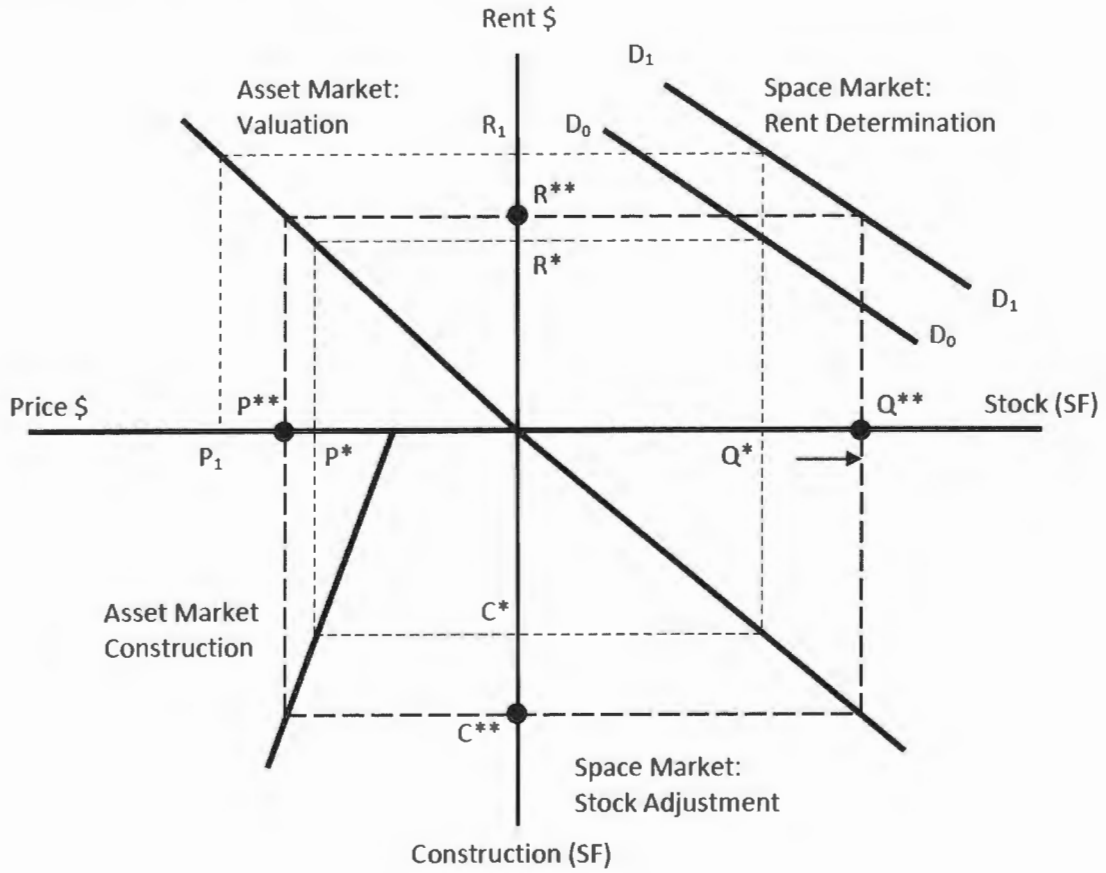

Figure 6: Effect of Demand Growth in Space Market
(Geltner, Miller, Clayton, Eichholtz. 2001. P. 30)

Figure 6 shows the first situation where the demand function in the northeast quadrant moves out to the right from D_0 to D_1. In the short run (one to two years) the time frame is not enough to build new space to respond to an unanticipated increase in usage demand. Therefore, rent will initially rise to levels that cannot be supported in the long run equilibrium. This level of rent is indicated in figure 6 by the increase of rent from the original point R* to a temporary high level of R_1 which was determined by the original stock of space Q* to the new demand function D_1. By relating this level of rent to the asset market on the

northwest quadrant, the asset prices will also temporally increase from the original P* level to P1 level. Note that as soon as the asset prices start to increase from P*, it will give a signal to the development industry to increase construction which will result in a new stock of space in the market at the level of Q**.

The new long-run equilibrium based on the new D_1 demand function and new stock space Q** is indicated by the rectangle in the thick dashed lines, which lies outside the old 4Q rectangle. Although the new equilibrium rent (R**) and the asset prices (P**) exceed the old equilibrium rent (R*) and asset price (P*), they are less than the temporary rent (R_1) and temporary price (P_1). This implies the fact that any unpredicted increase in demand for space will increase the rent and the asset price to certain levels but these levels will eventually fall as soon as the new equilibrium stock of space get to the market. The analysis also implies that the new equilibrium rectangle will always lie outside the old one as a result of growth in usage demand (holding the capital market in the northwest quadrant constant).

This analysis is based on the assumption that the long-run-marginal-cost function is upward-sloping (increasing real development costs). As noted earlier, if development costs are constant (completely vertical construction function), the rent will remain constant even with growing demand.

The second situation includes an increase of demand in real estate investment assets among investors in the capital market. This happens when investors start to perceive real estate to be less risky than other investment that they are willing to pay higher price/earnings multiples for real estate assets.

This type of change in capital market is shown in figure 7 by the downward movement (to a shallower slope) of the valuation line (cap rate) in the northwest quadrant.

When investors pay more for assets that have certain income (rent), then the cap rate will drop. If the prevailing cap rates, for example, have moved from 11% to 8% then there will be a substantial increase in property prices for some 37.5% if rents remained constant (from 1/0.11 to 1/0.08 per dollar of rent). Therefore, if investors continue with this trend, property prices could rise temporarily to a level above what is sustainable in the long run and would significantly stimulate the construction of new built space. This is shown by the short-run price movement from the original P* level to P_1 level.

