A Study into the Demand for Apartments in Central Auckland

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Abstract

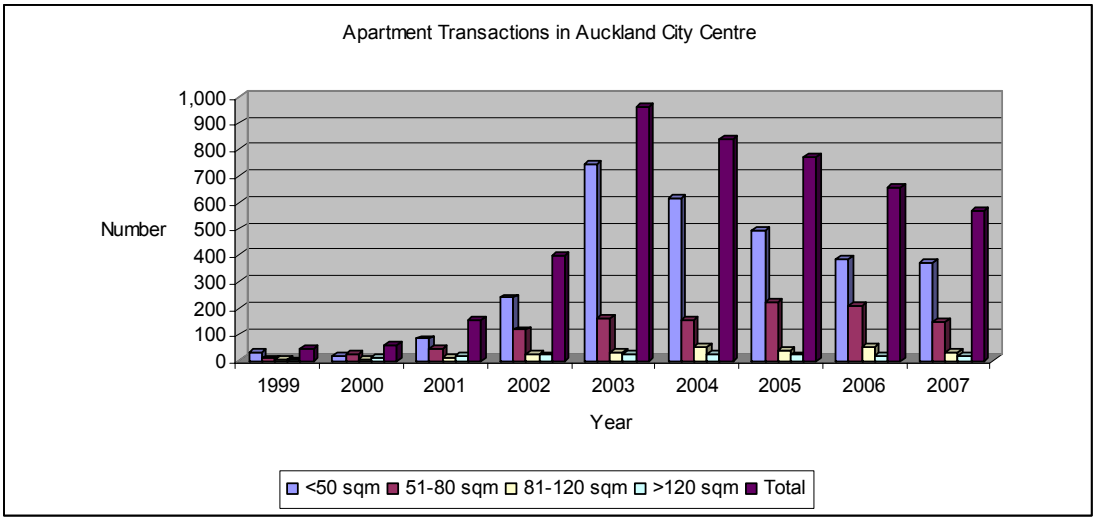
Property developers have been reported as "shunning Auckland's inner city market" in 2007 reducing their investments from around 2000 units (worth $600 million) in 2006 to around 150 units (worth $45 million) in 2008 (Gibson, 2007). The sale activities of apartments in the Auckland city central have dropped significantly in the first quarter of 2008 compared to the similar period last year. In spite of this however, there are new apartments under constructing or on the drawing board. The Reserve Bank of New Zealand (RBNZ) has raised its benchmark interest rate four times between March and July 2007 to 8.25, and is still under pressure to increase this further. What then is the trend of apartment prices in Auckland central city and whether apartments are worthy of investment in the near future? In order to answer these questions, this paper aims at studying the main determinants for the demand of apartments in the near future using the statistical method, analysing collected sales data. A total of 4,460 validated sale transactions of inner-city apartments in Auckland have been analysed in this study. A key finding of the study is that the number of international students and the net migration of residents are two factors that have an immediate impact on the sales of apartment in the Auckland's inner city. The main demand for apartments, especially those with an internal floor area of less than 50 square meters, are from the international students who would mainly rent the apartments, fuelling investor demands in turn. A consistent policy for overseas students to accommodate demand for apartments is thus an important ingredient in stabilising prices of apartment in Auckland.

Keywords: Apartment Price, international students, migrations, Auckland

Introcution

More and more people are realising that properties are not only for family's shelter, but can form one of many investments for the hedging of global inflation. Apartments in the Auckland's inner city are popular for many investors because of its location in the central business district with convenience transportation and reasonable rental returns. There are also two university campuses, the Auckland University (AU) and the Auckland University of Technology (AUT) inside the Auckland Central Business District (CBD). It was only in 2001 that the demand for apartments increased dramatically with the construction of many smaller apartments units in the Auckland CBD. However, the demand for such apartments started to decrease from the beginning of 2003 until late 2007. Exhibit 1 depicts the number of transactions of apartments in the Auckland Central City. It shows that the total sales of city apartments increased from 2001 and peaked in 2003. The demand for apartments of smaller sizes, especially the apartments less than 50 square meters, has changed greatly over the years from 1999 until the present. What are causes of such changes? What are the main determinants for the demand changes during this period? Are Auckland CBD apartments worth investing in the near future?

