Geographical Area and Economic Behavior of Potential Buyers for Condominium Units along Mass Rapid Transit Lines: the Case of Bangkok (2004 – 2008)

by

SONTHYA VANICHVATANA

Ph.D (Civil Eng.), M.S.C.E., B.Arch
Associate Architect, MRICS

ASSUMPTION UNIVERSITY,
Department of Real Estate, School of Management,
Ramkhamhaeng Soi 24,
Bangkok 10240, THAILAND

Email: www.sonthyaVnt@au.edu
Telephone: 66-0-2300-4543 (ext. 1125)
Mobile: 66-8-1612-2655
Fax: 66-0-2719-1962

Geographical Area and Economic Behavior of Potential Buyers for Condominium Units along Mass Rapid Transit Lines: the Case of Bangkok (2004 – 2008)

Sonthya Vanichvatana[1]

[1] Department of Real Estate, School of Management,
Assumption University, Bangkok, Thailand

Corresponding author: sonthyaVnt@au.edu

ABSTRACT

Condominium development is viewed as high risk, due to the fact that it requires precise project strategy to target specific groups of clients. As, the main purpose of the project strategy is to identify potential buyers, such strategy is then used to guide the design for proper product configurations to match the potential buyers. Once the condominium project is launched and the construction is in progress, any changes in the product design will be almost impossible, difficult and/or very costly. This is unlike low-rise housing development which each housing unit is built independently. In addition, potential buyers, for a particular product type, can come from different geographical areas and have different behaviors. Also that, the recent study (Vanichvatana 2008) has found that potential buyers, for a Condominium unit along the Mass Rapid Transit lines in Bangkok (C-MRT), come from different geographical areas in Thailand: (1) ten Bangkok districts which the mass rapid transit lines are located, (2) other forty districts in Bangkok, (3) five provincial metropolitan areas, and (4) other provinces outside Bangkok Metropolitan Areas (BMA).

The aim of this research is to understand the economic behaviors of the potential buyers for C-MRT who come from different geographical areas in Thailand. The study is based on the database of registered visitors to the House and Condo Shows number 12th through 18th exhibited in Bangkok during November 2004 and March 2008.

The analysis is of five economic behavioral variables: career, types of house live in, type of occupancy, budget for C-MRT, and income level. The results show that the economic behaviors of potential buyers who were from within Bangkok are quite different from those from other provinces, including from the five metropolitan provinces. The analysis results show that there is a strong correlation between budget and income level in every geographical area. However, the results from the regression analysis shows that in order to foresee the budget level, only the data from those who live in Bangkok can be more meaningful.

The results will be benefit to condominium developers to be well aware of diverse behaviors and economics of potential clients who are from different geographies.

Keywords: economic behaviors, condominium, geographical area, mass rapid transit

INTRODUCTION

Demand for housing in every city has steadily increased yet land supply is constrained. As such, city condominiums have been a popular type of housing development in many major cities worldwide, including Bangkok[1]. The risk of condominium development is in the ability to accurately assess needs of the market area. By definition, the meaning of "market area" is a geographic zone containing the people who are likely to purchase a firm's goods or services.[2] Also "market area" is the geographical region from which the majority of demand and the majority of competitors are drawn.[3]

As real estate products or buildings are permanently affixed to land, cconsumers come to the buy the buildings at any specific locations rather than the buildings is delivered to the consumers. Because of this, there can be no physical market-place. This spatial fixity means that market adjustment must occur by people moving to dwelling units, rather than the movement of the goods.[4] Vanichvatana (2008) found that potential buyers for condominium units along the mass rapid transit lines in Bangkok (C-MRT) come from different geographical areas: (1) ten Bangkok districts which the mass rapid transit lines are located, (2) other forty Bangkok districts, (3) five provincial metropolitan areas, and (4) other provinces outside Bangkok Metropolitan Areas (BMA). Such finding acknowledges the understanding about the potential demand for C-MRT. It is in conflict with the findings about the demand behaviors for condominium in Bangkok Metropolitan Area (BMA) (REIC, 2008) that the Thais are attached to their family and/or original areas. The supporting reasons are about transportation (42%), convenience to travel to child school and relatives (22%), and familiar to the area (13%).

Further than the understanding about the sources of demand, in terms of the location where potential buyers come from, for C-MRT, it is necessary to understand the economic behaviors of such potential buyers from each geographical area.

Research Objectives
The objectives of this research are as follows:

---

[1] Marr, Garry (2008) *Condos Standard Housing Stock*
http://www.househunting.ca/condos/story.html?id=e3eb4755-8182-4e10-a9d0-bc60de1e61a4 [viewed 8 August, 2008],
   Schaffel, Larry (2005) Coaklays Have a Different View of Condo Lifestyle
http://www.lakeshoreeast.com/media/pr/coakleys_5_24_05.html [viewed 8 August, 2008], and
   Anon. (2008) The Condo Spacialist of Madison, WI
http://www.condoshoppe.com/ client_services.shtml [viewed 8 August, 2008].
[2] Wade, Tasha & Sommer, Shelly (2008) *Market Area*
http://en.wikipedia.org/wiki/Market_area [viewed 30 September, 2008].
[3] Sokolov, Denis (2006) Commercial Real Estate Glossary
http://www.dsokolov.com/e107_plugins/ content/content.php?content.13 [viewed 30 September, 2008].
[4] Anon. (2008) Real Estate Economics http://en.wikipedia.org/wiki/Real_estate_economics [viewed 9 October, 2008].