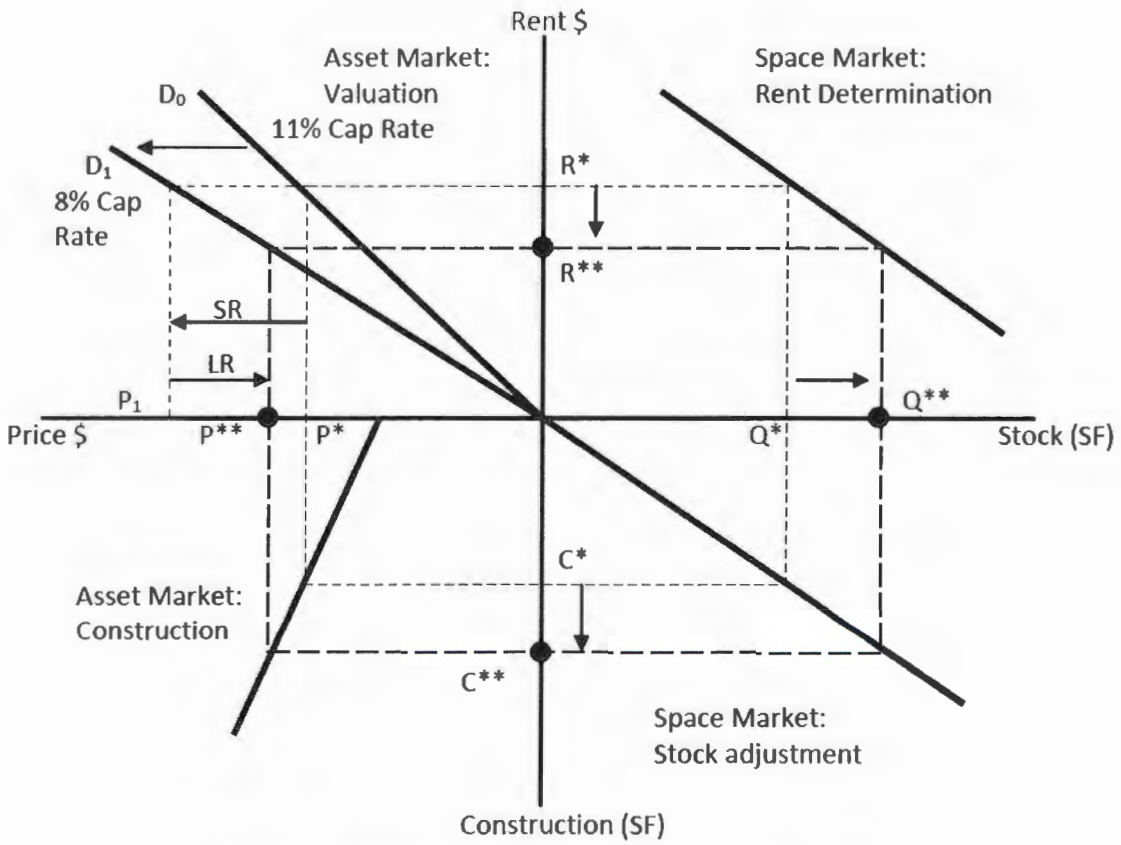

Figure 7: Effect of Demand Growth in Asset Market
(Geltner, Miller, Clayton, Eichholtz. 2001. P. 32)

The new long-run equilibrium is found by the new rectangle (in thick dashed lines) connecting the four quadrants based on the new 8% cap rate in the northwest quadrant. The new equilibrium involves a large increase in the amount of built space, which reflects the

effect of a real estate development boom that brought the stock of space up to the new Q** level. This is the result of the flow of financial capital to the real estate asset market when investor preferences shift toward real estate assets.

Based on the new stock of space quantity (Q**) and the same original usage demand, the new equilibrium rent (R**) is less than the original rent (R*). The lower rents will reduce the property prices to a lower level (P**) than the temporary price (P_1) but higher than the original price (P*).

This implies that an increase in investor demand for real estate assets will always result in a temporary increase in asset prices to a certain level but the new quantity of added built space will cause a fall in prices to a new level that is lower than the temporary prices but higher than the original. Also, the increase in investor demand will always result in a lower space rent than the original level of rent.

Now that we have seen how each of these situations can individually cause an increase and fall of asset prices, the simultaneous occurrence of both situations would double the effect of asset overpricing. This would be the answer to the question on whether a boom contains the seeds of a subsequent bust. The increase of demand in space and asset market would cause real estate prices to rise at first and then fall back, even without the subsequent reduction in demand for either space usage or real estate investment. If the fall back in prices was combined with a reduction in demand due to an economic recession, this fall will be much deeper. Cycles can be reduced by the ability of the asset market to respond quickly to the relevant new information. However, the 4Q model allows us to see how cycles in real estate can happen (Geltner et al., 2001).

Chapter Summary

Understanding real estate economics requires a basic perception to the three main elements that forms this discipline. These elements are the (a) space market, (b) the asset market and (c) the development industry. There is a continuous relation between these elements which affects the supply and demand in the space and asset markets.

The space market could be defined as the market for usage or rent of real property. This market is attributed as highly segmented due to the immobility of real estate. The asset market is the market for ownership of real estate assets. This market includes trading of assets that have claims to future cash flows (rent) and therefore could be compared to other products in the capital market like stocks and bonds. In addition to the short-run relationship between the space market and the asset market translated by the conversion of potential cash flow into asset value, these two markets are connected on the medium to the long run through the real estate development industry. This industry is the main source for supply to the space market as it applies financial resources to construct new built space.

This chapter explore the relationship between these three components of the real estate system including the dynamics of how each component affects others. One of the methods that could be used to illustrate this relation is the "Four-quadrant Model" which is also used to understand the boom and bust in the real estate market. Furthermore, this model explains the cyclical nature of the real estate in addition to the long-run equilibrium.

Chapter 3

DATA SOURCE AND METHODOLOGY

Based on the theoretical framework outlined in chapter 2, we now introduce the financial economics branch as a methodology to build a financial model that can correspond to the theory. Financial economics is the branch of economics that deals with the capital market where capital assets are traded. Since real estate assets are claims for future cash flows, they could be treated as capital assets. The substance of financial economics is the systematic study for how markets for capital assets function and thereby determine the prices of capital assets. The financial economics is the method of calculating the timing, risk and other attributes of the potential cash flows from these real estate assets in order to determine the expected return from these assets and how much they are worth in the capital market today (Geltner et al., 2001).

In order to illustrate this concept, this chapter will present a detailed analysis for a real estate development project in the Lower Mainland which includes two financial options. The analysis will determine the best option from the perspective of a developer by using financial economic techniques. The evaluation will include the site characteristics, development proposal, market analysis and financial analysis. The project is a hypothetical multi-family residential development which does not have any resemblance to any actual property. It has the characteristics of Burnaby in terms of pricing and rent levels but may not necessarily comply with the zoning bylaw or other jurisdiction requirements. The financial analysis method will include projecting the cash flow from the development in order to estimated the expected returns (IRR)

3.1 Site Description

The site of the project is located in Burnaby at the intersection of "X" street and "Y" street. The neighbourhood is characterised as a high density residential area with many commercial facilities that provide services to the entire community. "X" street boarders the site to the west and forms a major transportation route to Vancouver with a busy traffic during the rush hours. Many high rise developments lie along this street where major department stores are located. The south side of the site is bordered by "Y" street which is less busy and have the features of a residential neighbourhood. A 16-storey high rise residential development is located at the north of the site and a 4-story wood frame condo building is neighbouring the site on the east.

