

Chapter 5

Empirical Results

This study focused on the housing market in urban area of Kunming, the housing type of condominiums. The study selected 204 housing samples of which were sold during 2009 in the housing market of Kunming. After the data collection and the rearrangement, there are 198 housing units the data available. The empirical results are as follows:

5.1 The descriptive of the housing samples in Kunming

5.1.1 The socio-economic status of the sample households

i) The age of the house owners

The age of the house owners were divided into 6 groups. The results indicated that people less than 16 years old are too young to afford a housing unit. Most of the housing owners ranged from 36 to 49 years old (42.4%), followed by the house owners ranged from 26 to 35 years old (28.3%), and the house owners ranged from 50 to 65 years old (16.2%). Only 7.1% of the house owners greater than 65 years old and 6.1% of the house owners ranged from 16 to 25 years old. In general, the house owners mostly concentrated in the age group between 26 to 50 years old.

Table 5.1 Age of the house owners

Age (year)	Frequency	Percent
16-25	12	6.1
26-35	56	28.3
36-49	84	42.4
50-65	32	16.2
> 65	14	7.1
Total	198	100.0

Source: By survey

ii) Number of the household members

As can be seen in table 5.2, most of the households consisted of three members (51.0%), followed by households of two members (29.3%), households of single living (7.1%), households of four members (6.1%) and households of five members (5.1%), respectively. Only 1.5% households consisted of more than five members. In conclusion, the predominant households consisted of two and three members.

Table 5.2 Number of the household members

Family members	Frequency	Valid Percent
1	14	7.1
2	58	29.3
3	101	51.0
4	12	6.1
5	10	5.1
> 5	3	1.5
Total	198	100.0

Source: By survey

iii) Educational level of the house owners

Table 5.3 shows the educational background of the sample house owners, most of the house owners were of a undergraduate level (54.5%), followed by the house owners of a graduate level (23.7%) and a middle school level (20.2%), only

1.5% of the house owners had a primary school educational level.

Table 5.3 Educational level of the house owners

Educational Level	Frequency	Valid Percent
Primary school	3	1.5
middle school	40	20.2
undergraduate	108	54.5
graduate	47	23.7
Total	198	100.0

Source: By survey

iv) Occupation of the house owners

In table 5.4, the occupation of sample house owners were divided into two groups, 75.3% of the house owners work in the government sector and 24.7% of the rest house owners work in the private sector. It indicated that most of sample households work in the government sectors.

Table 5.4 Occupation of the house owners

Occupation	Frequency	Percent
government sector	149	75.3
the private sector	49	24.7
Total	198	100.0

Source: By survey

v) Household average income per month (Yuan)

The average family income of the sample households was divided into 5 levels.

As table 5.5 shows, most of households (75.3%) have an average income from 3,000 to 4,999 Yuan per month, followed by an average income ranged from 1,000 to 2,999 Yuan (14.1%), only 6.1% of the households have an average income ranging from 5,000 to 9,999 Yuan. At the two extremes, only 3.0% of the households have an average income less than 1,000 Yuan, and 1.5% of the households can get an average income equal or greater than 10,000 Yuan per month. In conclusion, most of the

households can earn an average income less than 5000 Yuan per month.

Table 5.5 Household average income per month (Yuan)

Average family Income (Yuan)	Frequency	Percent
< 1000	6	3.0
1000-2999	28	14.1
3000-4999	149	75.3
5000-9999	12	6.1
≥10000	3	1.5
Total	198	100.0

Source: By survey

5.1.2 Price and characteristics of the sample housing units

i) Housing price (P)

The housing prices were divided into 5 groups: less than 300,000 Yuan, 300,000 to 500,000 Yuan, 500,001 to 700,000 Yuan, 700,001 to 900,000 Yuan, and greater than 900,000 Yuan.

In table 5.6, the price of the housing units were mostly ranged from 300,000 to 500,000 Yuan (43.4%), followed by the price ranged from 500,000 Yuan to 700,000 Yuan (29.8%), and the price ranged from 700,000 to 900,000 Yuan (13.1%). Only 11.6% of the housing units were less than 300,000 Yuan and 2.0% of the housing units were greater than 900,000 Yuan. In general, the price of the sample housing units were mostly less than 500,000 Yuan.