- To find the similarities and differences among the economic behaviors of the potential buyers, whose existing residence are in the four geographical areas, in term of (1) career, (2) existing house live in, (3) type of occupancy of existing residence, (4) budget level, and (5) income level.
- To analyze any correlations among the above five factors from different geographic areas.
- To examine whether budget levels of C-MRT can be predicted based on other economic factors of the potential buyers from different geographic groups.

The results from the first two objectives will support condominium development to set up a precise project strategy that closely matches to the demand. The design for C-MRT will be proper to match to the economic behaviors of potential buyers. The results from the last objective will provide knowledge about the correlations among factors and the prediction power of the budget levels based on other economic factors.

Research Scope
This study focuses on the potential buyers for city condominium unit located along the existing Bangkok mass rapid transit (MRT). The potential buyers were registered visitors to the 12th through the 18th House and Condo Shows[5], organized in Bangkok during November, 2004 and March, 2008.

The expected results of this paper:
    Applications of the results
- To get the picture about the economic behaviors of potential buyers from different geographical areas. This knowledge can support the real estate developers and investors in order to plan for proper business and project strategy which can later be used to direct proper product design, and
- To understand the characteristics of budget levels for C-MRT of potential buyers from different geographical areas. This information can provide the size of potential demand for C-MRT in different budget levels. Real Estate developers and investors, governmental staffs, and financial officers can use the information for related future planning.
- As the information about economic behaviors and budget levels of potential buyers from each geographical area is realized, developers can be more pro-active in marketing strategies, i.e. to select the right strategy to use at the right place for the right target group. That is to select the proper marketing and advertising approach and media to use at the geographical area that have potential to buy the planned product price level, instead of using expensive mass media.

BACKGROUND REVIEW

City Condominium Pros and Cons
Condominium has more privilege than other type of residential product in the city. This is because condominiums allows easy affordability for owning at convenient locations to the work place, close to children's schools, close to facilities, reduce

---

[5] The House and Condo Shows have been organized by the three main real estate associations in Thailand including: (1) the Thai Real Estate Association, (2) the Thai Housing Association, and (3) the Thai Condominium Association

transportation time and transportation cost. About the transportation cost, the recent research about Bangkok condos found that the increasing number of potential buyers has significant relationship to oil price (Vanichvatana, 2008).

Inner city high cost land, developers can build many more condo units than for single family homes on the same amount of land. In some areas, a condominium may be the only consideration that fits within a certain budget. The reason is simple. In general, the same square meter will cost less in a condo setting than it will in a single family home or townhouse, due mainly to the cost of land.[6]

City condominium typically provides many benefits including: (1) Safety (24-hour security, key-card, closed-circuit television), (2) Amenities (commonly includes swimming pools, fitness room, sport areas, and etc), and (3) Eliminates exterior house chores (gardening, exterior maintenances and repairs).

In contrast, the occupants of city condominium, which is one type of multifamily housing, have to trade with the following exchanges: (1) Monthly condo fees, (2) Less privacy, (3) More noises, cooking smells in hallways, etc, and (4) Less opportunity to make any adjustment of the outer wall of the condominium unit. The last drawback is because condominium owners only have legal rights from their interior walls inward. The rest of the structure and the land are owned in common with the other condominium owners.

Potential Buyers for City Condominium along MRT in Bangkok
Malizia (1991) stated about two decades ago that forecasting metro-level real estate demand suffers more from inadequate theory than from inadequate data. However, this statement is still true especially for City Condo along MRT in Bangkok.

Although it is has been belief and supported by research that the Thais are attached to their family and/or original areas (RICS 2008), as discussed earlier, the recent research found that potential buyers for C-MRT come from geographical areas other than the ten districts that the MRT located (Vanichvatana 2008). There were four geographical areas where the existing residence of those potential buyers located: (1) 10 Bangkok districts of C-MRT locations (Bkk_MRT), (2) other peripheral Bangkok districts (Bkk_Other), (3) 5 provinces in metropolitan areas (5_Metro), and (4) outside Bangkok Metropolitan Areas (BMA) (Outside_BMA).

In Figure 1, the percentages of the registered visitors of all seven shows (the shows number 12th through the show number 18th) are in the similar proportion except for the show #12. The percentages of C-MRT, in contrary, were in a very different proportion from the percentages of overall visitors to the shows. In that, the percentages of C-MRT who is from: (a) Bkk_MRT (10 districts that located along the MRT) is a bit higer (about 5%), (b) Outside_BMA (provinces outside Bangkok Metropolitan Areas) is a lot larger (about 10%), approximately double of the average number, (c) 5_Metro (five provinces metropolitan areas) is a bit lesser (about 2%), and (d) Bkk_Other (other 40 districts in Bangkok) is a lot lesser (about 7%).

6
  Anon (2008) Condominiums: The Basics Pro's and Con's of Condominium Ownership
http://real-estate-agents.com/tips/buying-house/condominiums.shtml [viewed 8 August, 2008].