The site is rectangular in shape and has dimensions of (200 ft. X 300 ft) with a total area of 60,000 sq.ft.

The subject property lies in the Comprehensive Development (CD) zone of the district with a Floor Area Ratio (F.A.R.) of 3. Based on the total site area, this ratio allows 180,000 sq.ft. of buildable area. Table 1 in Appendix A provides the basic site information.

3.2 Development Proposal

The proposed development comprises of a 22-storey residential building with two levels of underground parking. The first two levels consist of an L-shape residential building along "X" street and "Y" street (row of Townhomes on level 1 and multiple size residential units on level 2). A 20-storey tower is located above the L-shape building with 8 different sizes of units in each floor. Figure 8 in Appendix A provide the design concept of the proposed development. There is a total of 200 units in the whole development which include 4 types: two bedroom Townhouse units on level 1 (Type A), one bedroom units (Type B),

one bedroom and a den units (Type C) and two bedroom units (Type D). Table 2 in Appendix A Provides unit mix and breakdown of the units.

The new development will integrate perfectly with the type and size of the buildings along "X" street as it provide the same level of density and architectural features of the adjacent buildings. There will be a specious green area located behind the L-shape building which provides some outdoor facilities for the residents of the building in addition to a children playground. The building also includes an exercise room and amenity room on level 1 and media room on level 2. The parkade entrance is located on "Y" street as it has lower traffic which gives the required safety. In order to provide marketable and affordable prices, the units will include a medium level finishes.

3.3 Market Study

Burnaby is situated in the central area of Metro Vancouver. As an established municipality, few lots of undeveloped land remain for new residential development. Recent population growth has mainly occurred in areas which have undergone residential intensification.

Over the last twenty-five years, Burnaby's population has grown by 49%, from 136,494 in 1981 to 202,799 in 2006. The aging trend is most noticeable in the baby boom generation. Those aged 40 to 59 (the age of the baby boomers in 2006) represented 30% of the population in 2006 compared to 23% of the population in 1986. Of Burnaby's 56,035 families in 2006, 34% had no children living at home, 32% had one child at home, 25% had two or more children at home and 9% had three or more children (City of Burnaby, 2009).

There has been a notable change in the type of dwellings occupied by Burnaby residents over the last 25 years. In 1981, single family houses represented over half (52%) of

the city's housing stock compared to only 28% in 2006. In contrast, apartments in buildings with 5 or more floors increased from 10% of the city's housing stock in 1981 to 19% in 2006 (City of Burnaby, 2009).

Since 1985, the percentage of Burnaby renters paying 30% or more of their total monthly household income on rent has increased from 40% in 1986 to 43% in 2006. For owners, the percentage has increased significantly from 14% in 1986 to 27% in 2006. This indicates a relatively higher trend toward ownership compared to rent (City of Burnaby, 2009).

Home values in Burnaby continued to edge upward in the fourth quarter of 2009 as demand in the whole Greater Vancouver housing market increases as a result of the economic recovery from the 2008 and 2009 recession. Over the last 12 months, the MLS Housing Price Index (HPI) for apartments in Burnaby increased 9.4% per cent to 255 from 233 in November 2008. Increasing sales and lower listing inventories are evidence of demand returning. Meanwhile, the number of new homes under construction is at its lowest point in four years and strong absorptions have kept the inventory of completed and unabsorbed new homes flat since the beginning of the year. Demand for new homes in 2010 will be supported by steady migration to the region, improvement in the economy and job market and mortgage rates that are expected to remain low until mid-year (Real Estate Bard of Greater Vancouver, Nov. 2009).

On the other hand, the rental market is still suffering from the economic downturn. The rental apartment vacancy rate in Burnaby increased significantly to 2.4 per cent, following several years of vacancies below one per cent. Same sample apartment rents increased, but at a slower pace than last year. The stock of purpose-built rental apartments

and Townhomes grew by more than one thousand units (Canada Mortgage and Housing Corporation, 2009).

3.4 Proforma

Two project Proformas have been prepared to show the potential expected return from the project. The Proforma is a projection of the cash flow that includes site acquisition, development cost, operating revenue and reversion revenue. These Proformas were based on the following assumptions:

1. Due to the fact that the project is hypothetical, the site acquisition price was approximated at $150 /sq.ft. based on the reasonable market value of the square footage of land obtained from the Multiple Listing Service (MLS). There is a wide range of land prices in Burnaby depending on the location and the potential type of development allowed on the site which makes the average price unrealistic in reflecting the value of this type of development sites. Table 3 in appendix A shows the total acquisition cost after adding the property purchase tax.
2. Two years (24 months) was estimated for the construction period.
3. Construction cost was estimated at $220 / sq.ft. based on the BDC cost index for concrete structure above underground parking in Burnaby. Table A-4 in appendix A calculates the development cost and the total project cost.
4. The following vacancy rates was considered in calculating the weighted average vacancy rate for the whole project based on the "Rental market Statistics – Fall 2009" issued by Canada Mortgage Housing Corporation.
    a. 2.6% for type A units (2 Bedroom Townhome)
    b. 2.1% for type B units (1 Bedroom)

c. 2.3% for type C units (1 Bedroom + Den)

d. 2.6% for type D units (2 Bedroom)

Table 5 in Appendix A shows the weighted average vacancy rate.

5. The capital structure was based on the assumption that 20% of the cost is required as equity while the other 80% will be obtained through a bank loan with a simple interest rate of 4.25% (2% above current prime rate). This interest rate was assumed to be fixed over the 10 years life of the project. The developer is also required to make an annual principal payment of $25,000. Table 6 in Appendix A shows the capital structure and the loan conditions.
6. The average rent obtained from "Rental market Statistics – Fall 2009, Canada Mortgage Housing Corporation" was adjusted to reflect the market rent of the project units in the next 10 year. The adjustment includes multiplying the average rent by 1.5. This adjustment was due to the fact that the average rent was based on the rent of properties in different part of Greater Vancouver area with different unit age. The adjustment is reasonable because the project is in a premium location (Burnaby) and includes brand new units (Kiel and Zabel, 2007).
7. The market rent was projected to grow at a constant rate of 1% per year. This projection was based on the assumption that the expected inflation rate is 2% per year and the market rent depreciation for the building is 1% per year. This results in a net 1% per year expected growth rate.
8. Operating expenses was estimated at 8% of the annual rent revenue and projected to grow at the same rent growth rate (1% per year). A $500,000 capital expenditure was assigned to take place in year 6 and year 9.

