



*International Journal of Engineering and Geosciences (IJEG),
Vol; 2; , Issue; 03, pp. 91-99, October, 2017, ISSN 2548-0960, Turkey,
DOI: [10.26833/ijeg.321278](https://doi.org/10.26833/ijeg.321278)*

VALUATION OF RESIDENCES THROUGH UTILIZING RATIO OF INTEGRATED CAPITALISATION

Ertas, M., ^{1*} Bayındır, B.,²

¹ Selçuk University, Technical Sciences Vocational Higher School, City and Region Planning Department, Map & Cadastre Program, Konya, Turkey (mertas@selcuk.edu.tr);

² Energy & Natural Resources Ministry, Türkiye Electricity Distribution Inc., Aras Region Directorate, Erzurum, Turkey (bahadiryayindir24@hotmail.com);

ID ORCID: 0000-0002-9458-3395; ID ORCID: 0000-0003-4033-346X

*Corresponding Author, Received: 13/06/2017, Accepted: 03/08/2017

ABSTRACT: Right after the Second World War, determining the value of real properties gained importance in the countries, in which citizens had the right for real property possession. As for our country, importance of evaluating real estates noticed in late 1990's. Now in Turkey, evaluation is the only method for the determining of the market value of real properties used by private and public sector.

Today, several methods have been used for evaluating real properties. One of them is the ratio of integrated capitalisation within income method. This method provides quite fast and accurate results for bankers, real estate consultants and judicial system operating in related market.

Through using this method, evaluation of the residences in a region, located in Centre District, Province of Erzincan is aimed. Selling and renting values have been researched for integrated capitalisation ratios in evaluation of residences located in project field. Through utilizing integrated capitalisation ratios; market values of the residences, located in project field and whose revenues are known, can be determined. In the same way, through utilizing related ratio, current rental values of residences located in project field and whose selling values are known can be determined.

Keywords: Valuation, Integrated Capitalisation, Income Method, Capitalisation Rate

1. INTRODUCTION

Nowadays, real properties are also regarded as an investment tool along with human's basic needs like shelter and trade. Being valuable, originated from ownership and ownership originated rights of real properties used for living and trade purposes, requires a need for determination of real properties' possible trade values.

Properties which are not possible to move one place to another and fixed in current location like land, building site and building (house/flat/residence, apartment, factory/plant/facility etc.) are called real properties/estates.

As for evaluation of real properties; it means to determine the value of a real property in a definite time objectively, independently and neutrally by evaluating agents related to real property like characteristic, utility, neighbourhood, using conditions.

It comprises independent and neutral evaluation of possible value of a real property, a real property project or rights and benefits originating from a real property in a definite time (UDES).

It is the prediction of defined value in evaluation date of a real property, a real property project or real rights based on independent, neutral and unbiased criteria (Ça da , 2012).

According to Capital Market Committee, evaluation; "is to independently and neutrally determine possible value of a real property, a real property project or rights and benefits originating from a real property in a definite time.

2. METHODS FOR VALUATION OF REAL PROPERTY

Real properties can be evaluated one of three widely used evaluation methods. These three main methods have also sub-groups. These sub-groups are;

- a) Comparison,
- b) Income,
- c) Cost

Purpose of the comparison methods to evaluate related real property through analysis of comparable sample real properties. Urban area and development data are basic comparison criteria. For this reason, samples and building sites whose values will be determined should be in the same region and possess same characteristic and similar development data.

To sum up, It means to determine the current value by comparing realised sales outcomes. Method can be especially applied for unconstructed parcels or partly constructed parcels. It requires getting generally attainable information from land registers, sale contracts, building contracts in which flat(s) or floor(s) is given in return to landowner, Chamber of Real Estate Agents' Lowest Price Lists, Capital Market Committee Registrations, National Property sales and loan agreements (Erta 2015).

Parcels should be appropriate with each other compared to location, quality, density and price levels. So, basically, according to similarities of fundamental

data, a price comparison is realised. Considering the evaluations mentioned above, features of evaluating and comparing parcels are written down suggested norm table. The point not to be forgotten is that, parcel qualities should indicate adequate similarities with each other.

Basis of income method in a constructed parcel is the net income that can be acquired continuously from land and its building facilities. Because of limited using period of a building and unlimited using period of land; while turning net revenue into money, its equivalent to

- a) Ground,
- b) Building and
- c) Additional facilities

is separated. Principally, value of ground is determined by "comparison method" (Köktürk ve ark).

Income Method is appropriate for evaluation of constructed parcels and rental revenue getting buildings like apartments, stores and office blocks by preference. Income isn't equal to the gross rental value's money equivalent. Income Method is also quite sensitive in letting predictions. Expert should be experienced to be able to decide usual rental value in a neighbourhood by utilizing related method.

- In income value determining;
- a) Construction year and economic using period,
 - b) Gross and net amount of revenue,
 - c) Square meter prices of each floors,
 - d) Sum of residential/housing areas
- should be carefully designated.