Comparison of the Percentage of C-MRT with All Visitors in Each Geographical Area
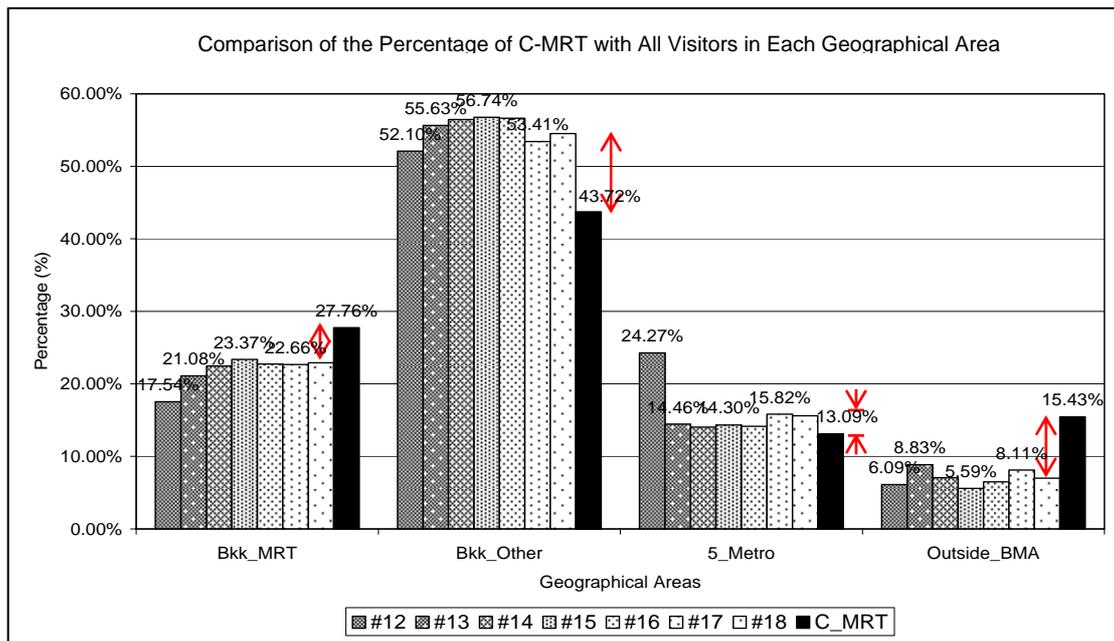
Figure 1: Comparison the Percentages for C-MRT with
the Percentages of All Visitors Registered to the Seven House and Condo Shows
(Show Number 12th through 18th), Comparing In Each Geographical Area

The above findings are in contrast to the surveyed data identified that in Q1-2008, there were 7,763 condo units supplied in 50 districts in Bangkok. Out of this number, there were 1,140 units located in the ten districts along MRT and the other 6,623 units located in the other forty districts (adapted from CB Richard Ellis, 2008). That is, there were a lot of, even more, choices of condominium development outside Bkk_MRT area. But there were many potential buyers who came from geographical areas outside Bkk_MRT. Although the data used are the number of potential buyers which might not equivalent to the number of demand, these finding enlightens about the existing locations, in term of the geographical areas, of the potential buyer/demand and the size from each area for condominium along the mass rapid transit lines in Bangkok.

This finding adds on to the objectives of this paper. As potential buyers for C-MRT can come from various geographical areas, it is very interesting to analyze economic behaviors of those who come from different existing locations with the same preference for housing type.

Housing Demand Determinants
Past researchers studied housing demand parameters covering in many directions including: economic characteristics of the demand, attributes of the product and environment, and attributes of location. Research works towards the economics literature on housing demand and residential mobility identified some of the important factors include: income, budget, career, and citizenship (Megbolugbe et al 1991, Bradley 2007). Research works towards the product and environment identified some of the important factors include: housing quality (functionality), type of amenities, spacious environment (accessibility and pleasantness), and neighbourhood factors

(Kauko 2006, Rappaport 2008). Scheiner and Holz (2007) stated about life style and life situation but they mentioned the importance of special condition and location attributes.

METHODOLOGY AND DATA

Table 1: The Summary of Variables Used in the Analysis

Abbreviations	Meaning
GeoID	– Four geographical areas of potential buyers for C-MRT: Bkk_MRT = Ten districts in Bangkok which the mass rapid transit in Bangkok are located Bkk_Other = Other fifty districts in Bangkok 5_Metro = Five provincial metropolitan areas including Nonthabury, Pathumthani, Nakornpathom, Samutprakarn, and Samutsakorn Outside_BMA = Other provinces outside Bangkok Metropolitan Areas
CareerID	– Types of career: 1 = Gov-officer (Government officers), 2 = State-enterp (State enterprises), 3 = Entrepreneur, 4 = Manager, and 5 = Employee (Employee of business companies)
HouseLiveInID	– Types of existing house live in: 1 = Own-built-SH (Single detached house built in owned land plot), 2 = Project-SH (Single detached house built in real estate housing project), 3 = Shophouse,[7] 4 = Townhouse, 5 = Condominium, and 6 = Flat/Apartment
OwnerID	– Types of occupancy of the existing residence: 1 = OwnHouse, 2 = Co-Owner, 3 = Parents', 4 = Company's, and 5 = Rent
BudgetID	– Budget level to buy a City Condo unit: 1 = <0.5 MB, 2 = 0.5-1 MB, 3 = 1-1.5 MB, 4 = 1.5-2 MB, 5 = 2-3 MB, 6 = 3-4 MB, 7 = 4-5 MB, 8 = 5-7 MB, and 9 = >7 MB
IncomeID	– Income level of the potential buyer 1 = <10,000 Baht 2 = 10,001-20,000 Baht 3 = 20,001-30,000 Baht 4 = 30,001-50,000 Baht 5 = 50,001-100,000 Baht 6 = >100,001 Baht

C-MRT is the condominium unit along the mass rapid transit lines in Bangkok.