Exhibit 1 No. of Transactions of Apartment in Auckland City Centre (Source: Quotable Value NZ)



This main objective of this research is to study the main determinants of demand for apartments in the Auckland's CBD. In order to achieve the objective, a total of 4460 qualified (in the sense that the transactions are objectively genuine) sale

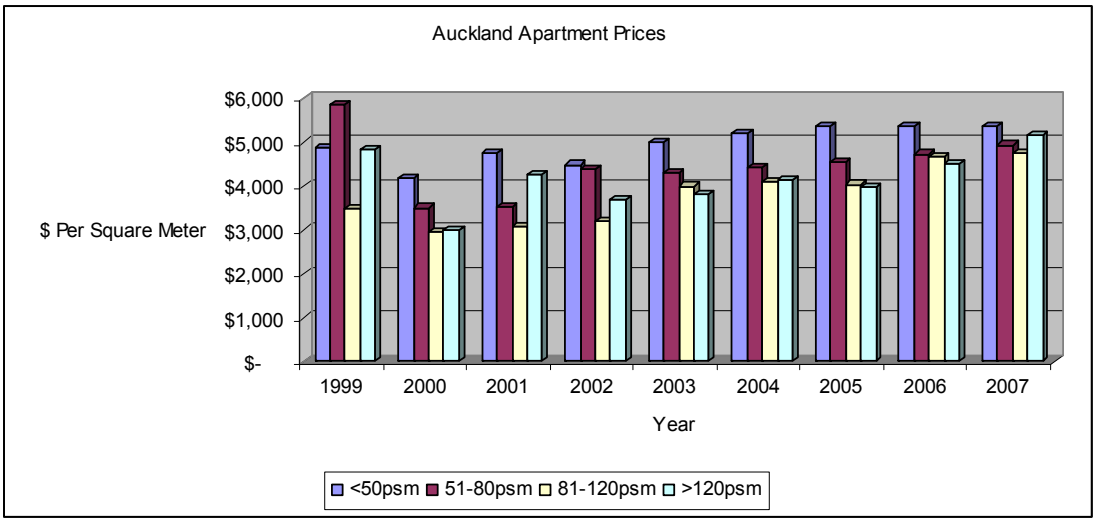
transactions were collected for the period of 1999 to 2007 from Quotable Value NZ and analysed using statistical methods. The research provides an overall picture of market background for the apartment transactions in the central Auckland. The paper then reviews literature of demand determinations and by quantitative analysis using SPSS, the paper derives the main determinants of demand for these apartments. The findings are studied to form a conclusion at the end of this study.

MARKET BACKGROUND

Apartments in Auckland's CBD have been categorized by sizes into four groups, namely: those less than 50 square meters, those between 51 to 80 square meters, those between 81 to 120 square meters and those more than 120 square meters.

Most apartments are located in the Queen Street, Albert Street, Symonds Street, Hobson Street and Neilson Street in the city centre. The average prices of the apartments are around $3,500 per square meter in the year 2000 and around $5,000 per square meter in the year 2007 as shown in the Exhibit 2. Though the number of transactions for all types of apartments shows a decreasing trend over time, the price per square meter generally shows an upward trend for the period of year 2000 to 2007 apart from some minor discrepancies.

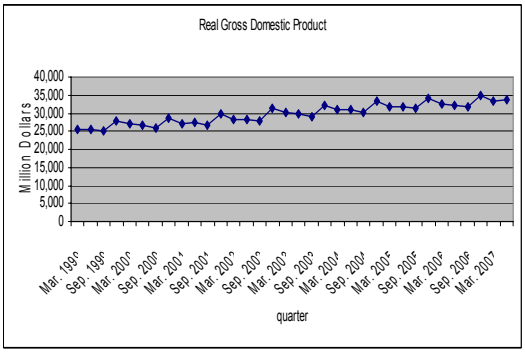
Exhibit 2 Auckland Apartment Prices (Source: Quotable Value NZ)



During the period, the economy has grown and residential dwelling prices (all categories including apartments, houses and townhouses) has increased rapidly as