In order to maximize the profit and to examine the effect of the cap rate on the expected return of the project, two Proforma options were considered in the financial analysis.

3.4.1 Option 1

The first Proforma includes holding the whole project for 8 years (rent start in year three immediately after construction completion) and then the units are sold in year 10. In this option, the developer needs to pay the annual debt service which includes the interest amount of the outstanding loan in addition to the $25,000 annual principal payment. The total amount of the outstanding balance will be paid off by the end of year 10 after all the units are sold. Table 7 shows the debt service and the outstanding balance each year. Note that the developer will borrow half the loan in year one and the other half in year two.

The rent revenue of the whole 200 units is calculated in table 8 and adjusted to reflect the market rent of the project as indicated earlier.

In order to calculate the reversion cash flow from selling all the units in year 10, the terminal cap rate needs to be estimated. This could be done by dividing the current rent (year 3 rent) by the market value of the project (we assume the market value of the project is 25% higher than the project cost to the developer). The resulted cap rate then could be used as the terminal cap rate to calculate the reversion cash. This includes dividing the expected rent of year 11 by the terminal cap rate. Table 9 shows the estimation of the terminal cap rate and the reversion cash flow.

Finally, table 10 include the Proforma of option 1 which shows the cash flow projection for the 10 years life of the project in addition to the unlevered and levered IRR. Note that the development cost has been divided between the first two years to reflect the cash outflow during the construction period. The same arrangement was done for the loan

because the developer does not need the whole amount in the first year. A summary of key financial measure of option 1 is shown below.

Financial Summary of Scenario 1 (100% Rent)	
IRR (Unlevered)	7.30%
IRR (Levered)	13.19%
Site Acquisition Cost	9,180,000
Development Cost	44,748,000
Equity to Cost	20%
Loan to Cost	80%
Total Equity Required	10,785,600
Total Amount of Loan	43,142,400
Rental Revenue (year 3)	3,809,628
Sale Revenue (year 10)	63,360,846

3.4.2 Option 2

The second Proforma option includes selling approximately 50% of the units and holding the other 50% till the end of year 10. In this scenario, the developer's target is to sell the upper 12 floors of the tower which includes 96 units before the end of year 3. The presales can start as soon as the development permit is obtained and even before the construction commencement. In order to reduce risk, half of the loan amount is required to be paid off by the end of year 3 (as soon as the 96 units are sold) in addition to the debt service which includes the interest of the outstanding balance and the $25,000 annual principal payment. The remaining outstanding balance will be paid off in year 10. Table 11 shows the debt service and the outstanding balance for each year. Like option one, the developer will borrow half the loan amount in year one and the other half in year two.

The rent revenue of the 104 unit holding is calculated in Table 12 and adjusted to reflect the market rent of the project as indicated earlier.

In this option, there are two sale revenues that need to be estimated, the sale of 96 units by the end of year 3 and the reversion of the remaining 104 units by the end of year 10. In order to calculate the first sales revenue, the current market price per sq.ft. was approximated based on the current MLS listing. These market prices and the total amount of the 96 unit sales are shown on Table 13.

For the second sales revenue, estimating what the market price (per sq.ft.) would be after 10 years is very difficult. Therefore, we will use the same terminal cap rate calculated in option one (5.65%) to estimate the reversion revenue for the remaining 104 units. The method is to divide the project net operating income (NOI) of year 11 by the cap rate as shown on Table 14.

Table 15 shows the Proforma for option 2 with all the cash flow projections for the 10 year life of the project. Table 15 also shows the unlevered and levered IRR for this option. Just like option one, the development cost has been divided between the first two years to reflect the cash outflow during the construction period. The same arrangement was done for the loan because the developer does not need the whole amount in the first year. A summary of key financial measure of option 2 is shown below.

Financial Summary of Option 2 (50% Sale + 50% Rent)	
IRR (Unlevered)	12.58%
IRR (Levered)	32.67%
Site Acquisition Cost	9,180,000
Development Cost	44,748,000
Equity to Cost	20%
Loan to Cost	80%
Total Equity Required	10,785,600
Total Amount of Loan	43,142,400
Rental Revenue (year 3)	2,059,596
Sale Revenue (year 3)	40,257,360
Sale Revenue (year 10)	34,557,860

3.5 Cost of Capital

The cost of capital is the return that the developer or any other investor typically expects to earn in other investments of similar risk to the subject investment. It is very important for any investor to estimate the cost of capital which should be used as a hurdle rate to examine the return of any project. If the return of the project exceed the hurdle rate then the project is profitable to the investor (Damodaran, 2001). This analysis will estimate the weighted average cost of capital (WACC) for the Burnaby project based on the cost of equity, cost of debt and the market value of equity and debt.

3.5.1 Cost of Equity

The cost of equity is the rate of return that investors require on an equity investment in any firm. Based on the capital asset pricing model CAPM explained by Damodaran (2001), there are three elements that need to be measured in order to estimate the cost of equity: the riskless rate, Beta and risk premium. These three inputs are used to arrive at the expected return on equity based on the equation:

$$\boldsymbol{Expected\ Return = Riskless\ rate + Beta\ (Risk\ Premium)}$$

The riskless rate that should be used to calculate the return should be a government bond where there is no risk of default. As long as the objective is to calculate the cost of equity for a project, then the time horizon of the government bond should match the time horizon of the project (10 years). For this purpose, the bank of Canada 10-years bond rate (4.08%) will be used (Google Finance).

The beta will be calculated based on the "Bottom-Up" method which includes the following steps.