As for Cost Method, it's appropriate for detached or semi-detached buildings/houses, industrial facilities and public buildings.

Object (cost) value= ground value + building (production along with additional facilities and business properties) value- technical deterioration (originating from functional or economic deterioration) value losses.

Production cost, by using building indexes, can be converted into evaluation date values. Value losses sourced by aging depend on remaining using period of building facilities. Building object value, production expenses and remaining economic using period are crucial. Ground value is depended on construction permission given according to development plan and related act & regulations. It is also depended on regional location, traffic condition, infrastructure expenditures and using opportunities.

3. COMPARISON METHOD WITH RATIO OF INTEGRATED CAPITALISATION

Capitalisation Ratio is defined as the ratio that turns real properties annual net operating income into market value. As for integrated capitalisation ratio, it's determined through dividing highly similar real properties' (land + building + equipment's) net income by sale price in local market (Erta , 2016).

Integrated capitalisation is calculated through dividing highly similar real properties' net incomes by sale values in local market (1).

$$k_{bit} = \left(\frac{G_1 + G_2 + \dots + G_n}{D_1 + D_2 + \dots + D_n} \right) \quad (1)$$

correlation is taken into consideration. When this correlation is divided into its compounds (land + building + equipment's), correlation no. (2) is obtained.

$$k_{bit} = k_a \frac{D_a}{D_{ta}} + k_y \frac{D_y}{D_{ta}} = \frac{G_{net}}{D_{ta}} \quad (2)$$

Comparison Method by utilizing integrated capitalisation ratio is applied by using comparable real properties' sale and net income values that are similar compared to building type and its age, type of residence, using type, its location, etc. Firstly, real properties are classified according to various qualities. Applying for each class separately, classified real properties' net income and sale values are examined. By using obtained data, real properties' capitalisation ratios are calculated and their means are solved. So, mean ratio for the related class is determined. This ratio provides us to evaluate similar real properties without dividing them into their compounds.

Net income is calculated by 3 correlations.

$$D_{knet} = D_{kyl} - ZG_{kira} \quad (3)$$

4. APPLICATIONS

By utilizing determined integrated capitalisation ratio of similar residences located in Project field (Map 1) composed of a part of Yavuz Selim Neighbourhood, Province of Erzincan, Centre District, and small part of Demirkent Municipality; evaluation of other real properties in the same region is aimed.



Map 1 Project Field

Determining market value of real properties are required for a great many of transactions like loan, mortgage, tax, trade, renting, nationalization. So, fair evaluation of real properties to preserve the rights of

related parties has a great importance. In evaluation process, preferred method and considered objective values are formed the first procedure steps to determine real value of properties. In practice, reason for preference of comparison method with integrated capitalisation ratio is that almost all residences located in project field are highly similar buildings with each other.

This method cannot be used when there is no measurable data available.

Gathering Data

Essential data for evaluation are gathered by utilizing survey table shown in Table 1. Renting value, sale value / time, age, data shown under the title of isolation, real properties' owners, inhabitants shown in prepared table are obtained by statements of local real estate agents.

Table 1 Survey Table (including information of real property)

Flat		Building No:	
Area(m ²)	Rental Value(TL)	Sale Value/Year	Construction Type
Age			Carcass <input type="checkbox"/> Masonry <input type="checkbox"/> Wooden <input type="checkbox"/> Prefabricated <input type="checkbox"/>
Floor No	Isolation	Frontage	Residence Type
Ground <input type="checkbox"/>	Present <input type="checkbox"/>	East <input type="checkbox"/>	Detached <input type="checkbox"/>
Top <input type="checkbox"/>	Absent <input type="checkbox"/>	West <input type="checkbox"/>	Housing Estate <input type="checkbox"/>
Intermediate <input type="checkbox"/>		North <input type="checkbox"/>	Apartment <input type="checkbox"/>
		South <input type="checkbox"/>	
Number of Floor	Road Width (m)	Parking/ Garage	Garden (m ²)
		Present <input type="checkbox"/> Absent <input type="checkbox"/>	
Closest Attraction Type	Distance to Closest Attraction (m)	Location in Block	Landscape
		Corner <input type="checkbox"/> Intermediate <input type="checkbox"/>	Present <input type="checkbox"/> Absent <input type="checkbox"/>
Others			

Development plans obtained from related municipalities is evaluated in NETCAD program and data titles called as area, road width, garden, distance to closest attraction point are achieved shown in table. Data called as "Other" and shown under the related title in table is achieved from physical researchs in project field.

Over 150 data have been collected in the project area nevertheless data exceeding 10% of the average value are eliminated and only 120 data were used.

A separate table is prepared for every flat, located in project field, which forms data for evaluation study. Buildings located in project field and their flats are numbered according to cadastre parcel number principles after connecting with municipality development plans (Map 2).