Table 5.6 Price of the housing units

Housing price (Yuan)	Frequency	Percent
< 300,000	23	11.6
300,000-500,000	86	43.4
500,001-700,000	59	29.8
700,001-900,000	26	13.1
> 900,000	4	2.0
Total	198	100.0

Source: By survey

ii) The distance to Central Business District (DCBD)

The distance to CBD was divided into 4 groups. Most housing units (54%) were located at a distance to CBD from 2.6 to 4 kilometers (54.0%), followed by the distance to CBD from 1.1 to 2.5 kilometers (20.7%). At the extremes, there were 14.6% of the housing units with a distance to CBD no more than 1 kilometer and 10.6% of the housing units were more than 4 kilometers to CBD. Generally, the predominant housing units were located within 4 kilometers from CBD.

Table 5.7 The distance to Central Business District (CBD)

Distance to CBD (kilometer)	Frequency	Percent
≤ 1	29	14.6
1.1 – 2.5	41	20.7
2.6 – 4	107	54.0
> 4	21	10.6
Total	198	100.0

Source: By survey

iii) Number of bus routes (BR)

In table 5.8, most of the housing units have 5 to 9 bus routes within 500 meters around the communities (70.7%), followed by the housing units have less than 5 bus routes (20.7%). Only 5.6% of the housing units have bus routes ranging in number from 10 to 14 lines and 3% of the housing units have at least 15 bus routes within 500 meters around the communities. In general, the public transportation of buses is relatively convenient in Kunming.

Table 5.8 The number of bus routes

The number of bus routes	Frequency	Percent
< 5	41	20.7
5 to 9	140	70.7
10 -14	11	5.6
≥15 routes	6	3.0
Total	198	100.0

Source: By survey

iv) Floor Area (FA)

Floor area of the housing units is measured by square meter in China. In table 5.9, the greatest percentage of the housing units ranged from 60 to 89.9 square meters (68.2%), which followed by the housing units ranged from 90 to 119.9 square meters (15.7%) and the housing units smaller than 60 square meters (12.1%). Only 4% of the housing units greater than 120 square meters.

Table 5.9 Floor area of the housing units

Floor area (m ²)	Frequency	Percent
< 60	24	12.1
60 -89.9	135	68.2
90 -119.9	31	15.7
> 120	8	4.0
Total	198	100.0

Source: By survey

v) Age of the housing units (Age)

Age of the housing units is calculated from the year of the housing units had been built. In table 5.10, most of the housing units had been built 5 to 9 years (58.6%), followed by the housing units had been built less than 5 years (23.2%), and the housing unit had been built from 10 to 14 years (16.7%), only 1.5% of the housing units had been built at least 15 years old.

Table 5.10 Age of the housing units

The age of the housing (year)	Frequency	Percent
<5	46	23.2
5-9	116	58.6
10-14	33	16.7
≥15	3	1.5
Total	198	100.0

Source: By survey

vi) Orientation of housing units (Orientation)

The housing orientation is normally defined by the direction of the windows are mostly facing or the main natural lighting direction of the housing units. In table 5.11, most of housing units were south-facing which took 67.2% and the rest of 32.8% of the housing units were facing to others directions. Thus, the south-facing housing units are the most popular orientation of the sample housing units.

Table 5.11 Orientation of the housing units

Orientation of the housing unit	Frequency	Percent
Other direction	65	32.8
South- facing	133	67.2
Total	198	100.0

Source: By survey

vii) Floor of the housing units (Floor)

In table 5.12, most of the housing units were on the fourth to the seventh floor (54.0%) of the total, followed by the housing units on the first to the third floor (33.3%) and the housing units on eighth to eleventh floor (8.6%). Only 4% of the housing units were on the twelfth floor or more. The total height of the housing unit mostly has seven stories in Kunming.

Table 5.12 Floor of the housing units

Floor	Frequency	Percent
The first -third	66	33.3
The fourth -seventh	107	54.0
The eighth- eleventh	17	8.6
≥twelfth	8	4.0
Total	198	100.0

Source: By survey

viii) Structural quality (SQ)

The structural quality of the housing samples were measured according to the

5-point Likert scale, a high score means high quality. From table 5.13, most of the housing units got 3 points (54.0%) which indicated most of the housing units were of a fair structural quality. Followed by the housing units got 4 points which were of a good structural quality (25.3%) and the housing units got 2 points (12.1%) of a relatively low quality. Only 5.6% of housing units were of the perfect quality which got 5 points and 3.0% of the housing units just got 1 point of a lowest quality level. In conclusion, most of housing units were at a fair structural quality.