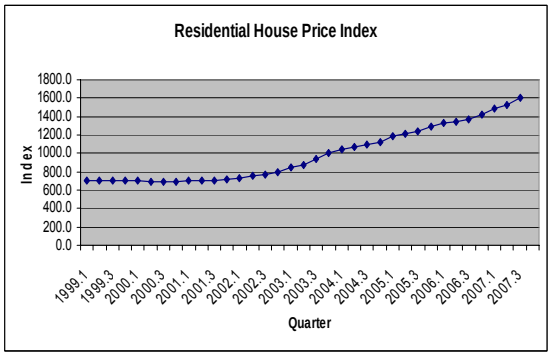
shown in Exhibit 3 and 4. The cost of investment is comparatively low at under 7% in 1999 and this has increased to above 10% in 2007 (Exhibit 5). Government policies had encouraged many foreign students and immigrants during the years, especially in the period 2003 to 2005.

Exhibit 3 GDP NZ



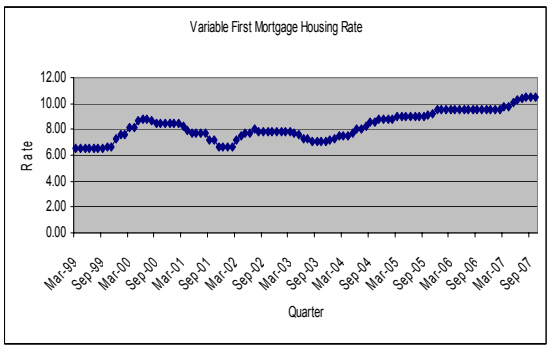
(Source: Statistics NZ)

Exhibit 4 House Price Index



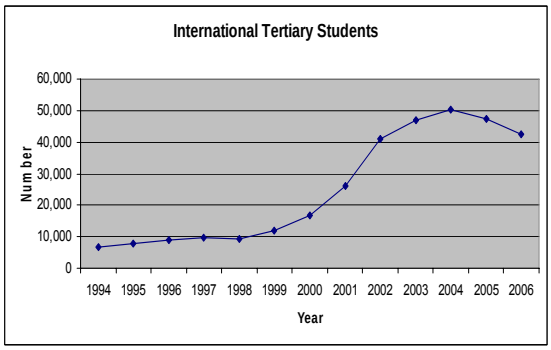
(Source: Quotable Value NZ)

Exhibit 5 Mortgage Rate



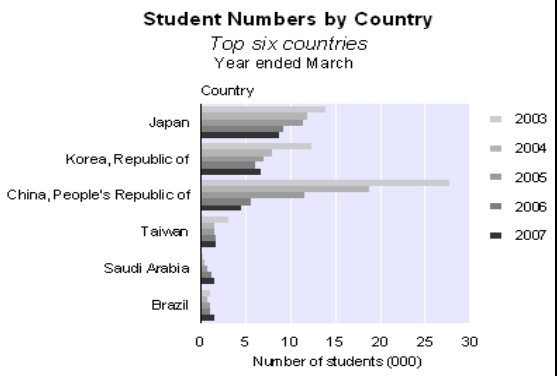
(Source: RBNZ)

Exhibit 6 International Students



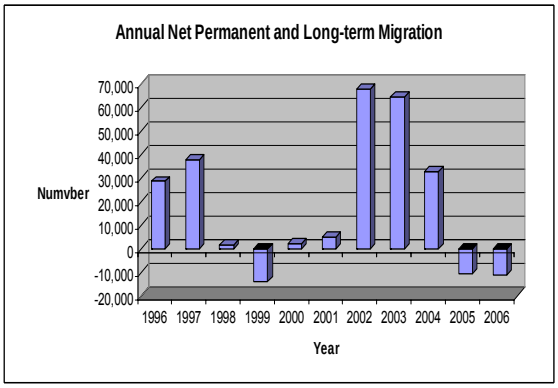
(Source: Ministry of Education, NZ)

Exhibit 7 Student numbers by country



(source: statistics NZ)

Exhibit 8 Migration in NZ



(Source: Statistic NZ)

The number of international students has increased rapidly and Exhibit 6 shows that the number of International Tertiary Students allowed to study in New Zealand since 1999 has increased from around 10,000 in 1999 to 50,000 in 2004. The number of students has since declined due to the high New Zealand dollar and revised government policy. The number of students studying in New Zealand is shown by country of origin the Exhibit 7. The number of migrants indicates a similar trend as the number of students (Exhibit 8).