Map 2 Residences in Project Field (in numbered condition)

While calculating capitalisation ratio of similar real properties located in Project Field; last five year's selling values and current rental values of real properties are used. Sales in 2016 are accepted as sales in April, sales before 2016 are accepted as sales in June of related years. Consumer Price Index (TÜFE) is applied for updating sale prices related to the sales realised before 2016. For the reason that urbanization and planning processes have not been completed yet in our country, real property value increases more than TÜFE Index. For this reason, TÜFE index of 2016 is taken into consideration and its weight is reduced throughout past years. Last five years are studied to diminish possible faults. In updating calculation, correlation no.4 is used in coefficient of weight.

$$p = \frac{1}{2016 - yıl} \quad D_{sgd} = D_s \cdot p \quad (4)$$

4.2 Calculating Data

Similar real properties located in Project Field, firstly regarding their location (intermediate parcel and corner parcel), then regarding their floor (ground floor, intermediate floor, top floor), are classified. Integrated capitalisation ratio of each class is calculated separately.

Table 2 Ground Floor – Corner Apartments

Sequence No	Block/ Building No	Apartment No	Floor (m ²)	D _{kyıl}	D _{knet}	D _{kbr}	D _s	D _{syıl}	D _{sgd}	D _{snet}	D _{sbr}	k (%)	CY	AK	U _c (m)
S,1	2190/4	2	152	9900	9306	61,22	155 000	2013	193 213,53	179 688,58	1 182,16	5,179	G - D	K .	SM – 260
S,2	2146/5	2	175	9900	9306	53,18	170 000	2014	194 123,19	180 534,56	1 031,63	5,155	G - D	K .	ÇOP – 20
S,6	2147/1	1	155	8880	8347,2	53,85	158 000	2014	180 420,37	167 790,95	1 082,52	4,976	B - K	K .	ÇOP – 90
S,8	2087/1	2	162	9000	8460	52,22	163 000	2014	186 129,88	173 100,79	1 068,52	4,887	K - B	K .	O – 270
S,8	2087/4	1	162	8760	8234,4	50,83	146 000	2013	181 994,68	169 225,05	1 044,78	4,865	D - G	K .	O – 200
S,10	2085/1	1	156	8400	7896	50,62	175 000	2016	175 000,00	162 750,00	1 043,27	4,852	B - K	K .	O – 80
S,11	2015/5	1	167	11 400	10 716	67,17	206 000	2014	235 231,63	218 765,41	1 309,97	4,898	D - G	K .	PYA – 10
S,12	2022/10	1	149	8400	7896	52,99	145 000	2014	165 575,66	153 985,36	1 033,46	5,128	G - B	K .	C – 30
S,14	D,106/3	1	160	9600	9024	56,4	166000	2014	189 555,58	176 286,69	1 101,79	5,119	G - B	K .	SM – 225
S,15	1858/5	1	131	9000	8460	64,58	171 000	2015	182 142,58	169 392,60	1 293,07	4,994	G - B	K .	PYA – 5
S,16	1584/1	2	100	4800	4512	45,12	72 000	2014	82 216,88	76 461,70	764,62	5,901	D - K	K .	PYA – 75
S,16	1586/5	1	100	4680	4399,2	43,99	73 000	2014	83 358,78	77 523,67	775,24	5,675	K - D	K .	PYA – 70
S,17	2190/1	3	153	9300	8742	57,14	195 000	2016	195 000	181 350	1 185,29	4,821	K - B	K .	PYA – 10
S,17	2190/5	1	153	9600	9024	58,98	190 000	2015	202 380,64	188 214,00	1 230,16	4,795	G - B	K .	SM – 200
A,4	2088/1	1	100	8400	7896	78,96	175 000	2016	175 000	162 750	1 627,50	4,852	G - B	K .	PYA – 3
AVR.			145	8668	8148	56,28	157333,3		174756,23	162521,29	1118,27	5,073			