Table 5.13 The structural quality of the housing units

Structural Quality Level	Frequency	Percent
1	6	3.0
2	24	12.1
3	107	54.0
4	50	25.3
5	11	5.6
Total	198	100.0

Source: By survey

ix) Environmental quality around the communities (ENQ)

The environmental quality around the communities is measured by the 5-point Likert scale, a high score means a high quality. In table 5.14, most of the housing units had 3 points at a fair quality (62.6%), followed by the housing units had 4 points at a pretty good quality (21.7%). Only 7.6% housing units had 5 points at the perfect quality and 6.1% housing units had 2 point at a relative low quality. Only 2% of housing units had 1 point at a lowest environmental quality around the communities. In conclusion, most of sample housing units had a fair quality of the surrounding environment of the communities.

Table 5.14 The environmental quality around the communities

ENQ Level	Frequency	Percent
1	4	2.0
2	12	6.1
3	124	62.6
4	43	21.7
5	15	7.6
Total	198	100.0

Source: By survey

x) Inner environmental quality of the communities (IENQ)

The inner environmental quality of the communities is measured by the 5 point Likert scale, a high score means a high quality. In table 5.15, most of sample housing units got 3 points at a fair inner environmental quality of the communities (62.6%), followed by the housing units got 4 points with a good quality (21.7%). Only 9.1% of the housing units got 5 points with a perfect quality, 5.1% of the housing units got 2 points at a relatively low quality and 1.5% of the housing units only got 1 point at a lowest inner environmental quality level. In general, most of the housing samples have a fair inner environmental quality of the communities.

Table 5.15 The inner environmental quality of the communities

IENQ Level	Frequency	Percent
1	3	1.5
2	10	5.1
3	124	62.6
4	43	21.7
5	18	9.1
Total	198	100.0

Source: By survey

xi) Total distance to the nearest life establishments (TDLE)

The total distance to the nearest life establishments (supermarket, restaurant, bank, post office, and hospital) from the communities were divided into 4 groups. In

table 5.16, most of the sample housing units had a total distance ranged from 3 to 3.9 kilometers (56.6%) to the nearest life establishments, followed by the housing units had a total distance from 4 to 4.9 kilometers (30.8%) and the housing units had a total distance less than 3 kilometers (10.6%). Only 2% of the housing units had a total distance greater than 5 kilometers to the nearest life establishments. In general, the proximity of the housing units to the life establishments was relatively convenient for the most of the sample households.

Table 5.16 The total distance to the nearest life establishments

TDLE (kilometer)	Frequency	Percent
< 3	21	10.6
3-3.9	112	56.6
4-4.9	61	30.8
> 5	4	2.0
Total	198	100.0

Source: By survey

xii) Total distance to the nearest educational services (TDED)

The total distance to the nearest educational services of different levels (kindergarten, elementary school, middle school, university) of the sample housing units was divided into 4 groups: less than 3 kilometers, 3 to 3.9 kilometers, 4 to 4.9 kilometers and greater than 5 kilometers. In table 5.17, most of the housing units had a total distance to the nearest educational services ranged from 4 to 4.9 kilometers (67.2 %), followed by the housing units with a total distance ranged from 3 to 3.9 kilometers (26.8%). At the extremes, only 3% of the housing units had a total distance less than 3 kilometers or greater than 5 kilometers to the nearest educational services with the different levels. In conclusion, most of the housing units are not far away from the educational services.

Table 5.17 The total distance to the nearest educational services

TDED (kilometer)	Frequency	Valid Percent
< 3	6	3.0
3-3.9	53	26.8
4-4.9	133	67.2
> 5	6	3.0
Total	198	100.0

Source: By survey

xiii) Total distance to the nearest entertainment facilities (TDEF)

The total distance of sample housing units to the nearest entertainment facilities (park, cinema, museum, and gymnasium) was divided into 4 groups. In table 5.18, most of the housing units had a total distance ranging from 4 to 4.9 kilometers (70.2 %), followed by a total distance ranging from 3 to 3.9 kilometers (20.2%). Only 6.6% of the housing units with a total distance greater than 5 kilometers and 3% of the housing units had a total distance to the nearest entertainment facilities less than 3 kilometers.

Table 5.18 The total distance to the nearest entertainment facilities

TDEF (kilometer)	Frequency	Percent
< 3	6	3.0
3-3.9	40	20.2
4-4.9	139	70.2
> 5	13	6.6
Total	198	100.0

Source: By survey

In conclusion, the house owners were mostly ranged from 26 to 50 years old, in which the majority of these house owners concentrated in 36 to 49 years old. The sample households mostly consisted of 3 members. Most of sample house owners had an undergraduate educational level, majority of the house owners work in the government sectors. The average family income of the sample households were

mostly in the group ranged from 3000 to 4999 Yuan per month, exactly at 3919 Yuan per month by average.