REVIEW OF LITERATURE

Demand is the relationship between prices and the quantity of goods consumers buy. The law of demand says that the as the price falls, the quantity demanded goes up, and as the price rises, the quantity demanded goes down (Henderson, 2002). The effective housing demand is the amount of housing for which the population is willing and able to pay. The effective housing demand for private housing is volatile and has been affected in the past by the market supply and market allocation mechanism. House prices, household incomes, and demographic characteristics such as age, race, household size, and marital status are frequently cited determinants of the housing demand decision (Megbolugbe and Chao, 1993).

Potential buyers have been divided into two subgroups: residents who buy and sell houses for personal use, and speculators and property developers who make money by selling and buying property (Roehner, 1999). Individuals view housing not merely as a consumption good, but as an investment good to hold in their portfolios (Case and Shiller, 1988; Dusansky and Wilson, 1993). Lin and Lin (1999) held a similar view, that buying a house usually satisfies housing consumption and housing investment demands simultaneously. Uncertainty and expectations play a crucial role in housing demand models, as expectations of future prices influence current consumption, including housing choice and future consumption.

Most literature has demonstrated that demographic factors are statistically significant, contributing to the development of housing prices in their econometric model mainly in the long term (Anas and Eum, 1984; Goodman, 1990; Haurin and Gill, 1987; Ho and Ganesan, 1998; Meen, 1995; Rosen, 1979; Turner and Struyk, 1984). Manning (1989) and Potepan (1994) have each considered the role of

population growth. Potepan (1994) suggests that a higher level of current population growth tends to raise current housing prices through the expectation that higher future population levels will cause higher future housing, and that migration influences housing price and vice versa. Migration is the primary source of variation in population growth (Potepan, 1994) between areas. Residents' choice to migrate from one city to another depends on the employment, income and political and social environments. Dieleman *et al*. (2000) have demonstrated that population growth and employment growth seem to create differences in the rate of turnover and the differences in price levers. Woodward (1991) argues that fluctuations in the demographic profile should have little influence on prices. Omar and Ruddock (2002) suggested that the distribution of population in a country is largely influenced by economic development. The development of the economy encourages population concentration in urban areas, as the economy becomes industrialised.

Many researchers claim that income is an important determinant of housing demand. Dieleman *et al*. (2000) pointed out that the major determinants of variation in house prices are household income and the tenure structure of the local market. An expected rise in income will increase the aspiration of home owning and the incentive of investing in property, and housing demand increases, as does housing price. Holly and Jones (1997) suggested that the single most important determinant of real house prices is real income. Household incomes may affect house prices for two main reasons, independently of the relationship between household income and house size (Abelson, 1997).

Much debate has taken place about whether it is the cost or the availability of credit that determines the effective demand for housing in the short term. Credit constraints in the form of down payment requirements significantly affect housing consumption for many buyers. Bank loans are usually required by most households to finance their purchases. The credit or financial market typically cannot lend on the basis of the borrower's expected future income prospects. Therefore, current income and current financial assets then become important indicators of a borrower's means of repaying a loan. The availability of housing loans and government subsidies will influence consumers' choice of whether or not to buy a

home (Omar and Ruddock, 2002). The demand for housing also depends on the mortgage rates and the general level of consumer confidence (Tutor2u, 2003). Housing demand is therefore determined by consumer tastes, incomes, consumer expectations, demography, and the prices of related goods.

DEMAND DETERMINANTS OF APARTMENTS IN CENTRAL AUCKLAND

This section studies demand determinants of apartments in the central Auckland. According to the literature, the determinants of quantity demand for housing can be summarised as demographic factors, housing-related elements, and macroeconomic variables. Thus, the demand equation can be denoted as follows:

$Q_d = f(G, H, D, t)$ ($t = 1, 2, 3, \ldots n$) (1)

$G = g(x_1, x_i, \ldots x_m, t)$ ($i = 1, 2, 3, \ldots m$) (2)

$H = h(y_1, y_i, \ldots y_m, t)$ (3)

$D = d(z_1, z_i, \ldots z_m, t)$ (4)

therefore, $Q_d = f(x_i, y_i, z_i, t)$ (5)

where

Q_d = aggregated quantity demand for new housing during period t

G = macroeconomic variables

H = apartment-related variables

D = demographic variables

x_i = macroeconomic variables such as interest rates

y_i = apartment-related variables such as returns on rent

z_i = demographic variables such as migrations and number of international students.