---

[7] A shophouse is a vernacular architectural building type that is both native and unique to urban Southeast Asia. Typically, shophouses consist of shops on the ground floor which open up to a public arcade and which have residential accommodation upstairs. Shophouses are generally low rise buildings having narrow street frontages, but may extend backwards to great depths. Source: Anon (2008) http://en.wikipedia.org/wiki/Shophouse [viewed 20 August, 2008]

DATA
The data is as adopted by Vanichvatana (2008). The data from the House and Condo Shows between #12 and #18 was screened for samples that planned to purchase condominium that located along, at or close to mass rapid transit lines. The screened data are then analyzed in four geographical data sets: Bkk_MRT, Bkk_Other, 5_Metro, and Outside_BMA.

Each of the four geographical data sets contains six essential economic behaviour variables used in the subsequent analysis, as summarized in Table 1.

ANALYSIS
This research was analyzed using the five economic behavioral variables: (1) career type, (2) housing occupancy type, (3) house live in type, (4) budget category for housing, and (5) income level. In order to investigate the samples thoroughly, this research performs three analysis: descriptive, correlation, and regression.

(a) Descriptive Analysis
    a. Career
    There are five types of career options in the show registration including: (1) Government-officer, (2) State enterprise officer, (3) Entrepreneur, (4) Manager, and (5) Corporate employee.
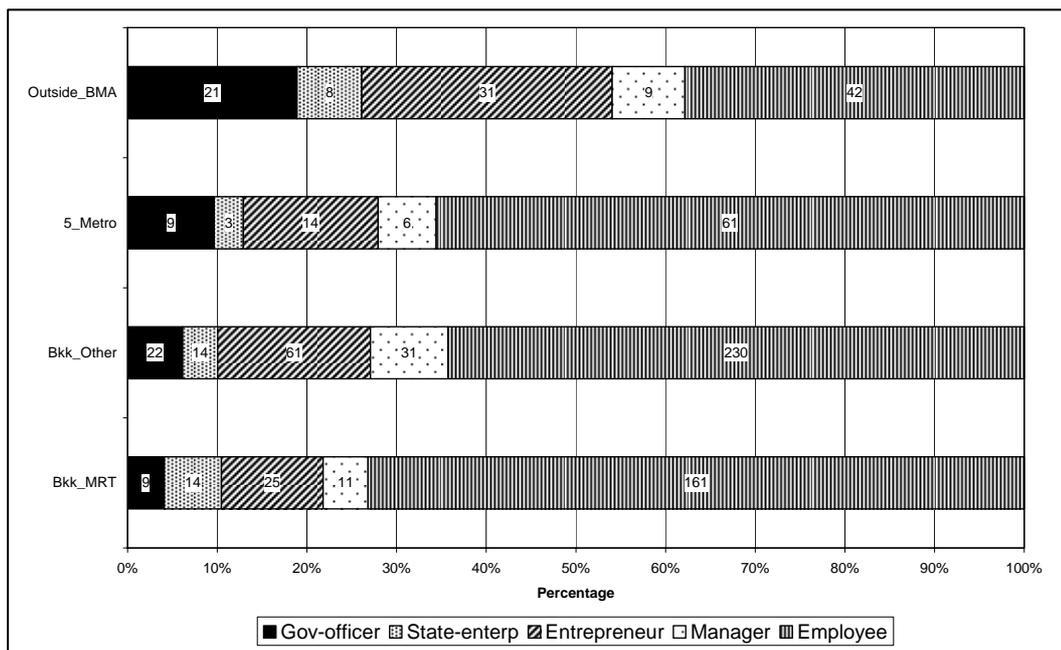
Figure 2: Types of Career of Each Geographical Area, 2004 – 2008
(in percent)

    In Figure 2, the four bars present the proportion of career types in each geography data areas. Majority of Bangkokians are corporate employees, both Bkk_MRT and Bkk_Other. On the other end, Bangkokians work for government and state enterprise the least. On the other hand, people from outside BMA work for government and state enterprise the most and work as corporate employees the least. It is also interesting to see that there are more people from outside BMA who are entrepreneurs than in other areas.

b. <u>Type of House Live In</u>
There are six types of housing options in the show registration including: (1) Single detached house built in own land, (2) Single detached house built in a housing project, (3) Shop-house, (4) Townhouse, (5) Condominium, and (6) Flat or Apartment. Figure 3 illustrates the results
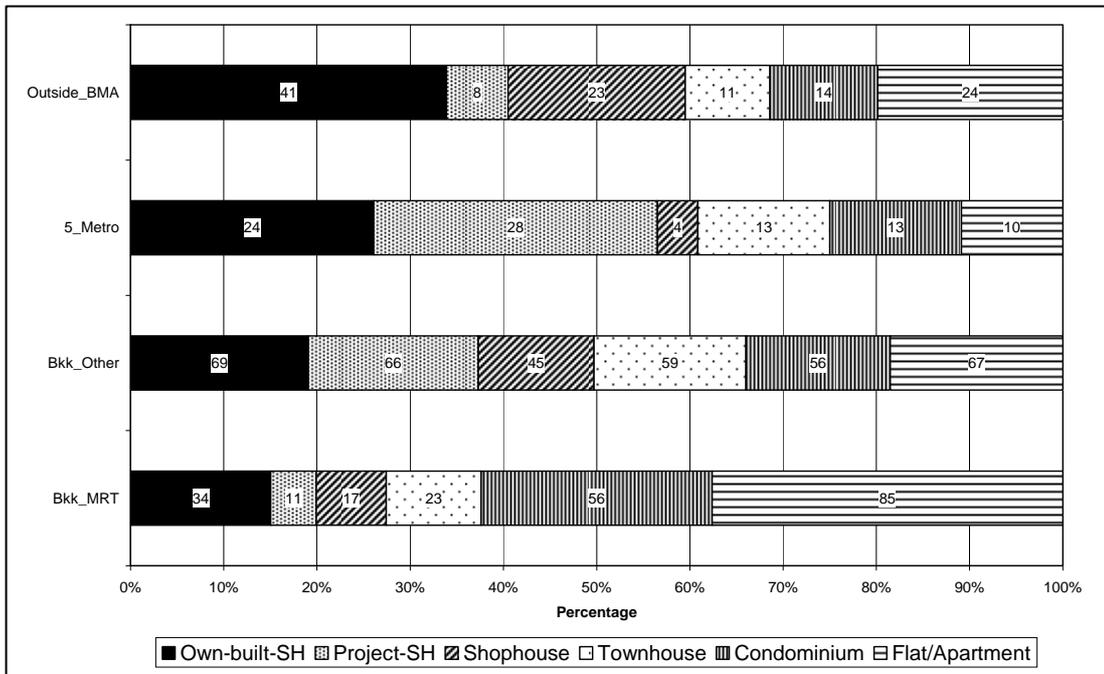
Figure 3: Types of Housing Live In of Each Geographical Area, 2004 – 2008
(in percent)