Table 3 Ground Floor – Intermediate Apartments

Sequence No	Block/ Building No	Apartme nt No	F (m ²)	D _{kyl}	D _{knet}	D _{kbr}	D _s	D _{syl}	D _{sgd}	D _{snet}	D _{sbr}	k (%)	CY	AK	U _c (m)
S,1	1591/1	1	152	9000	8460	55,66	170 000	2015	181 077,42	168 402	1 107,91	5,024	K - D	Ar.	SM – 245
S,1	1591/3	2	152	9600	9024	59,37	178 000	2015	189 598,71	176 326,81	1 160,04	5,118	G - D	Ar.	SM – 270
S,1	2190/2	1	152	9300	8742	57,51	149 000	2013	185 734,30	172 732,89	1 136,40	5,061	G - B	Ar.	SM – 210
S,1	2190/3	1	152	9300	8742	57,51	148 000	2013	184 487,76	171 573,61	1 128,77	5,095	G - B	Ar.	SM – 235
S,2	2146/7	2	175	9000	8460	48,34	171 000	2015	182 142,58	169 392,60	967,96	4,994	G - D	Ar.	ÇOP – 30
S,4	D,1840/1	1	161	8400	7896	49,04	150 000	2014	171 285,17	159 295,20	989,41	4,957	K - D	Ar.	C – 250
S,4	D,1840/3	1	161	8520	8008,8	49,74	140 000	2013	174 515,45	162 299,36	1 008,07	4,935	K - D	Ar.	C – 280
S,5	1858/2	2	172	7200	6768	39,35	100 000	2011	146 969,37	136 681,52	794,66	4,952	G - D	Ar.	SM – 300
S,5	1858/3	1	172	7200	6768	39,35	115 000	2013	143 351,97	133 317,33	775,10	5,077	G - B	Ar.	SM – 320
S,5	2016/1	1	172	6960	6542,4	38,04	104 000	2012	140 396,95	130 569,17	759,12	5,011	D - G	Ar.	SM – 290
S,5	2016/4	2	172	7080	6655,2	38,69	125 000	2014	142 737,64	132 746,00	771,78	5,013	B - G	Ar.	O – 340
S,5	2016/5	2	172	7200	6768	39,35	110 000	2012	148 496,78	138 102,00	802,92	4,901	B - G	Ar.	O – 350
S,5	2016/9	2	172	6900	6486	37,71	110 000	2013	137 119,28	127 520,93	741,40	5,086	D - K	Ar.	SM – 350
S,5	2016/10	1	172	6960	6542,4	38,04	115 000	2013	143 351,97	133 317,33	775,10	4,907	D - G	Ar.	SM – 340
S,6	2147/7	1	155	8400	7896	50,94	120 000	2011	176 363,25	164 017,82	1 058,18	4,814	B - K	Ar.	ÇOP – 150
S,6	2147/8	2	155	8700	8178	52,76	145 000	2013	180 748,14	168 095,77	1 084,49	4,865	B - G	Ar.	ÇOP – 120
S,8	2087/2	1	162	8700	8178	50,48	135 000	2012	182 246,04	169 488,82	1 046,23	4,825	K - D	Ar.	O – 240
S,8	2087/6	1	162	8400	7896	48,74	140 000	2013	174 515,45	162 299,36	1 001,85	5,074	B - K	Ar.	O – 280
S,9	2021/1	2	200	9600	9024	45,12	162 000	2013	201 939,30	187 803,55	939,02	4,805	G - D	Ar.	C – 230
S,9	2021/3	2	200	9900	9306	46,53	155 000	2012	209 245,46	194 598,28	972,99	4,782	G - D	Ar.	C – 300
S,9	2021/8	2	200	10560	9926,4	49,63	194 000	2014	221 528,81	206 021,80	1 030,11	4,818	G - D	Ar.	PYA – 10
S,9	2022/5	1	200	9600	9024	45,12	166 000	2013	206 925,46	192 440,67	962,20	4,690	G - B	Ar.	C – 180
S,11	2015/4	2	167	10 800	10 152	60,79	185 000	2013	230 609,70	214 467,02	1 284,23	4,734	B - G	Ar.	PYA – 10
S,12	2022/10	2	149	8160	7670,4	51,48	127 000	2013	158 310,44	147 228,71	988,11	5,210	G - B	Ar.	C – 30
S,13	2086/1	2	100	6300	5922	59,22	111 000	2014	126 751,02	117 878,45	1 178,78	5,024	G - D	Ar.	O – 130
S,13	2086/3	1	100	6600	6204	62,04	117 000	2014	133 602,43	124 250,26	1 242,50	4,993	G - B	Ar.	O – 130
S,14	D,105/4	1	160	9000	8460	52,88	165 000	2015	175 751,61	163 449,00	1 021,56	5,176	G - B	Ar.	SM – 120
S,14	D,105/7	2	160	8820	8290,8	51,82	150 000	2014	171 285,17	159 295,20	995,60	5,205	G - D	Ar.	SM – 130
S,15	1858/7	1	131	7800	7332	55,97	153 000	2015	162 969,67	151 561,80	1 156,96	4,838	G - B	Ar.	SM – 260
S,16	1586/8	1	100	4620	4342,8	43,43	77 000	2015	82 017,42	76 276,20	762,762	5,694	D - G	Ar.	PYA – 20
A,6	1584/7	1	114	6600	6204	54,42	110 000	2013	137 119,28	127 520,93	1 118,60	4,865	G - B	Ar.	O – 25
A,6	2085/6	2	112	7200	6768	60,43	135 000	2015	143 796,77	133 731,00	1 194,03	5,051	B – G	Ar.	O – 110
A,7	1584/3	1	132	7800	7332	55,55	160 000	2016	160 000	148 800	1 127,27	4,927	B – K	Ar.	O – 150
A,8	1858/1	1	162	10800	10152	62,67	187 000	2014	213 535,51	198 588,02	1 225,85	5,112	K - D	Ar.	SM – 250
AVR.			156,8	8264,12	7768,27	50,23	140559		168250,77	156473,22	23420,86	4,989			