By using the multiple regression equation, the demand for apartments becomes

$$Q_d = \partial_0 + \partial_1 P_t + \partial_2 x_t + \partial_3 y_t + \partial_4 z_{1t} + \partial_5 z_{2t} + \varepsilon_t \quad (6)$$

Q_d is the dependent variable and ε_t is the disturbance term. $\partial_1, \ldots \partial_5$ are the regression coefficients (Exhibit 9).

Exhibit 9 The Regression Coefficients

Coefficients	Description
∂_0	constant term of the model
∂_1	price elasticity of demand for apartments
∂_2	coefficient of the real mortgage rate
∂_3	coefficient of the return on rent
∂_4	coefficient of the international students
∂_5	coefficient of the migration

In the coefficients, ∂_1 is the demand elasticity of the apartments. Price elasticity of demand is the percentage change in the quantity of apartment demanded, divided by the percentage change in the price causing the change in quantity. Price elasticity of demand indicates the degree of response to variations in price (Gwartney et al., 2000).

The expected sign of the coefficient ∂_1 is negative, because a rise in apartment price dampens the quantity demanded of apartments. Similarly, a rise in real mortgage rate increases the relative cost for an intended homeowner, and thus ∂_2 should be negative as well. The parameter for return on rent (∂_3) is expected to be positive, as it relates to a household's investment decision. A positive sign is expected for ∂_4 and ∂_5 as there are direct pressures on demand for apartments with growth of the international students and migrations.

Data Analysis

The total of 4460 sale transactions is collected from the Quotable Value NZ for the period of 1999 to 2007 in Auckland's CBD, covering nine streets therein where apartments are present. Exhibit 10 shows the numbers of sales of different types in each street during the period. The more sales are, the higher the demand is in the market. Thus, the numbers of sale transactions are used as proxy for the demand as a dependent variable in the analysis.

Exhibit 10 Data Collection

Street	Albert	Queen	Shortland	Fanshawe	Victoria	Anzac	Symonds	Neilson	Hobson	Sum
under 50m2	161	709	0	16	5	175	381	724	810	2981
51 to 80m2	144	57	12	30	54	158	148	156	322	1081
81 to 120m2	33	19	8	0	7	31	12	22	117	249
over 120m2	47	19	0	0	0	3	0	19	61	149
Sum	385	804	20	46	66	367	541	921	1310	4460

Yearly time series independent variables were collected from department of statistics and Reserve Bank New Zealand which is depicted in Exhibit 11.

Exhibit 11 Source of Independent Variables

Independent variable	Symbol	Measurement	Source
Apartment Price	Price(size)	per square meter	Quotable Value NZ
Mortgage Rate	MR	percentage	RBNZ
Migration Arrival	I_arrivals	number	Statistic NZ
Migration Departure	I_departu	number	Statistic NZ
Net Migration	I_net_mig	number	Statistic NZ
International Student	Intl_stude	number	Statistic NZ
Rent Return	Return(size)	percentage	Quotable Value NZ

All data have been analysed and checked for stationary as well as correlations. The results suggest that sale transactions of apartments are strongly correlated to the incoming international students in Auckland and migrations, as well as some of the prices and rent returns. Exhibit 12 and Exhibit 13 show the Pearson Correlation by apartment sizes and by streets.

Exhibit 12 Pearson Correlation by Apartment Sizes

	all50lowno	a5180_no	a81120_no	a120m_no	all_no
Intl_stude	.897**	.912**	.882**	.915**	.941**
I_arrivals	.925**	.768*	.751*	.861*	.922**
I_departu	-.725*	-.289	-.333	-.365	-.633
I_net_mig	.938**	.676*	.677*	.771*	.905**
return5180	0.578	.830**	.793*	.687*	.674*
price50less	0.627	.746*	.751*	0.304	.682*
price_81120	0.641	.767*	.785*	0.293	.698*

Exhibit 13 Pearson Correlation by Streets

	Hobso5180	Hobs81120	Hob120mo	Anzac5180	Neilson_no	queen_no
Intl_stude	.885**	.793*	.785*	0.495	0.519	.927**
I_arrivals	.808**	.725*	.732*	0.259	0.656	.905**
I_net_mig	.708*	.722*	.685*	0.127	.706*	.892**
return5180	.800**	0.561	0.462	0.41	0.199	.683*

Regression Models

The analysed data have been used to derive regression models applying SPSS and to test the demand for apartments by size of the apartments and by streets. The key statistical criteria for testing the significance of the models are F-statistics, R square, adjusted R and Durbin-Watson test. The regression results show the Model_5 is the best model of all, which are exhibited in the Exhibit 14.