Bangkok residents, especially those who live in Bkk_MRT, are the most likely to live in highrise residences, condominium and flat/apartment. As opposed: 5_Metro has the lowest proportion, while Bkk_Other and Outside_BMA have about 30% – 35%.

c. <u>Type of Occupancy</u>
There are five types of housing occupancy options in the show registration including: (1) Own-house, (2) Co-Owner, (3) Parent's House, (4) Company's dormitory (residence hall), and (5) Rent.

The results from the analysis of housing occupancy, in Figure 4, correlate with those in Figure 3. The Bkk_MRT has the least possession, as has the most combined proportion of company's dormitory and rent.   The Outside_BMA has the most possession proportion, with 5_Metro comes the second. The other noticeable result is on the proportion of people who lived with parents in each group.   Many condominium development companies noticed the opportunity aim this group as the prime target clients and created marketing strategies to communicate directly to this group.
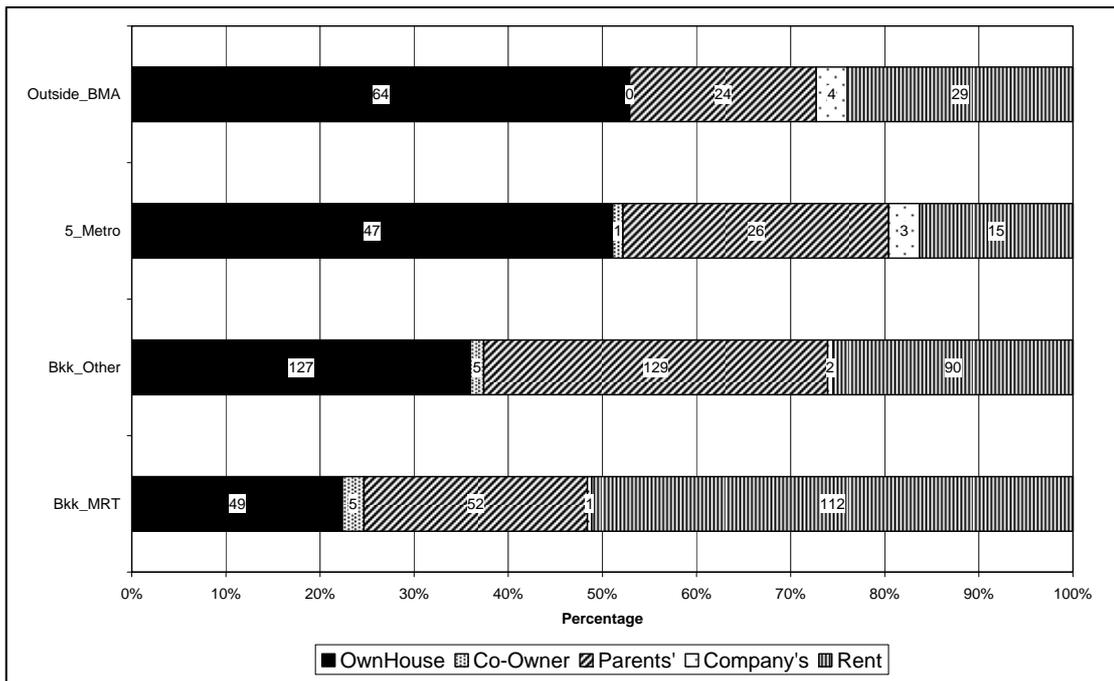
Figure 4: Types of Occupancy of Each Geographical Area, 2004 – 2008
(in percent)