- First, we identify the comparable companies that have a similar business of the targeted project. For this purpose, three publicly traded residential real estate companies have been chosen. These companies are: Equity Residential, Canadian Apartment Properties REIT and Cartwell Senior Housing REIT (Google Finance).
- Second, the historical beta on the public domain (Google Finance) is adjusted to calculate the beta. This should be done by using the formula: $[Beta = 0.33 + 0.67(Historical\ Beta)]$.
- Third, we estimate the unlevered beta for each of the three companies by using the formula: $[Unlevered\ Beta = Current\ Beta/(1 + (1 - tax\ rate)(debt/equity)]$. Exhibit 16 shows the calculations of the levered and the unlevered betas. The tax rate is estimated at 35%.
- Forth, the weighted average of the unlevered beta is estimated. This has been done using the total revenue obtained from the public domain (Google Finance) as the weight as shown on table 17.
- Finally, we use the project debt to equity values to calculate the debt/equity ratio. This ratio will then be used to estimate the levered beta by applying the equation: $[Levered\ Beta = Unlevered\ Beta\ X\ (1 + (1 - tax\ rate)(debt/equity)]$. Based on this method, the project Beta is 1.67 as shown of table 18.

The risk premium is estimated as the difference between the historical return on stocks and the risk free rate. The historical return on stocks (1970-2003) is 12.72% (Geltner et al. -Exhibit 11-4, P252) and the risk free rate is 4.08% *(10-year bond; Google Finance)*. Therefore, the risk premium is 8.64% as shown on table 19.

Applying the above inputs (4.08% risk free rate, 1.67 beta and 8.64% risk premium) to the CAPM equation result in 18.47% cost of equity (table 20).

3.5.2 Cost of Debt

The cost of debt measures the current cost to the firm of borrowing funds to finance projects (Damodaran, 2001). Therefore, the interest rate of the project loan (4.25%) will be considered as the cost of debt. Since the project cash flow and IRR was estimated before-tax, then the tax advantage of debt will not be used to reduce the cost of debt. Before-tax cost of debt will be used in the calculation of the cost of capital.

3.5.3 Market Value

The total amount of equity required for the project ($10,785,600) is considered as the market value of equity and the total amount of the project loan ($43,142,400) is assumed to be the market value of debt.

3.5.4 Weighted Average Cost of Capital (WACC)

Since Burnaby project raises its money from two sources, equity and debt, the cost of capital could be calculated by finding the weighted average of each of these costs. By applying 18.47% as a cost of equity, 4.25% as a cost of debt and $10,785,600 and $43,142,400 as the market value of equity and debt to the following equation, we can estimate the weighted average cost of capital (Damodaran 2001).

$$WACC = Cost\ of\ Equity\left(\frac{Equity}{Equity + Debt}\right) + Cost\ of\ Debt\left(\frac{Debt}{Equity + Debt}\right)$$

The weighted average cost of capital (WACC) obtained from this equation is 7.09% as summarized on table 21.

Chapter 4

EMPIRICAL RESULTS – SCENARIO'S

In order to conduct an analysis on the two development options (100% rent against the 50% rent and 50% sell), we need to look at the criteria of each option from the financial and marketing aspects.

4.1 Financial Analysis

The levered IRR for both option 1 and 2 are higher than the unlevered IRR for the two options. This is due to the effect of debt financing where the return is amplified due to leverage. Yet, the equity return (levered IRR) for option one (13.19%) is not greatly above the unlevered return (7.30%) because there is not a great deal of positive leverage as the loan faces 4.25% interest rate and the property return is hardly 1.4% above that at 5.65% (cap rate). Considering that the cap rate equals the net operating income (NOI) divided by the property price, low cap rate means that the return form rent (NOI) is lower than the return from appreciation of the property. Although the whole property in option one will eventually be sold with the same low cap rate, the reversion will happen in year 10 where the impact of the high price on the IRR is minimized by the 10 years period (time value of money).

This indicates that the relatively low rent levels and high property prices have a great impact on lowering investor returns from real estate properties (rent investments). Despite the current economic downturn, property prices have increased significantly in the last few years (2001-2008) while the rent levels have been declining. This was partially due to low mortgage rates where home ownership became affordable and more appreciated than rent (CMHC, Sprig 2009) (Somerville and Swann, 2008) (Tsounta 2009). This result exactly reflects the implication of the analytical framework. If you recall the four-quadrant analysis

of boom and bust, an increase in demand for real estate assets will always result in a lower space rent.

On the other hand, the difference between the levered IRR (32.67%) of option two and the unlevered IRR (12.58%) is much higher because the effect of the low cap rate was reduced by holding only 50% of the property for rent until year 10. Furthermore, both levered and unlevered IRR's are higher in option two due to the revenue from the sale of 50% of the property in year 3. Advancing reversion revenue from year 10 to year 3 has a great impact on the IRR (time value of money).

Although the property returns (unlevered IRR) of option one is slightly higher than the cost of capital (7.30% unlevered IRR against 7.09% for WACC), the equity return (levered IRR), however, is much lower than the cost of equity (13.19% levered IRR against 18.47% cost of equity). This implies that option one does not meet the investment requirement and should be rejected. On the other hand, both levered and unlevered IRRs of option two are much higher than the cost of capital and the cost of equity (12.58% unlevered IRR against 7.09% WACC and 32.67% levered IRR against 18.47% cost of equity). Therefore, option two is acceptable as an investment alternative.

The above analysis shows that selling the whole property immediately after development is more profitable than holding it for rent. This could be the perfect option in a high demand market. But with the current slow recovery from the recession and moderate demand of housing market, selling 200 units may take much longer than the end of year-3 limit. Therefore selling 50% of the units could be a reasonable target to meet the investment and market constraints.

4.2 Market Analysis

The market study shows that there is strong trend toward ownership compared to rent in Burnaby (City of Burnaby, 2009). Currently, there is a stronger demand for housing than last year implied by relatively higher prices (Real Estate Bard of Greater Vancouver, Nov. 2009). On the other hand, the rental market is still suffering from the recession and the vacancy rate has increased (Canada Mortgage and Housing Corporation, 2009). All these facts support the criteria of option two which includes the sale of 50% of the units after development rather than holding the whole property for the 10 years life of the investment.

The aging trend of the population where those above the age of 40 account for high percentage of population implies that the targeted market segment should be the working professionals and empty nesters. These two market segments have the financial resources to bear the high unit prices of this development.

Since the majority of families in Burnaby have either on children or one child living at home, the size of the units should be small in order to reduce the unit price and makes it affordable to a higher percentage of home buyers. The one bedroom, one bedroom and den and two bedroom units are the most appropriate unit mix. Conversely, the studio or the three bedroom units are not preferable for the above two market segments.

The change in the type of dwelling in Burnaby from the single family houses to apartments in multi-level building implies that there is a shortage in the open green areas. The new development should provide enough outdoor facilities to meet the requirement of the residents.