Most of the housing units were at a price from the 300,000 to 500,000 Yuan. For the locational side, most of housing units have a distance to the CBD ranging from 2.6 to 4 kilometers, and most of the housing units have 5 to 9 bus routes within 500 meters around the communities. On the structural side, the floor area of the housing units mostly ranged from 60 to 89.9 square meters, most of the housing units had 5 to 9 years old. The orientation of the housing units was mostly facing the southern direction. The floor level of housing units were mostly on a relatively low floor on the fourth to the seventh floor, most of housing units got 3 points at a fair quality of the structure, the environment around and inside the communities. And most of the housing units had a total distance to the nearest life establishments ranged from 3 to 3.9 kilometers, and a total distance to the nearest educational services of different levels and entertainment facilities both ranged from 4 to 4.9 kilometers. It indicates that the daily life of the sample households to the life establishments is relatively convenient.

5.2 The relationship between housing price and each characteristic

The relationship between the housing price and each characteristic of the sample housing units by cross-tabulation can be illustrated as follows:

5.2.1 The households' socio-economic status and housing price

i) Age of the house owners and housing price

In table 5.19, most of the house owners prefer the housing units ranged from 200,000 to 500,000 Yuan, which took the greatest percentage of all the age groups. None of younger people who aged from 16 to 25 years old purchased a housing unit

greater than 700,000 Yuan. Likewise, none of the older people greater than 65 invested in a housing unit higher than 900,000 Yuan. In general, there is no linear relationship between the age of house owners and housing price.

Table 5.19 The cross tabulation of age of the house owners and housing price

Age of the house owner (year)	Housing Price group					Total
	<200,000	200,000-500,000	500,001-700,000	700,001-900,000	>900,000	
16-25	3 25.0%	7 58.3%	2 16.7%	0 .0%	0 .0%	12 100.0%
26-35	8 14.3%	21 37.5%	19 33.9%	7 12.5%	1 1.8%	56 100.0%
36-49	5 6.0%	36 42.9%	28 33.3%	13 15.5%	2 2.4%	84 100.0%
50-65	4 12.5%	15 46.9%	7 21.9%	5 15.6%	1 3.1%	32 100.0%
> 65	3 21.4%	7 50.0%	3 21.4%	1 7.1%	0 .0%	14 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

ii) Number of household members and housing price

As can be seen in table 5.20, most of the house owners who live alone bought the housing units less than 200,000 Yuan. The households which were composed of 2 or 3 members mostly bought the housing units ranging from 200,000 to 500,000 Yuan, which took 55.2% and 49.5%, respectively. The households with 4 members living together mostly bought the housing units ranging from 700,001 to 900,000 Yuan. The households with more than 5 members living together all bought the housing units greater than 500,000 Yuan. In general, the number of household members has a positive relationship with housing price. An increasing number of family members would cause the households to pay more to increase the housing space. There is a positive relationship between the members of households and housing price.

Table 5.20 The cross tabulation of number of household members and housing price

Family members	Housing Price group					Total
	<200,000	200,000-500,000	500,001-700,000	700,001-900,000	>900,000	
1	12 85.7%	2 14.3%	0 .0%	0 .0%	0 .0%	14 100.0%
2	11 19.0%	32 55.2%	11 19.0%	4 6.9%	0 .0%	58 100.0%
3	0 .0%	50 49.5%	40 39.6%	11 10.9%	0 .0%	101 100.0%
4	0 .0%	0 .0%	4 33.3%	6 50.0%	2 16.7%	12 100.0%
5	0 .0%	2 20.0%	3 30.0%	4 40.0%	1 10.0%	10 100.0%
> 5	0 .0%	0 .0%	1 33.3%	1 33.3%	1 33.3%	3 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

iii) Educational level of the house owners and housing price

In table 5.21, the greatest percentage of the house owners at any educational level bought the housing units ranged from 200,000 to 500,000 Yuan. From which, none of the house owners who only had a primary school level education bought a housing unit greater than 500,000 Yuan. Similarly, none of house owners who had a middle school level education bought a housing unit greater than 900,000 Yuan. The house owners with an undergraduate and a graduate level education still mostly purchased the housing units ranging from 200,000 to 500,000 Yuan, but there is an increasing percentage of purchase in the price group range from 500,000 to 700,000 Yuan and from 700,001 to 900,000 Yuan. Especially, house owners with a graduate educational level had a higher percentage of purchases of the housing units ranging from 700,000 to 900,000 Yuan. In general, educational level of the house owners has a relatively positive relationship with housing price. The house owners with a higher

educational level can afford a higher price of the housing unit.