Table 4 Intermediate Floor(s) – Corner Apartments

Sequence No	Block/ Building No	Apartment No	F (m ²)	D _{kyl}	D _{knet}	D _{kbr}	D _s	D _{syl}	D _{sgd}	D _{snet}	D _{sbr}	k (%)	CY	AK	U _c (m)
S,1	2190/4	4	152	10440	9813,6	64,56	168 000	2013	209 418,53	194 759,24	1 281,31	5,039	G - D	K .	SM – 260
S,2	2146/1	3	175	9600	9024	51,57	186 000	2015	198 119,99	184 251,60	1 052,87	4,898	G - B	K .	ÇOP – 10
S,3	2145/1	3	181	10200	9588	52,97	172 000	2013	214 404,69	199 396	1 101,64	4,808	G - B	K .	O – 60
S,5	2016/7	3	172	9000	8460	49,19	145 000	2013	180 748,14	168 095,77	977,30	5,033	G - B	K .	PYA – 3
S,6	2145/6	3	155	9600	9024	58,22	183 000	2015	194 924,51	181 279,80	1 169,55	4,978	G - B	K .	ÇOP – 55
S,6	2147/1	3	155	9420	8854,8	57,13	171 000	2014	195 265,09	181 596,53	1 171,59	4,876	B – K	K .	ÇOP – 90
S,7	2147/5	4	188	12000	11280	60	200000	2014	228 380,22	212 393,60	1 129,75	5,311	B – K	K .	PYA – 5
S,8	2087/4	3	162	9900	9306	57,44	185 000	2015	202 380,64	188 214,00	1 161,81	4,944	D – G	K .	O – 200
S,9	2021/7	4	200	10800	10152	50,76	201 000	2015	214 097,41	199 110,59	995,55	5,099	G - D	K .	PYA – 10
S,10	2085/1	3	156	9600	9024	57,85	169 000	2014	192 981,29	179 472,60	1 150,46	5,028	B – K	K .	O – 80
S,13	2086/1	3	124	7800	7332	59,13	153 000	2015	162 969,67	151 561,80	1 222,27	4,838	G - B	K .	ÇOP – 115
S,14	D,106/3	4	160	10200	9588	59,92	209 000	2016	209 000	194 370	1 214,81	4,933	G - D	K .	SM – 250
S,15	1858/5	3	154	10800	10152	62,26	210 000	2015	223 683,87	208 026,00	1 350,82	4,880	G - B	K .	PYA – 5
S,17	2190/1	6	168	10560	9926,4	59,09	220 000	2016	220 000	204 600	1 217,86	4,852	K - B	K .	PYA – 10
S,17	2190/5	4	168	10800	10152	60,43	229 000	2016	229 000	212 970	1 267,68	4,767	G - B	K .	SM – 200
A,2	D,1885/5	2	140	9240	8685,6	62,04	184 000	2015	195 989,67	182 270,40	1 301,93	4,765	G - D	K .	M – 20
A,8	1858/1	4	162	11520	10828,8	66,84	203 000	2014	231 805,92	215 579,51	1 330,74	5,023	K - B	K .	SM – 250
AVR.			163	10087	9482	58,2	187529		206069	191644	1125,71	4,945			