d. Level of Budget
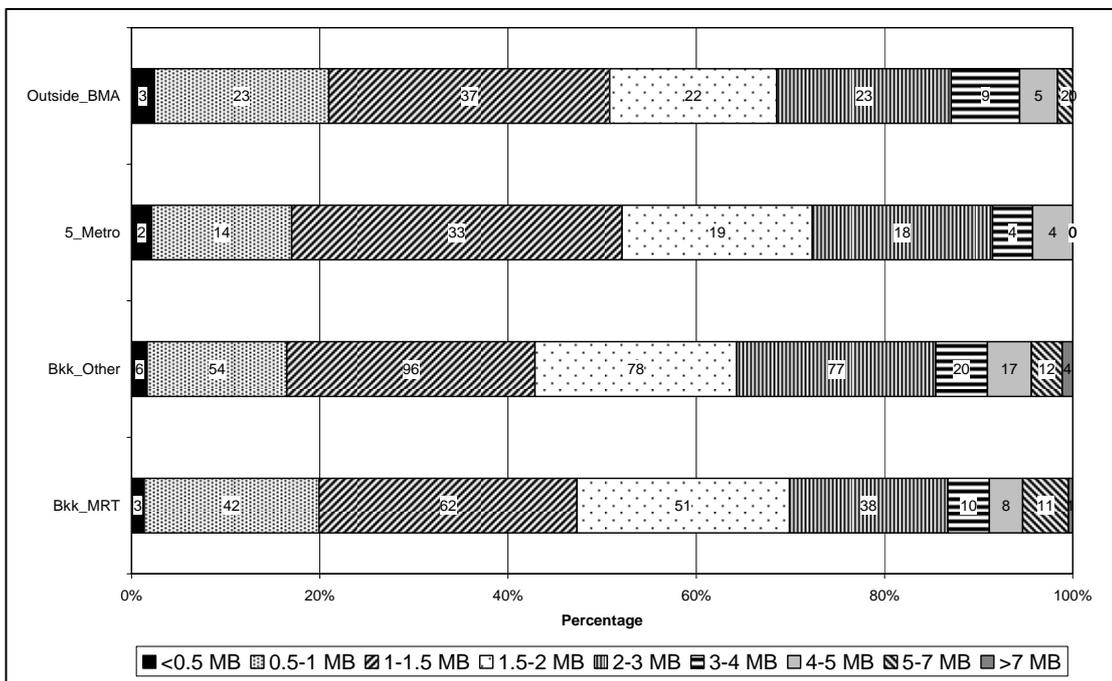
Note: **The exchange rate 1 USD = 34.53 Baht**
           The exchange rate 1 AUD = 24.29 Baht [8]

Figure 5: Levels of Budget of Each Geography Area, 2004 – 2008
(in percent)

---

[8]
  The Bank of Thailand http://www.bot.or.th/Thai/Statistics/FinancialMarkets/ExchangeRate/
ExchangeRate_TH_PDF/ER_PDF_09102551.PDF [viewed 12 October, 2008]

The budget level was asked for the sum of money for buying a unit of condominium. There are nine levels of budget for of C-MRT options in the show registration including: (1) less than 500,000 Baht,
  (2) 500,001 – 1,000,000 Baht,   (3) 1,000,001 – 1,500,000 Baht,
  (4) 1,500,001 – 2,000,000 Baht,   (5) 2,000,001 – 3,000,000 Baht,
  (6) 3,000,001 – 4,000,000 Baht,   (7) 4,000,001 – 5,000,000 Baht,
  (8) 5,000,001 – 7,000,000 Baht, and (9) More than 7 Million Baht.

From Figure 5, the budget of 1 – 1.5 million baht is the most selected budget level in every geographical area. The majority of every group selected the choices of low to medium budgets between 0.5 – 3 million baht.

For the premium products of 5 million Baht and more, the main market is the people who existing live in Bangkok (both Bkk_MRT and Bkk_Other). While, the 5_Metro has the budget only up to 5 million Baht, and the Outside_BMA has the budget up to 7 million Baht.

The Bkk_Other group has more proportion of higher budget level, of more than 2 million baht than any other geographical areas. The 5_Metro group preferred for the lower budget products of 1 to 3 million baht. The Outside_BMA group also preferred the lower budget products, but

e. Level of Income
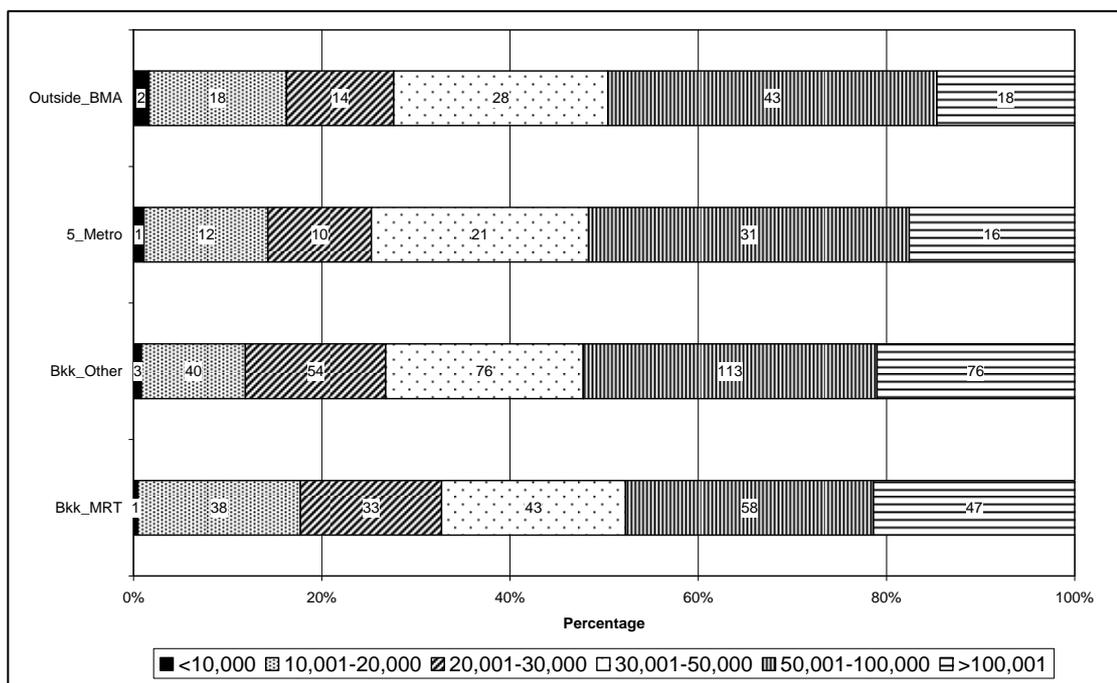
Note: 10,000 Baht per month is approximately equal to USD 290 or AUD 210 per month.