Table 5.21 The cross tabulation of educational level of the owners and housing price

Educational Level of the House owners	Housing Price group					Total
	<200,000	200,000-500,000	500,001-700,000	700,001-900,000	>900,000	
primary school	2 66.7%	1 33.3%	0 .0%	0 .0%	0 .0%	3 100.0%
middle school	15 37.5%	19 47.5%	4 10.0%	2 5.0%	0 .0%	40 100.0%
Undergraduate	5 4.6%	48 44.4%	41 38.0%	11 10.2%	3 2.8%	108 100.0%
graduate	1 2.1%	18 38.3%	14 29.8%	13 27.7%	1 2.1%	47 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

iv) Occupation of the house owners and housing price

In table 5.22, the house owners either work in the government sector or private sector mostly bought the housing units ranging from 200,000 to 500,000 Yuan, took 43.6% and 42.9%, respectively. Even though the larger number of the house owners work in the government sector compared with the private sector, there was only one housing unit greater than 900,000 Yuan consumed by the house owner working in the government sector while three housing units in the same group were purchased by the house owners working in the private sector.

Table 5. 22 The cross tabulation of occupation of the house owners and housing price

Occupation of the House owners	Housing Price group					Total
	<200,000	200,000-500,000	500,001-700,000	700,001-900,000	>900,000	
Government sector	15 10.1%	65 43.6%	51 34.2%	17 11.4%	1 .7%	149 100.0%
Private sector	8 16.3%	21 42.9%	8 16.3%	9 18.4%	3 6.1%	49 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

v) The household average income and housing price

In table 5.23, none of the households with an average family income less than 1,000 Yuan per month bought a housing unit greater than 200,000 Yuan. The households with an average income ranged from 1,000 to 2,999 Yuan mostly purchased housing units less than 200,000 Yuan (50.0%), followed by ranged from 200,000 to 500,000 Yuan (46.4%). Similarly, households with an average income ranged from 3,000 to 4,999 Yuan mostly bought the housing units ranged from 200,000 to 500,000 Yuan (49.0%), followed by ranged from 500,001 to 700,000 Yuan (34.9%). The greatest percentage of the households which had an average income ranged from 5,000 to 9,999 Yuan bought the housing units ranged from 700,000 to 900,000 Yuan (75.0%). None of the households bought a housing unit less than 700,000 Yuan with an average family income at least 10,000 Yuan per month and most of them bought a housing unit greater than 900,000 Yuan. In general, there is a positive relationship between the average family income and the housing price.

Table 5.23 The cross tabulation of the household average income per month and housing price

Household average Income(Yuan)	Housing Price group					Total
	<200,000	200,000-500,000	500,001-700,000	700,001-900,000	>900,000	
<1,000	6 100.0%	0 .0%	0 .0%	0 .0%	0 .0%	6 100.0%
1,000-2,999	14 50.0%	13 46.4%	0 .0%	1 3.6%	0 .0%	28 100.0%
3,000-4,999	7 4.7%	73 49.0%	52 34.9%	15 10.1%	2 1.3%	149 100.0%
5,000-9,999	0 .0%	0 .0%	3 25.0%	9 75.0%	0 .0%	12 100.0%
≥10,000	0 .0%	0 .0%	0 .0%	1 33.3%	2 66.7%	3 100.0%
Total	27 13.6%	86 43.4%	55 27.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

5.2.2 The relationship between housing price and related characteristics

i) The distance to CBD and housing price

As can be seen in table 5.24, the housing units which located at a distance to CBD greater than 4 kilometers were mostly less than 200,000 Yuan, located at a distance from 2.6 to 4 kilometers mostly ranging from 200,000 to 500,000 Yuan, located at a distance from 1.1 to 2.5 kilometers mostly ranging from 500,000 to 700,000 Yuan, and located at a distance no more than 1 kilometers mostly ranging from 700,000 to 900,000 Yuan. In general, there is a decreasing trend of housing price with an increasing distance to CBD, thus, there is an obviously negative relationship between the distance to CBD and housing price.