Table 5 Intermediate Floor – Intermediate Apartments

Sequence No	Block/ Building No	Apartment No	F (m ²)	D _{kyl}	D _{knet}	D _{kbr}	D _s	D _{syl}	D _{sgd}	D _{snet}	D _{sbr}	k (%)	CY	AK	U _c (m)
S,1	1591/1	3	152	9900	9306	61,22	172 000	2014	196 406,99	182 658,50	1 201,70	5,051	K - D	Ar.	SM – 245
S,1	1591/3	4	152	10200	9588	63,08	186 000	2014	212 393,60	197 526,05	1 299,51	4,854	G - D	Ar.	SM – 270
S,1	2190/2	3	152	9840	9249,6	60,85	160 000	2013	199 446,22	185 484,99	1 220,30	4,987	G - B	Ar.	SM – 210
S,2	2146/4	3	175	9900	9306	53,18	176 000	2014	200 974,59	186 906,37	1 068,04	4,979	G - B	Ar.	ÇOP – 70
S,2	2146/5	4	175	10800	10152	58,01	205 000	2015	218 358,06	203 072,99	1 160,42	4,999	G - D	Ar.	ÇOP – 25
S,2	2146/6	3	175	9900	9306	53,18	184 000	2015	195 989,67	182 270,40	1 041,54	5,106	G - B	Ar.	ÇOP – 20
S,3	2145/3	3	181	9900	9306	53,18	156 000	2012	210 595,43	195 853,75	1 082,06	4,751	G - B	Ar.	O – 60
S,3	2145/5	3	181	10500	9870	54,53	180 000	2013	224 377,00	208 670,61	1 152,88	4,730	G - B	Ar.	ÇOP – 30
S,4	1840/2	3	161	9600	9024	56,05	185 000	2016	185 000	172 050	1 068,63	5,245	K - D	Ar.	O – 325
S,5	1858/3	4	172	7920	7444,8	43,28	152 000	2015	161 904,51	150 571,20	875 41	4,944	G - D	Ar.	SM – 320
S,5	2016/3	3	172	7800	7332	42,63	130 000	2013	162 050,06	150 706,55	876,20	4,865	B – K	Ar.	O – 300
S,5	2016/7	4	172	8760	8234,4	47,87	155 000	2014	176 994,67	164 605,04	957,01	5,002	G - D	Ar.	PYA – 3
S,5	2016/10	3	172	7800	7332	42,63	114 000	2012	153 896,66	143 123,89	832,12	5,123	D - G	Ar.	SM – 340
S,6	2147/7	3	155	9300	8742	56,40	190 000	2016	190 000	176 700	1 140	4,947	B – K	Ar.	ÇOP – 150
S,6	2147/8	3	155	9240	8685,6	56,04	168 000	2014	191 839,38	178 410,63	1 151,04	4,868	B – K	Ar.	ÇOP – 120
S,7	2147/4	4	168	10200	9588	57,07	203 000	2016	203 000	188 790	1 123,75	5,079	D – K	Ar.	ÇOP – 30
S,8	2087/6	4	162	9600	9024	55,70	192 000	2016	192 000	178 560	1 102,22	5,054	B – G	Ar.	O – 280
S,9	2021/10	3	200	9600	9024	45,12	192 000	2016	192 000	178 560	892,8	5,054	G - B	Ar.	ÇOP – 15
S,12	2022/1	4	149	9000	8460	56,78	175 000	2015	186 403,22	173 355,00	1 163,46	4,880	G - D	Ar.	C – 20
S,12	2022/2	4	149	8700	8178	54,89	160 000	2014	182 704,18	169 914,88	1 140,37	4,813	G - D	Ar.	C – 60
S,12	2022/4	3	149	8880	8347,2	56,02	175 000	2015	186 403,22	173 355,00	1 163,46	4,815	G - B	Ar.	C – 110
S,13	2086/3	3	124	7800	7332	59,13	125 000	2013	155 817,36	144 910,15	1 168,63	5,060	G - B	Ar.	ÇOP – 110

S,14	D,105/6	4	160	9720	9136,8	57,10	145 000	2012	195 745,75	182 043,55	1 137,77	5,019	G - D	Ar.	SM - 130
S,16	1587/4	3	100	5100	4794	47,94	88 000	2016	88 000	81 840	818,4	5,858	B - K	Ar.	O - 150
A,3	D,1236/1	3	140	8400	7896	56,4	165 000	2015	175 751,61	163 449,00	1 167,49	4,831	K - D	Ar.	M - 15
A,5	1580/1	3	136	8100	7614	55,98	153 000	2015	162 969,67	151 561,80	1 114,42	5,024	K - D	Ar.	SM - 150
A,6	2085/6	3	135	7800	7332	54,31	150 000	2015	159 774,19	148 590,00	1 100,67	4,934	B - K	Ar.	O - 120
AVR.			158,3	9046,67	8503,87	54,02	164296,30		183733,19	170871,86	6852,83	4,995			