Exhibit 14 Regression Results by Size of Apartments

Models	Dependent		Constant	Intl_stude	I_net_mig	price_81120	F-test	R square	Adj. R	DW	Sig.
Model_1	all_no	Coefficient	-332.47	.023			53.916	0.885	0.869	2.197	.000
		t-test	-2.763	7.343							
		Sig.	.028	.000							
Model_2	a120m_no	Coefficient	13.677	0.001		-.005	97.00	0.970	0.960	1.831	.000
		t-test	4.382	13.299		-5.141					
		Sig.	.005	.000		.002					
Model_3	a81120_no	Coefficient	-10.349	.001			24.64	0.779	0.747	2.033	.002
		t-test	-1.267	4.964							
		Sig.	.246	.002							
Model_4	a5180_no	Coefficient	-60.165	.005			34.777	0.832	0.809	1.332	.001
		t-test	-1.844	5.897							
		Sig.	.108	.001							
Model_5	all50lowno	Coefficient	192.584		.013		51.136	0.880	0.862	2.118	.000
		t-test	5.126		7.151						
		Sig.	.001		.000						
Model_6	queen_no	Coefficient	-62.213	.004			42.58	0.859	0.839	2.031	.000
		t-test	-2.699	6.525							
		Sig.	.031	.000							

The dependent variable of Model_1 is the total number of sale transactions for apartments in the Auckland central city for the period of 1999 to 2007. Independent variable, International students, was derived as the main determinant for the

demand of apartments. The F-test is 53.92 and Durbin-Watson test is 2.197. The model explained 88.5 percent of the variable in the regression. It indicated that for every 1000 incoming international students will result of 23 sales of apartments in the Auckland central city.

In the Model_2, apartment size greater than 120 square meters was used as the dependent variable. The Model was derived by the number of international students and sale price per square meter for the apartments sized 81 to 120 square meters. 97 percent of the variables in the regression were explained by the model. The model indicated that one sale will occur for increasing 1000 international students for the apartment size greater than 120 square meters. However, it is interested to see the negative correlation between the sale of apartment size above 120 square meters and the price of apartments sized between 81 to 120 square meters. Further study is required to find out the reasons. Model_3 and Model_4 are statistically insignificant.

The dependent variable of Model_5 is the number of transactions of all apartments less than 50 square meters. The Model_5 was derived by the number of net migrations. The model explained 88 percent of the variable in the regression and all criteria showed statistically significant. For every 1000 net migrations will result of 13 new sales for the apartments less than 50 square meters in the central of Auckland city.

In the Model_6, dependent variable is the transactions of Queen Street apartments less than 50 square meters. The model_6 was derived by international students. The model was statistically significant, which explained 86 percent of the variable in the regression. The result of F-test is 42.58 and the adjusted R is .839. The DW value is 2.031. For every increase of 1000 international students, there are 4 sales in the Queen Street apartments.

RESEARCH ANALYSIS

The regression models of demand for apartments were developed and the models were derived from demographic variables, macro-variables and apartment related

variables, which included apartment data from 1999 to 2007 located in the central city of Auckland. Two models were found statistically significant. The models are

Model_2: a120m_no =13.677 + .001 Intel_stude - .005price_81120 (R^2 =.97, DW=1.831)
Model_5: All50lowno = 192.584 + .013 Intel_stude (R^2 = .88, DW = 2.118)

The models demonstrate that demand for apartments was determined mainly by the number of international students, in particular of small size of apartments. The results also imply that the large size apartments are less influenced by the number of international students and migrations.