Table 5.24 The cross tabulation of the distance to CBD and housing price

Distance to CBD (kilometer)	Housing Price group					Total
	<200,000	200,000- 500,000	500,001- 700,000	700,001- 900,000	>900,000	
≤ 1	0 .0%	0 .0%	9 31.0%	17 58.6%	3 10.3%	29 100.0%
1.1– 2.5	0 .0%	7 17.1%	28 68.3%	5 12.2%	1 2.4%	41 100.0%
2.6 – 4	10 9.3%	71 66.4%	22 20.6%	4 3.7%	0 .0%	107 100.0%
>4	13 61.9%	8 38.1%	0 .0%	0 .0%	0 .0%	21 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

ii) The relationship between the number of bus routes and housing price

In table 5.25, the housing units with less than 5 bus routes within 500 meters around the communities ranged from 200,000 to 500,000 Yuan (48.8%), followed by less than 200,000 Yuan (36.6%). The housing units with 5 to 9 bus routes mostly

ranged from 200,000 to 500,000 Yuan (47.1%) and ranged from 500,001 to 700,000 Yuan (34.3%). The housing units with 10 to 14 bus routes mostly ranged from 500,001 to 700,000 Yuan (54.5%). Finally, the greatest percentage of the housing units with at least 15 bus routes within 500 meters around the communities, ranged from 700,001 to 900,000 Yuan. Overall, there is a relatively increasing trend on the housing price with an increasing number of the bus routes within 500 meters around the communities.

Table 5.25 The cross tabulation of the number of bus route and housing price

The number of Bus Routes	Housing Price group					Total
	<200,000	200,000-500,000	500,001-700,000	700,001-900,000	>900000	
< 5	15 36.6%	20 48.8%	4 9.8%	2 4.9%	0 .0%	41 100.0%
5 to 9	8 5.7%	66 47.1%	48 34.3%	17 12.1%	1 .7%	140 100.0%
10 -14	0 .0%	0 .0%	6 54.5%	3 27.3%	2 18.2%	11 100.0%
≥ 15	0 .0%	0 .0%	1 16.7%	4 66.7%	1 16.7%	6 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

iii) The relationship between the floor area and housing price

In table 5.26, the housing units with a floor area less than 60 square meters were mostly less than 200,000 Yuan, which ranged from 60 to 89.9 square meters mostly ranged from 200,000 to 500,000 Yuan. The biggest percentage of housing units with a floor area ranged from 90 to 119.9 square meters ranged from 500,001 to 700,000 Yuan. The housing units with a floor area greater than 120 square meters all greater than 500,000 Yuan. There is an escalating trend in housing price when there is

an increasing of the floor area by square meters, it can be concluded that the floor area has a positive relationship with housing price.

Table 5.26 The cross tabulation of the floor area and housing price

Floor Area (square meter)	Housing Price group					Total
	<200,000	200,000- 500,000	500,001- 700,000	700,001- 900,000	> 900,000	
< 60 m ²	21 87.5%	3 12.5%	0 .0%	0 .0%	0 .0%	24 100.0%
60 -89.9 m ²	2 1.5%	78 57.8%	40 29.6%	15 11.1%	0 .0%	135 100.0%
90 -119.9 m ²	0 .0%	5 16.1%	15 48.4%	7 22.6%	4 12.9%	31 100.0%
> 120 m ²	0 .0%	0 .0%	4 50.0%	4 50.0%	0 .0%	8 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

iv) The relationship between the housing age and housing price

It can be seen in table 5.27, the housing units which had been built less than 5 years were mostly ranged from 500,001 to 700,000 Yuan (47.8%) and followed by 700,001 to 900,000 Yuan (41.3%). The housing units which had been built 5 to 9 years were mostly ranged from 200,000 to 500,000 Yuan, and the housing units which had been built 10 to 14 years were mostly less than 200,000 Yuan. The housing units which had been built at least 15 years prior were entirely less than 200,000 Yuan. In general, the price of housing units has a decreasing trend with an increase of the housing age. It relatively has a negative relationship between the housing age and housing price.

Table 5.27 The cross tabulation of the housing age and housing price

Housing Age (year)	Housing Price group					Total
	<200,000	200,000- 500,000	500,001- 700,000	700,001- 900,000	> 900000	
< 5	0 .0%	1 2.2%	22 47.8%	19 41.3%	4 8.7%	46 100.0%
5 to 9	3 2.6%	72 62.1%	35 30.2%	6 5.2%	0 .0%	116 100.0%
10 -14	17 51.5%	13 39.4%	2 6.1%	1 3.0%	0 .0%	33 100.0%
≥ 15	3 100.0%	0 .0%	0 .0%	0 .0%	0 .0%	3 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

v) The relationship between the orientation and housing price

In table 5.28, the housing units with a south-facing direction were mostly ranged from 200,000 to 500,000 and 500,001 to 700,000 Yuan both at a same percentage of 36.8%. On the other hand, most of housing units which face other directions, ranged from 200,000 to 500,000 Yuan. Overall, the housing units with a south-facing direction relatively have a higher price than the other directions.