Chapter 5

CONCLUSIONS

The financial analysis shows that the 100% rent option (option one) does not meet the investment criteria as it has a levered IRR of 13.19% which is lower than the 18.47% cost of equity. This was due to the low cap rate reflected by the current low level of rent.

During 2008 and 2009, the rent level was below the replacement cost rent that stimulates new development in the market. The high demand for real estate assets in (2001-2008) has increased the supply in the space market and eventually led the rent level to fall below the long-run equilibrium. The effect of excess supply, in fact, was doubled by the sharp fall of demand for space during to the recession that stared in late 2007. As indicated in the analytical framework, low rent levels do not motivate developers to start new construction which was clearly illustrated in the financial analysis of option one. (CMHC, Sprig 2009) (Somerville and Swann, 2008) (Tsounta 2009)

On the other hand, the financial analysis indicates that option two (50% rent - 50% sell) has an acceptable investment potential. The total property return (unlevered IRR) of 12.58% exceeds the 7.09% cost of capital in addition to the significantly high return on equity (levered IRR) of 32.67% compared with the 18.47% cost of equity. This was due to limiting the negative impact of the low cap rate on the return by holding only 50% of the total number of units for rent. It also shows the effect of current high asset prices on the total return when 50% of the property is sold immediately after development.

The asset market during the last quarter of 2009 moderately rose after a marginal decline at the end of 2008 and beginning of 2009 (Real Estate Board of Greater Vancouver, Nov. 2009). Although the return from real estate investment (rent investment) does not

exceed the cost of capital, as shown in option one, investors are expecting significant growth in the future return. This growth expectation has led to higher asset prices during the last few months of 2009. Furthermore, the sharp fall of the stock market in late 2008 and early 2009 had a major impact on perceiving real estate assets as less risky than any other assets. This perception made a gradual shift of investors' preference toward real estate assets. All the above reasons combined with the historically low mortgage rates had led to the recent increase in real estate asset prices (Goodman and Goodman, 2007).

The market analysis also support the criteria of option two where the trend for ownership is stronger than rent. The asset prices have gradually began to improve during the last few months while the rent level is still suffering from the recession. The current vacancy rate is at its highest level of many years which will create a negative impact on the operating income of option one.

The demographics of Burnaby population support the development proposal where small units are required for market feasibility. Furthermore, the proposed unit mix (1 bedroom, 1 bedroom + den, and 2 bedroom units) are the most appropriate product for the market segment targets.

Since the working professionals and empty nesters are the most important market segments, the strategy of the developer should include providing three important elements.

1. Contemporary unit features which is the main focus of all home buyers especially in the urban environment where professionals seek the best life style.
2. Sufficient outdoor green areas which is an important interest of the market segments that corresponds to the modern trend of practicing outdoor activities.

3. Affordable unit price is also the main interest for any buyer as home prices are escalating to a very high level.

These three elements are normally the main interest of the target marketing consumer of working professionals and empty nesters which correspond to their lifestyle and purchasing behaviour. This strategy concept is drawn from personal experience based on many years of employment in the development industry.

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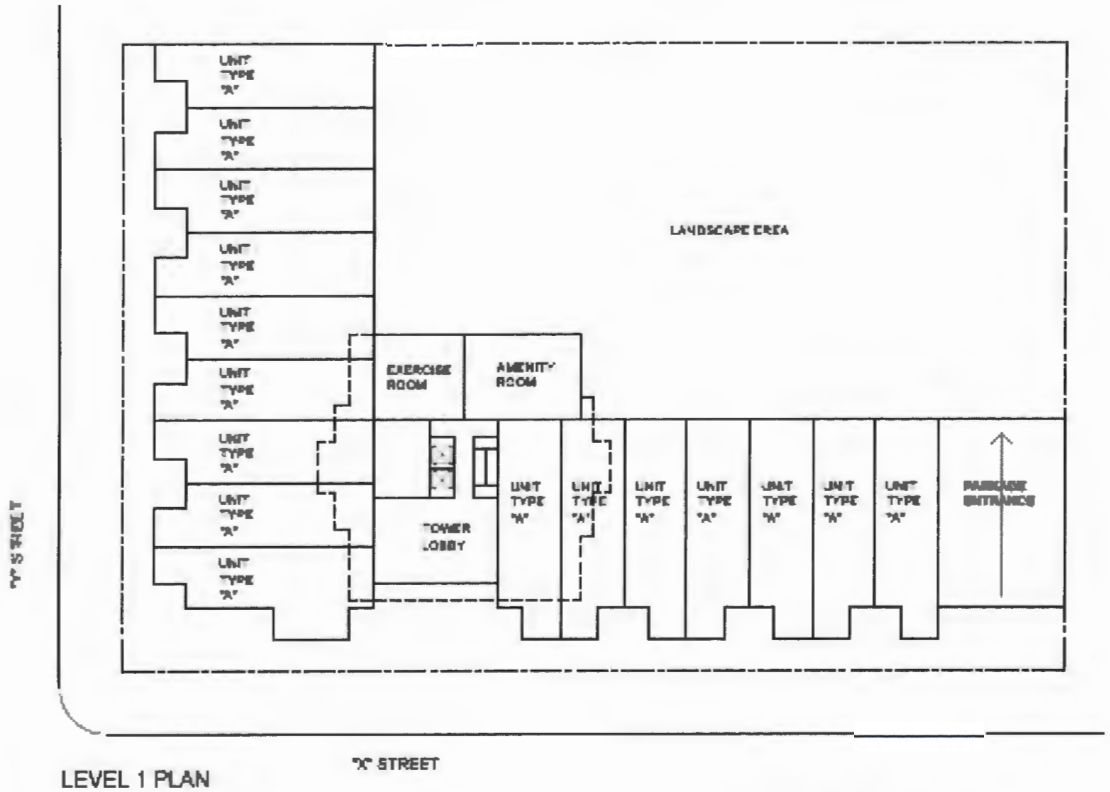
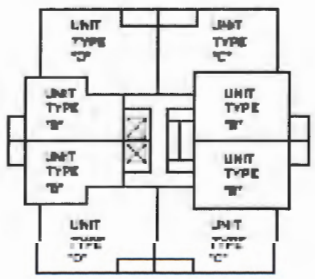
APPENDIX A