Table 6 Top Floor – Intermediate Apartments

Sequence No	Block/ Building No	Apartment No	F (m ²)	D _{kyl}	D _{knet}	D _{kbr}	D _s	D _{syl}	D _{sgd}	D _{snet}	D _{sbr}	k (%)	CY	AK	U _c (m)
S,2	2146/4	5	175	9780	9193,2	52,53	190 000	2016	190 000	176 700	1 009,71	5,203	G - B	Ar.	ÇOP - 70
S,3	2145/4	5	181	10440	9813,6	54,22	215 000	2016	215 000	199 950	1 104,70	4,908	G - B	Ar.	ÇOP - 25
S,3	2145/5	6	181	10200	9588	52,97	168 000	2013	209 418,53	194 759,24	1 076,02	4,923	G - D	Ar.	ÇOP - 30
S,5	2016/3	5	172	7500	7050	40,99	148 000	2015	157 643,87	146 608,80	852,38	4,809	B - K	Ar.	O - 300
S,6	2147/8	5	155	9120	8572,8	55,31	187 000	2016	187 000	173 910	1 122	4,929	B - K	Ar.	ÇOP - 120
S,8	2087/2	5	162	9600	9024	55,70	153 000	2013	190 720,45	177 370,02	1 094,88	5,088	K - D	Ar.	O - 240
S,9	2021/5	5	200	9780	9193,2	45,97	167 000	2014	190 697,48	177 348,66	886,74	5,184	G - B	Ar.	C - 335
S,9	2021/7	5	200	11040	10377,6	51,89	216000	2016	216000	200 880	1004,40	5,166	G - B	Ar.	PYA - 10
S,9	2021/8	6	200	11160	10490,4	52,45	214 000	2015	227 944,51	211 988,39	1059,94	4,949	G - D	Ar.	PYA - 10
S,12	2022/4	6	149	8520	8008,8	53,75	154 000	2014	175 852,77	163 543,08	1 097,60	4,897	G - D	Ar.	C - 110
S,13	2086/1	6	124	7500	7050	56,85	146 000	2015	155 513,54	144 627,60	1 166,35	4,875	G - D	Ar.	ÇOP - 115
S,14	D,105/1	6	160	9600	9024	56,4	140 000	2012	188 995,90	175 766,18	1098,54	5,134	G - D	Ar.	SM - 140
S,15	1858/7	6	154	8700	8178	53,10	165 000	2015	175 751,61	163 449,00	1 061,36	5,003	G - D	Ar.	SM - 260
S,16	1586/8	5	100	4680	4399,2	43,99	82 000	2016	82 000	76 260	762,6	5,769	D - G	Ar.	PYA - 20
AVR.			165	9116	8568,77	51,87	167500		183038,48	170225,78	1028,37	5,060			

Table 7 Top Floor – Corner Apartments

Sequence No	Block/ Building No	Apartment No	F (m ²)	D _{kyl}	D _{knet}	D _{kbr}	D _s	D _{syl}	D _{sgd}	D _{snet}	D _{sbr}	k (%)	CY	AK	U _c (m)
S,1	1591/1	6	152	9900	9306	61,22	183 000	2015	194 924,51	181 279,80	1 192,63	5,133	K - B	K .	SM - 245
S,1	1591/3	5	152	10200	9588	63,08	184 000	2014	210 109,80	195 402,12	1 285,54	4,907	G - B	K .	SM - 270
S,1	2190/4	6	152	10320	9700,8	63,82	182 000	2014	207 826,00	193 278,18	1 271,57	5,019	G - D	K .	SM - 260
S,5	2016/8	5	172	8700	8178	47,55	185 000	2016	185 000	172 050	1000,29	4,753	G - B	K .	PYA - 3
S,6	2145/6	5	155	9420	8854,8	57,13	170 000	2014	194 123,19	180 534,56	1 164,74	4,905	G - B	K .	ÇOP - 55
S,17	2190/1	9	168	10500	9870	58,75	225 000	2016	225 000	209 250	1 245,54	4,717	K - B	K .	PYA - 10
A,1	1584/7	11	136	7800	7332	53,91	122 000	2013	152 077,74	141 432,30	1 039,94	5,184	K - D	K .	O - 25
A,5	1580/1	6	136	7920	7444,8	54,74	150000	2015	159 774,19	148 590,00	1 092,57	5,010	K - B	K .	SM - 150
AVR.			153	9345	8784,30	57,53	175125		191104,43	177727,12	1161,60	4,954			

In this way, integrated capitalisation ratio of flats in separate locations is calculated.

$$D_{knet} = D_{kyl} - ZG_{kira} \quad (5)$$

$$D_{snet} = D_{sgd} - ZG_{sat} \quad (6)$$

$$D_{sgd} = D_s \left(\frac{TFER}{TFER_s} \right) \quad (7)$$

$$D_{kbr} = \frac{D_{knet}}{F} \quad (8)$$

$$D_{sbr} = \frac{D_{snet}}{F} \quad (9)$$

$$k = \frac{D_{knet}}{D_{snet}} \quad (10)$$

5. CONCLUSION

Similar residences' integrated capitalisation ratios located in project field calculated as in Table 8, utilizing correlations from 5 to 10

Table 8 Residences Arranged According to Their Locations (with respect to unit rental and selling values)

Location	F (m ²)	D _{kyl}	D _{knet}	D _{kbr}	D _s	D _{sgd}	D _{snet}	D _{sbr}	k (%)	Index Rent	Index Sale
Ground-Intermediate	157	8264,12	7768,27	50,23	140559	168250,77	156473,22	996,64	4,989	100,00	100,00
Top Flat-Intermediate	165	9116	8568,77	51,87	167500	183038,48	170225,78	1031,67	5,060	103,26	103,51
Intermediate Flat-Intermediate	158	9046,67	8503,87	54,02	164296,30	183733,19	170871,86	1081,47	4,995	105,55	108,51
Ground-Corner	145	8668	8148	56,28	157333,3	174756,23	162521,29	1120,84	5,073	112,04	112,46
Top Flat-Corner	153	9345	8784,30	57,53	175125	191104,43	177727,12	1161,60	4,954	114,53	116,55
Intermediate Flat-Corner	163	10087	9482	58,2	187529	206069	191644	1175,71	4,945	115,87	117,97