Figure 6: The Levels of Income of Each Geography Area, 2004 – 2008
(in percent)

There are six levels of income (Baht per month) options in the show registration including: (1) less than 10,000, (2) 10,001 – 20,000, (3) 20,001 – 30,000, (4) 30,001 – 50,000, (5) 50,001 – 100,000, and (6) More than 100,000.

The income descriptive analysis results, in Figure 6, both correlate and conflict to the budget for C-MRT results, in Figure 5. For the correlation results, the Bangkok residents, both Bkk_MRT and Bkk_Other, have high proportion of high income of more than 100,000 baht per month. In connection, these two groups has higher budget for premium products than the other two groups (5_Metro and Other_BMA).

For the conflict between the results from Figure 5 and Figure 6, both Bkk_Other and 5_Metro groups have income levels of 50,000 baht and more per month, about 50% of the sampling sizes. However, the 5_Metro prefers less budget level products, less than 1.5 baht, in comparing to the Bkk_Other.

(b) Correlation Analysis

The next analysis step is to test the correlation among the five economic behavior variables of all data samples and in each geographical area. As seen in Appendix, in every test, there are high correlations in two pairs of variables: (1) HouseLiveInID and OwnerID and (2) BudgetID and IncomeID. These correlation analysis results link with the descriptive analysis in the previous part.

(c) Regression Analysis

The regression analysis built models to predict BudgetID for C-MRT. The selection of economic behavior dependent variables is based on the correlation results in the previous part. The predicting of BudgetID will be based on the three variables: CareerID, OccupancyID, and IncomeID. HouseLiveIn is not included as this factor has high correlation values with OccupancyID. Table 2 shows the test results on all sampling data set and each of the four geographical areas.

Table 2: Regression of Budget for C-MRT of Each Geographical Area

Independent Variables	Data from All Area Parameter Estimate	t-value	Data from Bkk_MRT Area Parameter Estimate	t-value	Data from Bkk_Other Area Parameter Estimate	t-value	Data from 5_Metro Area Parameter Estimate	t-value	Data from Outside_BMA Area Parameter Estimate	t-value
Intercept	2.561	9.468**	3.051	5.441**	2.769	6.537**	2.656	3.575**	2.836	4.327**
CareerID	-0.123	-3.044**	-0.218	-2.541**	-0.177	-2.756**	-0.113	-1.086	-0.037	-0.390
OwnerID	-0.109	-3.253**	-0.130	-2.084 *	-0.149	-2.790**	-0.058	-0.578	-0.140	-1.567
IncomeID	0.510	12.614**	0.536	7.467**	0.560	8.914**	0.385	3.355**	0.326	3.025**
R^2	0.253		0.300		0.294		0.186		0.157	
Adjusted R^2	0.250		0.290		0.288		0.156		0.133	
F-value	83.172		28.872		46.624		6.301		6.406	

* significant at the 5% level
** significant at the 1% level

The data in Bkk_MRT and Bkk_Other provide the best prediction model. The three economic behavior variables in Bkk_MRT explain 30% of the variation in BudgetID. All variables are significant at 5% level for OwnerID and at 1% level for CareerID and IncomeID, consecutively. While in Bkk_Other, the three variables explain 29.4% of the variation in BudgetID, however with all three variables are significant at the 1% level.

In the opposite, the data in 5_Metro and Outside_BMA provide weaker predicting results. The three variables in 5_Metro and Outside_BMA explain 18.6% and 15.7% of the variation in BudgetID, consecutively. In both models, only the IncomeID variable is significant at 1% level. The regression analysis results also support the previous results from descriptive and correlation analysis.

CONCLUSION

The analysis shows quite interesting insightful results about potential buyers for C-MRT from different parts of Thailand. The results reflect about the followings:

(1) The results show that the potential buyers from different geographical areas had different buying powers (through income variable).

(2) There are rooms for inner city condominium development for sale. As, about half of the data who lived in the districts along the MRT lines were renters (in flat/apartment). And that, this group of people were familiar to live in highrise buildings.

(3) The results provide a better picture about the characters of budgets. Potential buyers from different geographical areas, however, preferred a condo between 1 to 1.5 million Baht more than other budget level, and

(4) The three analysis approaches, graphical/correlation/regression analysis provide the similar direction of the findings.

The Bangkok residents are more likely to use what they earn; the pair of variables BudgetID and IncomeID, about 50% of the data is significant at the 1% level. While the similar test for the Thais from other provinces are shows less quantity, only about 40%. These results can be used to foresee the characters, in term of income levels, of potential buyers, from different geographical areas, who can be the target clients for a certain product pricing. However, the registered survey samplings were not asked to tell the purpose of the intended purchasing. Future suggested research should be done to survey on the demand who make reservations, put down payments, and/or purchases condominium units along MRT.

REFERENCES

Bradley, Donald (2007) Discrimination in metropolitan housing markets. *Real Estate Economics*, Vol 35, No 4, pp. 451 – 478.

CB Richard Ellis (2008) Bangkok Property Report, First Quarter 2008.

Kauko, Tom (2006) What Makes a Location Attractive for the Housing Consumer? Preliminary Findings from Metropolitan Helsinki And Randstad Holland Using the Analytical Hierarchy Process. *Journal of Housing and the Built Environment,* Vol 21, No 2, pp. 159-176.