LEVEL 1 PLAN



LEVEL 3 - 22 PLAN

LEVEL 2 PLAN

Figure 8: Design Concept of Project A

Site Information		
Site Area (sq.ft)	a	60,000
Floor Space Ratio (FSR)	b	3
	c = a X	
Buildable Area (sq.ft)	b	**180,000**
Efficiency	d	85%
	e = c X	
Sellable Area (sq.ft)	d	153,000

Table 1: Site Information of Project A

Unit Breakdown						
Unite Type	**Level 1**	**level 2**	**Level 3-22**	**Total**	**%**	**Area Rang sq.ft.**
Type A (TH - 2 Bedroom + Den)	16			16	8%	1200
Type B - 1 Bedroom		7	60	67	34%	600-700
Type C - 1 Bedroom + Den		4	40	44	22%	700-800
Type D - 2 Bedroom		13	60	73	37%	Above 800
			Total	**200**	**100%**	

Table 2: Unit Breakdown

Site Acquisition		
Ste Area (sq.ft)	60,000	
Price per sq.ft	150	
Land Cost		9,000,000
Property Purchase Tax (2%)		180,000
Other Acquisition Expenses		0
Total Site Acquisition Cost		**9,180,000**

Table 3: Site Acquisition Cost

Development Cost		
Buildable Area (sq.ft)	180,000	
Construction Cost (per sq.ft)	220	
Total Construction Cost		39,600,000
Soft Cost (10% of const. Cost)		3,960,000
Contingency (3% of const. Cost)		1,188,000
Total Development Cost		**44,748,000**

Total Project Cost	**53,928,000**

Table 4: Development Cost and Total Project Cost (Site Acquisition + Development Cost)

Vacancy Rate				
Unit Type	Vacancy Rate*	Number of Units	Weight	Weighted Vacancy
Type A (2B TH)	2.6%	16	0.080	0.21%
Type B (1B)	2.1%	67	0.335	0.70%
Type C (1B + D)	2.3%	44	0.220	0.51%
Type D (2B)	2.6%	73	0.365	0.95%
Weighted Average Vacancy Rate				**2.4%**

** Data Source: Rental Market Statistics, Canada Mortgage Housing Corporation - Fall 2009*

Table 5: Weighted Average Vacancy Rate

Capital Structure		
Project Cost	53,928,000	
Equity %	20%	
Loan %	80%	
Interest Rate	4.25%	
Total Amount of Equity		10,785,600
Total Amount of Loan		43,142,400
Annual Principal Payment	25,000	

Table 6: Capital Structure and Loan Conditions

Year	Beginning Balance	Interest Payment	Principal Payment	Ending Balance	Debt Service
1	21,571,200	916,776	25000	21,546,200	941,776
2	43,117,400	1,832,490	25000	43,092,400	1,857,490
3	43,092,400	1,831,427	25000	43,067,400	1,856,427
4	43,067,400	1,830,365	25000	43,042,400	1,855,365
5	43,042,400	1,829,302	25000	43,017,400	1,854,302
6	43,017,400	1,828,240	25000	42,992,400	1,853,240
7	42,992,400	1,827,177	25000	42,967,400	1,852,177
8	42,967,400	1,826,115	25000	42,942,400	1,851,115
9	42,942,400	1,825,052	25000	42,917,400	1,850,052
10	42,917,400	1,823,990	42,917,400		44,741,390

Table 7: Debt Service and Outstanding Balance for option 1

Rent Revenue				
Unit Type	Number of Units	Avg. Monthly Rent *	Avg. Annual Rent	Total
Type A (2B TH)	16	1,175	14,100	225,600
Type B (1B)	67	919	11,028	738,876
Type C (1B + D)	44	1,044	12,528	551,232
Type D (2B)	73	1,169	14,028	1,024,044
Total Rent Revenue				**2,539,752**
Adjusted Rent Revenue**				**3,809,628**

** Data Source: Rental Market Statistics, Canada Mortgage Housing Corporation - Fall 2009*

***Adjusted rent revenue is calculated by multiplying the rent revenue by 1.5*

Table 8: Rent Revenue for option 1

Cap Rate Calculations	
Current Market Rent	3,809,628
Project Cost for Developer	53,928,000
Project Market Value at (125%)*	67,410,000
Cap Rate	**5.7%**

** Assuming that the extra 25% accounts for developer profit plus taxes*

Reversion Cash Flow		
Projected NOI of Year 11	3,704,173	
Terminal Cap Rate	5.7%	
Resale Price		64,985,483
Cost of Sale (2.5%)		1,624,637
Reversion Cash Flow		**63,360,846**

Table 9: Cap rate and Reversion Cash Flow Estimation for option 1

	Item	1	2	3	4	5	6	7	8	9	10	11
a	**Site Acquisition**	**-9,180,000**										
b	**Development Cost**	**-22,374,000**	**-22,374,000**									
	Operating Revenue											
c	Potential Rent Revenue			3,809,628	3,847,724	3,886,202	3,925,064	3,964,314	4,003,957	4,043,997	4,084,437	4,125,281
d	Vacancy Allowance			91,431	92,345	93,269	94,202	95,144	96,095	97,056	98,026	99,007
e = c - d	**Total Revenue**			**3,718,197**	**3,755,379**	**3,792,933**	**3,830,862**	**3,869,171**	**3,907,862**	**3,946,941**	**3,986,410**	**4,026,274**
f	Operating Expenses			297,456	300,430	303,435	306,469	309,534	312,629	315,755	318,913	322,102
g = e-f	**Net Operating Income (NOI)**			**3,420,741**	**3,454,949**	**3,489,498**	**3,524,393**	**3,559,637**	**3,595,233**	**3,631,186**	**3,667,498**	**3,704,173**
h	Capital Improvement						500,000			500,000		
i	Reversion										63,360,846	
j=a+b+g-h+i	**PBTCF***	**-31,554,000**	**-22,374,000**	**3,420,741**	**3,454,949**	**3,489,498**	**3,024,393**	**3,559,637**	**3,595,233**	**3,131,186**	**67,028,343**	
	Unlevered IRR	**7.30%**										
k	Loan	21,571,200	21,571,200									
l	Debt Service	941,776	1,857,490	1,856,427	1,855,365	1,854,302	1,853,240	1,852,177	1,851,115	1,850,052	44,741,390	
m=j+k-l	**EBTCF****	**-10,924,576**	**-2,660,290**	**1,564,314**	**1,599,584**	**1,635,196**	**1,171,154**	**1,707,460**	**1,744,119**	**1,281,134**	**22,286,954**	
	Levered IRR	**13.19%**										