Residences shown in table with respect to their locations are arranged according to Unit Sale (D_{sbr}) and Unit Rental (D_{kbr}) Values. When examining rental and selling indexes in last two columns of Table 8, following conclusions can be reached;

- Unit Sale Values are always more than Unit Rental Values.
- Because of first clause, increase rate of sale value is greater than increase rate of rental value.
- In locational sequencing, residences located in the corner are more valuable than residences located in intermediate floors.
- There are no considerable differences among integrated capitalisation ratios.
- Most valuable place among corner and intermediate located real properties is intermediate floor.
- Value-based locational sequencing is Ground Floor Intermediate – Top Floor Intermediate – Intermediate Floor Intermediate–Ground Floor Corner – Top Floor Corner – Intermediate Floor Corner respectively.
- Value of intermediate floor corner residence is about 18% more valuable than ground floor intermediate residence.

The k rates by the calculations can be used in similar characteristics areas.

By utilizing similar residences' determined integrated capitalisation ratio, sale values of residences located in project field whose renting revenues are known and also renting values of residences whose sale prices are known can be determined. In order to calculate sale values

$$D_{sat} = \frac{G_{net}}{k_{bit}} \quad (11)$$

Correlation can be applied for determining flats' sale values by utilizing flats' renting revenues.

REFERENCES

- Açlar & Ça da , 2002. Ta nınmaz (Gayrimenkul) De erlemesi, Birinci Baskı TMMOB Harita ve Kadastro Mühendisleri Odası, Ankara,
- Ça da , Ders Notları, Yıldız Teknik Üniversitesi-Davutpa a Kampüsü, Slayt Notlar,
- Çelik, Ders Notları, Gümü hane Üniversitesi-Gümü hane Kampüsü, Slayt Notlar,
- Demir, Ders Notları, Yıldız Teknik Üniversitesi-Davutpa a Kampüsü, Slayt Notlar,
- Erol Köktürk & Erdal Köktürk, 2011. Ta nınmaz De erlemesi, Birinci Baskı, stanbul,
- Erta , Ders Notları, 2015. Selçuk Üniversitesi-Alaeddin Keykubat Yerle kesi Selçuklu/Konya, Slayt Notlar,
- Kuster J. 1998. Factors Determining Housing Prices in Zurich, s:163–179, VR/39/8, Zürich
- Tanrıvermi , 2010. Gayrimenkul De erleme Esasları, Lisanslama Sınavları Çalı ma Kitapları, Ders Kodu: 1014, Ankara Üniversitesi Uygulamalı Bilimler Fakültesi Gayrimenkul Geli tirme ve Yönetimi Bölümü,
- UDES, 2016. Uluslararası De erleme Standartları, Genel De erleme Kavram ve İkeleri, S.11, 4.4
- URL 1. Türkiye statistik Kurumu, <http://www.tuik.gov.tr/UstMenu.do?metod=> , Tüketici Fiyat Endeksi (2003=100

ABBREVIATIONS

A,1 : Apartment No:1
A,2 : Apartment No:2
A,3 : Apartment No:3
A,4 : Apartment No:4

Copyright © International Journal of Engineering and Geosciences (IJEG). All rights reserved, including the making of copies unless permission is obtained from the copyright proprietors.

A,5 : Apartment No:5
A,6 : Apartment No:6
A,7 : Apartment No:7
A,8 : Apartment No:8
A/B No: Block/Building Number
AK : Location in Block
Ar. : Intermediate
B : West
kbüt : Integrated Capitalisation Ratio
C : Mosque
CY : Frontage
ÇOP : Playground
D : East
Dk : Rental Value (TL) / month
Dkbr : Unit Rental Value (TL)
Dknet : Annual Net Rental Value (TL) / year
Dkyl : Annual Rental Value (TL) / year
D No: Flat Number
Ds_{yl} : Sale Year (TL)
Ds : Sale Value (TL)
Dsgd : Sale Value Updated according to Consumer Price Index (TL)
Dsbr : Unit Sale Value (TL)
Dsnet : Net Sale Value (TL)
F : Area m²
G : South
K : North
K . : Corner
k : Rental Capitalisation Ratio (%)
M : Market
O : School
ORT : Average
PYA : Park
S,1 : Housing Estate Number
S/A : Housing Estate/Apartment
SM : Supermarket
TFER : Consumer Price Index of April 2016
TFERS : Price Index of June of Sale's Year
Uc : Distance to Closest Attraction Point(m)

ZGkira : Compulsory Expenses to Renting (Real Estate Agent's Commission + Collection Difficulties + Real Estate Tax and Expenditures+ Permanent Equipment Expenses)= % 6

ZGsati : Compulsory Expenses for Sale(Real Estate Agent's Commission + Sale Tax and Expenditures + Income Tax)= % 7