Table 5.28 The cross tabulation of the housing orientation and housing price

Orientation	Housing Price group					Total
	<200,000	200,000- 500,000	500,001- 700,000	700,001- 900,000	> 900,000	
others	14 21.5%	37 56.9%	10 15.4%	4 6.2%	0 .0%	65 100.0%
south	9 6.8%	49 36.8%	49 36.8%	22 16.5%	4 3.0%	133 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

vi) The relationship between the floor and housing price

In table 5.29, the housing units on the first to the third floor were mostly ranged from 200,000 to 500,000 Yuan (56.1%), the housing units on the fourth to the seventh floor were mostly ranged from 500,001 to 700,000 Yuan (42.1%), on the eighth to the eleventh floors were ranged from 200,000 to 500,000 Yuan (47.1%). The housing units at least on the twelfth floor were mostly ranged from 200,000 to 500,000 Yuan. In short, the housing units located on the fourth to seventh floors were relatively preferred by the households. There is no linear relationship between the housing floor and the housing price.

Table 5.29 The cross tabulation of the floor and housing price

Floor of the housing unit	Housing Price group					Total
	<200,000	200,000-500,000	500,001-700,000	700,001-900,000	>900,000	
1-3	13 19.7%	37 56.1%	12 18.2%	3 4.5%	1 1.5%	66 100.0%
4-7	9 8.4%	37 34.6%	45 42.1%	14 13.1%	2 1.9%	107 100.0%
8-11	1 5.9%	8 47.1%	2 11.8%	6 35.3%	0 .0%	17 100.0%
≥12	0 .0%	4 50.0%	0 .0%	3 37.5%	1 12.5%	8 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

vii) The structural quality and housing price

The structural quality of the housing units was measured by the 5-point Likert scale, a high score means a high quality. In table 5.30, none of the housing units exceeded 500,000 Yuan which just got 1 point with a lowest structural quality, the housing units which got 2 points only have one unit exceeding 500,000 Yuan. The

housing units which got 3 points at a fair quality were mostly ranged from 200,000 to 500,000 Yuan (62.5%), the housing units which got 4 points with a good quality were mostly ranged from 500,001 to 700,000 Yuan (62.0%) and the housing units with a perfect quality were mostly ranged from 700,001 to 900,000 Yuan (63.6%). In general, it has a increasing trend in housing price with an one level improvement of housing structural quality. There exists a positive relationship between the structural quality and housing price.

Table 5.30 The cross tabulation of the structural quality and housing price

Structural Quality	Housing Price group					Total
	<200,000	200,000-500,000	500,001-700,000	700,001-900,000	>900,000	
1	3 50.0%	3 50.0%	0 .0%	0 .0%	0 .0%	6 100.0%
2	12 50.0%	11 45.8%	0 .0%	1 4.2%	0 .0%	24 100.0%
3	8 7.5%	67 62.6%	28 26.2%	4 3.7%	0 .0%	107 100.0%
4	0 .0%	5 10.0%	31 62.0%	14 28.0%	0 .0%	50 100.0%
5	0 .0%	0 .0%	0 .0%	7 63.6%	4 36.4%	11 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

viii) The environmental quality around the communities and housing price

The environmental quality around the communities of housing samples was measured by the 5-point Likert scale, a high score means a high quality. In table 5.31, none of the sample housing units which just got 1 point or 2 points with a relatively lower environmental quality around the communities exceeding 500,000 Yuan. The housing units with a fair quality which got 3 points were mostly ranged from 200,000

to 500,000 Yuan (58.1%). The greatest proportion of the housing units which got 4 points with a good quality ranged from 500,001 to 700,000 Yuan (60.5%), the housing units which got 5 points at a perfect quality were entirely greater than 700,000 Yuan and mostly ranged from 700,001 to 900,000 Yuan (86.7%). In general, there is an increasing trend in housing price with an improvement of the environmental quality around communities. Thus, there is a positive relationship between the environmental quality around the communities and housing price.