Table 10: Proforma of Option 1

**PBTCF: Property Before-Tax Cash Flow*

***EBTCF: Equity Before-Tax Cash Flow*

Year	Beginning Balance	Interest Payment	Principal Payment	Ending Balance	Debt Service
1	21,571,200	916,776	25,000	21,546,200	941,776
2	43,117,400	1,832,490	25,000	43,092,400	1,857,490
3	43,092,400	1,831,427	21,596,200	21,496,200	23,427,627
4	21,496,200	913,589	25,000	21,471,200	938,589
5	21,471,200	912,526	25,000	21,446,200	937,526
6	21,446,200	911,464	25,000	21,421,200	936,464
7	21,421,200	910,401	25,000	21,396,200	935,401
8	21,396,200	909,339	25,000	21,371,200	934,339
9	21,371,200	908,276	25,000	21,346,200	933,276
10	21,346,200	907,214	21,346,200		22,253,414

Table 11: Debt Service and Outstanding Balance for option 2

Unit Type	Number of Units	Avg. Monthly Rent *	Avg. Annual Rent	Total
Type A (2B TH)	16	1,175	14,100	225,600
Type B (1B)	19	919	11,028	209,532
Type C (1B + D)	20	1,044	12,528	250,560
Type D (2B)	49	1,169	14,028	687,372
Total Rent Revenue				**1,373,064**
Adjusted Rent Revenue**				**2,059,596**

** Data Source: Rental Market Statistics, Canada Mortgage Housing Corporation - Fall 2009*

Table 12: Rent Revenue for Option 2

Unit Type	Area	Price per sq.ft	Unit price	Number of Units	Total
Type A (2B TH)					
Type B (1B)	620	600	372,000	48	17,856,000
Type C (1B + D)	780	590	460,200	24	11,044,800
Type D (2B)	890	580	516,200	24	12,388,800
Total Revenue					41,289,600
Cost of Sale (2.5%)					1,032,240
Before-Tax Sales					**40,257,360**

Table 13: Unit Sales Revenue on Year 3 for Option 2

Projected NOI of Year 11	2,002,584	
Terminal Cap Rate	5.65%	
Resale Price		35,443,959
Cost of Sale (2.5%)		886,099
Before-Tax Reversion		**34,557,860**

Table 14: Reversion Revenue on Year 10 for Option 2

	Item	1	2	3	4	5	6	7	8	9	10	11
a	**Site Acquisition**	**-9,180,000**										
b	**Development Cost**	**-22,374,000**	**-22,374,000**									
	Operating Revenue											
	Potential Rent											
c	Revenue			2,059,596	2,080,192	2,100,994	2,122,004	2,143,224	2,164,656	2,186,303	2,208,166	2,230,247
d	Vacancy Allowance			49,430	49,925	50,424	50,928	51,437	51,952	52,471	52,996	53,526
e = c - d	**Total Revenue**			**2,010,166**	**2,030,267**	**2,050,570**	**2,071,076**	**2,091,786**	**2,112,704**	**2,133,831**	**2,155,170**	**2,176,721**
f	Operating Expenses			160,813	162,421	164,046	165,686	167,343	169,016	170,707	172,414	174,138
	Net Operating											
g = e-f	**Income (NOI)**			**1,849,352**	**1,867,846**	**1,886,524**	**1,905,390**	**1,924,444**	**1,943,688**	**1,963,125**	**1,982,756**	**2,002,584**
h	Capital Improvement						500,000			500,000		
i	Reversion			40,257,360							34,557,860	
j=a+b+g-h+i	**(PBTCF)***	**-31,554,000**	**-22,374,000**	**42,106,712**	**1,867,846**	**1,886,524**	**1,405,390**	**1,924,444**	**1,943,688**	**1,463,125**	**36,540,616**	
	Unlevered IRR	**12.58%**										
k	Loan	21,571,200	21,571,200									
l	Debt Service	941,776	1,857,490	23,427,627	938,589	937,526	936,464	935,401	934,339	933,276	22,253,414	
m=j+k-l	**(EBTCF)****	**-10,924,576**	**-2,660,290**	**18,679,085**	**929,257**	**948,998**	**468,926**	**989,043**	**1,009,350**	**529,849**	**14,287,203**	
	Levered IRR	**32.67%**										

Table 15: Proforma of Option 2

**PBTCF: Property Before-Tax Cash Flow*
***EBTCF: Equity Before-Tax Cash Flow*

Levered Beta

Company	Historical Beta	Beta
Equity Residential	1.42	1.28
Canadian Apartment Properties REIT	0.43	0.62
Cartwell Senior Housing REIT	1.01	1.01

Unlevered Beta

Company	Levered Beta	D/E Ratio	Tax Rate	Unlevered Beta
Equity Residential	1.28	2.10	35%	0.54
Canadian Apartment Properties REIT	0.62	3.28	35%	0.20
Cartwell Senior Housing REIT	1.01	2.87	35%	0.35

Table 16: Levered and Unlevered Beta of the Three Comparable Companies

Company	Unlevered Beta	Revenue*	Weight	Weighted Average
Equity Residential	0.54	2103	0.67	0.36
Canadian Apartment Properties REIT	0.20	320	0.10	0.02
Cartwell Senior Housing REIT	0.35	725	0.23	0.08
Total		3148		**0.46**

**Data Source: Google Finance*

Table 17: Weighted Average of Unlevered Beta

Project Cost	53,928,000
Debt (80%)	43,142,400
Equity	10,785,600
D/E Ratio	4
Unlevered Beta	0.46
Tax Rate	35%
Project Levered Beta	**1.67**

Table 18: Project Beta

Average return on stocks (1970-2003)*	12.72%
Riskless Rate (10-year bond)**	4.08%
***Risk* Premium**	**8.64%**

**Data Source: Geltner, Miller, Clayton, Eichholtz- "Commercial Real Estate Analysis & Investment" (Exhibit 11-4, P252)*

***Data Source: Google Finance*

Table 19: Risk Premium

Riskless rate	4.08%
Beta	1.67
Risk Premium	8.64%
Cost of Equity	**18.47%**

Table 20: Cost of Equity

Cost of Capital = Ke (E/D+E) + Kd (D/D+E)

Cost of Equity	18.47%
Before-tax Cost of Debt	4.25%
Market Value of Equity	10,785,600
Market Value of Debt	43,142,400
Cost of Capital	**7.09%**

Table 21: Weighted Average Cost of Capital (WACC)