Assoc. Prof. Dr. Sonthya Vanichvatana　　　　　　Assumption University, Thailand

Malizia, Emil E. (1991) Forecasting Demand for Commercial Real Estate Based on the Economic Fundamentals of U.S. Metro Markets, *Journal of Real Estate Research*, Vol. 6, No. 3, pp. 251 – 265.

Megbolugbe, Isaac F., Marks, Allen P., and Schwartz, Mary B. (1991) The Economic Theory of Housing Demand: A Critical Review, *Journal of Real Estate Research*, Vol. 6, No. 3, pp. 381 – 393.

Rappaport, Jordan (2008) Consumption amenities and city population density. *Regional Science And Urban Economics*, Vol 38, No 6, pp. 533 – 552.

Real Estate Information Center (REIC) and the Department of Marketing Thammasart University (2008) *Demand Behavior for Condominium in BMA* http://www.reic.or.th/ research/default.asp [viewed 30 June, 2008].

Scheiner, Joachim & Holz-Rau, Christian (2007) Travel mode choice: affected by objective or subjective determinants? *Transportation*, Vol 34, No 4, pp. 487-511.

The Department of Provincial Administration of Thailand (2008) *Statistical Report of the Population by Province, District, and Tambon as of December, 2004* http:// isc.dopa.go.th / xstat/p4710_01.htm [viewed 20 July, 2008].

Vanichvatana, Sonthya (2008) Relationship between the Existing Locations of Potential Buyers for Condominium along Mass Rapid Transit Lines and Oil Prices: the Case of Bangkok (2004 – 2008), presented to European Real Estate Society Conference, Krakow, Poland, 18 – 21, June, 2008.

APPENDIX

Pearson Correlations Coefficient Matrix
All Data (from 4 Geographical Areas)

	GeoID	CareerID	HouseLiveInID	OwnerID	BudgetID	IncomeD
GeoID	1					
	815					
CareerID	-.217(**)	1				
	.000					
	782	782				
HouseLIveInID	-.230(**)	.213(**)	1			
	.000	.000				
	801	772	801			
OwnerID	-.235(**)	.240(**)	.590(**)	1		
	.000	.000	.000			
	785	757	776	785		
BudgetID	-.040	-.156(**)	-.205(**)	-.293(**)	1	
	.253	.000	.000	.000		
	808	775	794	779	808	
IncomeID	.001	-.062	-.336(**)	-.348(**)	.481(**)	1
	.979	.087	.000	.000	.000	
	796	768	785	769	792	796

** Correlation is significant at the 0.01 level (2-tailed).

Pearson Correlations Coefficient Matrix
Potential Buyers who lived in the10 Districts along Bangkok MRT (Bangkok_MRT)

	CareerID	HouseLiveInID	OwnerID	BudgetID	IncomeID
CareerID	1				
	220				
HouseLiveInID	.129	1			
	.056				
	219	226			
OwnerID	.161(*)	.581(**)	1		
	.019	.000			
	212	218	219		
BudgetID	-.248(**)	-.265(**)	-.289(**)	1	
	.000	.000	.000		
	218	224	218	226	
IncomeID	-.097	-.337(**)	-.277(**)	.508(**)	1
	.158	.000	.000	.000	
	215	219	212	218	220

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Pearson Correlations Coefficient Matrix
Potential Buyers who lived in the Other40 Districts of Bangkok (Bangkok_Other)

	CareerID	HouseLiveInID	OwnerID	BudgetID	IncomeID
CareerID	1				
	358				
HouseLiveIn	.175(**)	1			
	.001				
	354	362			
OwnerID	.229(**)	.522(**)	1		
	.000	.000			
	346	350	353		
BudgetID	-.161(**)	-.238(**)	-.340(**)	1	
	.002	.000	.000		
	355	359	350	364	
IncomeID	.004	-.367(**)	-.388(**)	.508(**)	1
	.945	.000	.000	.000	
	353	357	348	361	362

** Correlation is significant at the 0.01 level (2-tailed).

Pearson Correlations Coefficient Matrix
Potential Buyers who lived in the 5 Metropolitan Provinces (5_Metro)

	CareerID	HouseLiveInID	OwnerID	BudgetID	IncomeID
CareerID	1				
	93				
HouseLiveInID	.135	1			
	.201				
	91	92			
OwnerID	.094	.461(**)	1		
	.377	.000			
	91	90	92		
BudgetID	-.076	-.104	-.270(*)	1	
	.472	.331	.010		
	91	90	90	94	
IncomeID	-.036	-.233(*)	-.470(**)	.410(**)	1
	.735	.028	.000	.000	
	90	89	89	90	91

** Correlation is significant at the 0.01 level (2-tailed).
 * Correlation is significant at the 0.05 level (2-tailed).

Pearson Correlations Coefficient Matrix
Potential Buyers who lived Outside Bangkok Metropolitan Areas (Outside_BMA)

	CareerID	HouseLiveInID	OwnerID	BudgetID	IncomeID
CareerID	1				
	111				
HouseLiveInID	.366(**)	1			
	.000				
	108	121			
OwnerID	.335(**)	.673(**)	1		
	.000	.000			
	108	118	121		
BudgetID	-.145	-.143	-.295(**)	1	
	.128	.117	.001		
	111	121	121	124	
IncomeID	-.220(*)	-.360(**)	-.335(**)	.382(**)	1
	.021	.000	.000	.000	
	110	120	120	123	123

** Correlation is significant at the 0.01 level (2-tailed).
 * Correlation is significant at the 0.05 level (2-tailed).