Most apartments in the central Auckland are small units under 50 square meters. During the period of 1999 to 2007, in particular for the years of 2001 to 2004, unit prices were rising sharply because of escalations in construction costs and higher demands. At that moment, a studio apartment costing $125,000 would rent for $250 a week and provide a net return of 7.4 per cent after management fees (API, 2005). Properties attracted local investors as well as overseas investors because of the exchange rate for the NZ dollar was near record lows in 2001 and 2002. However, the rental returns and prices are in a declining mode since 2005. The arguments that the small units carry the promise of high returns would not be sustainable because many units were built and unit sizes were too small, limiting its market for sales. Currently, there are 1,230 new apartments under construction and these are scheduled to be completed between 2008 and 2013 (Bayleys, 2008). A higher mortgage rate regime now in place also adds an extra pressure on the apartment prices.

On the other hand, New Zealand government has a fairly loose policy to attract migration and international students into the country. Most migrants and students coming into New Zealand settle in Auckland. There are two universities and a large number of English language education institutes in the Auckland central city. Students can access easily to universities and schools, shops and other places if they live in Auckland's CBD. Demands for the small units therefore were high, pushing up the apartment prices and sale transactions. Since 2005, the number of

international students has decreased and the net migration is negative and together with the strong New Zealand currency, the demand for apartments in Auckland's CBD drops.

FINDINGS AND IMPLICATIONS

A lot of thought has already been given into the planning of Auckland's CBD to take the City of Sails into a 'World Class City' by the year 2014 – six years from today (Auckland City Council, 2004). The objectives of the Council are to see Auckland becoming, inter alia, the following:

- One of the world's premier business locations;
- A high quality urban environment;
- The most popular destination for Aucklanders and visitors in the region;
- A world-class centre for education, research and development;
- A place that feels like the heart and expresses the soul of Auckland.

The resident population of Auckland's CBD is expected to increase from 16,740 in June 2003 to 26,470 by the year 2013 (Auckland City Council, 2004). "People choose to live in the CBD to be close to work and entertainment and because transport costs are lower. The CBD's population is significantly different from the population of the rest of the city and the Auckland region. It is younger, with high concentrations of people in the 15 to24 and 25 to 44 age groups. 27 per cent of residents are students." (Auckland City Council, 2004). The current stock of apartments in Auckland's CBD has been estimated at 17,537 units, comprising 76% as residential apartments, 15% as serviced apartments and 9% as dedicated student accommodation (Bayleys, 2008). Using a rough count of 2 persons per unit, the population now (in March 2008) at over 34,000 already exceeds the Council's 2004 estimate of 26,470 for the year 2013.

The demand determinants of apartments in Auckland's CBD studied here have the following key results:

- every 1,000 incoming international students produce a sale of 23 apartment units – Model 1 (all four types of apartment sizes);

- every 1,000 incoming international students produce a sale of 13 apartment units – Model 5 (apartment size less than 50m2); and
- every 1,000 incoming international students produce a sale of 4 apartment units – Model 6 (apartments in the Queen Street location where Auckland University of Technology – AUT and most Language Schools are situated).

The implications from this study are, inter alia, as follows:

- with the downward trend of the number of international students coming into Auckland, the price per square metre of apartments less than 50 square metre will drop in the foreseeable future, especially when the banking institutions have reduced the loan amount for such apartment units to 50% of the sale price as compared to the loan amount of between 80% and 95% for larger units.
- The number of international students coming into Auckland has insignificant bearing to the sale of apartment units larger than 50 square metres. This indicates that such larger units may well be the homes of workers choosing to work and live within Auckland's CBD or the holiday homes of foreign (including out-of-Auckland) tourists wanting a place to stay when visiting Auckland. The value per square metre for these apartments may well stay firm in the foreseeable future, wearing the current storm of negative media releases on the New Zealand economy in general and the Auckland property market in particular.
- For the Queen Street location, the number of international students is significant and the key reason for this may well be the easy reach to public transportation (Central Railway Station at Downtown Auckland and all bus route terminals at Customs Street).

The recent trade agreement signed between the Peoples Republic of China and New Zealand has promised to herald another wave of Chinese investors coming into Auckland, especially within the Auckland's CBD area but this is still early days yet. Suffice it to say that already the tourism industry in New Zealand has seen an increase of tourists from the Peoples Republic of China in recent months.

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