Table 5.31 The cross tabulation of the environmental quality around the communities and housing price

ENQ	Housing Price group					Total
	<200,000	200,000-500,000	500,001-700,000	700,001-900,000	> 900,000	
1	2 50.0%	2 50.0%	0 .0%	0 .0%	0 .0%	4 100.0%
2	6 50.0%	6 50.0%	0 .0%	0 .0%	0 .0%	12 100.0%
3	15 12.1%	72 58.1%	33 26.6%	4 3.2%	0 .0%	124 100.0%
4	0 .0%	6 14.0%	26 60.5%	9 20.9%	2 4.7%	43 100.0%
5	0 .0%	0 .0%	0 .0%	13 86.7%	2 13.3%	15 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

ix) Inner environmental quality of the communities and housing price

The inner environmental quality of the communities was measured according to the 5-point Likert scale, a high score means a high quality. In table 5.32, the inner environment of the housing units of a relative lower quality which scored 1 and 2, both did not exceed 500,000 Yuan and were mostly less than 200,000 Yuan which took 66.7% and 70.0%, respectively. The housing units which got 3 points of a fair quality mostly ranged from 200,000 to 500,000 Yuan (62.9%), and the housing units

scored 4 of a good quality ranged from 500,001 to 700,000 Yuan (65.1%). The housing units which scored 5 at a perfect quality were mostly ranged from 700,001 to 900,000 Yuan. In general, there is an increasing trend in housing price with an improvement of inner environmental quality of the communities. Thus, there is a positive relationship between the inner environmental quality of the communities and housing price.

Table 5.32 The cross tabulation of the inner environmental quality and housing price

IENQ	Housing Price group					Total
	<200,000	200,000-500,000	500,001-700,000	700,001-900,000	> 900,000	
1	2 66.7%	1 33.3%	0 .0%	0 .0%	0 .0%	3 100.0%
2	7 70.0%	3 30.0%	0 .0%	0 .0%	0 .0%	10 100.0%
3	14 11.3%	78 62.9%	26 21.0%	6 4.8%	0 .0%	124 100.0%
4	0 .0%	4 9.3%	28 65.1%	10 23.3%	1 2.3%	43 100.0%
5	0 .0%	0 .0%	5 27.8%	10 55.6%	3 16.7%	18 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: by calculation

x) Total distance to the nearest life establishments and housing price

The total distances to the nearest life establishments (supermarket, restaurant, bank, post office, hospital) from the communities were divided into four groups. In table 5.33, the housing units with a total distance to the nearest life establishments less than 3 kilometers mostly ranged from 700,001 to 900,000 Yuan (66.7%). The housing units with a total distance ranged from 3 kilometers to 3.9 kilometers, the price were mostly ranged from 200,000 to 500,000 Yuan (45.5%), followed by the price ranged from 500,001 to 700,000 Yuan (43.8%). The majority of the housing units had a total

distance to the nearest life establishment ranged from 4 to 4.9 kilometers, the price were ranged from 200,000 to 500,000 Yuan. Most of housing units with a total distance greater than 5 kilometers, the price were mostly less than 200,000 Yuan. In general, there is a decreasing trend of the housing price with an increasing of the total distance to the nearest life establishments. There is a negative relationship between the housing price and a total distance to the nearest life establishments.

Table 5.33 The cross tabulation of total distance to the nearest life establishments and housing price

TDLE (kilometer)	Housing Price group					Total
	<200,000	200,000- 500,000	500,001- 700,000	700,001- 900,000	> 900,000	
< 3	0 .0%	0 .0%	3 14.3%	14 66.7%	4 19.0%	21 100.0%
3-3.9	2 1.8%	51 45.5%	49 43.8%	10 8.9%	0 .0%	112 100.0%
4-4.9	12 23.5%	30 58.8%	7 13.7%	2 3.9%	0 .0%	51 100.0%
> 5	9 64.3%	5 35.7%	0 .0%	0 .0%	0 .0%	14 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: by calculation

xi) Total distance to the nearest educational services and housing price

The total distance to the nearest educational services (kindergarten, elementary school, middle school, university) from the communities were divided into four groups. In table 5.34, the housing units with a total distance to the nearest educational services less than 3 kilometers primarily ranged from 500,000 to 700,000 Yuan (46.6%) and 700,001 to 900,000 Yuan (33.9%). The housing units with a total distance ranged from 3 to 3.9 kilometers mostly ranged from 200,000 to 500,000 Yuan (59.8%). Most of housing units with a total distance from 4 to 4.9 kilometers

mostly ranged from 200,000 to 500,000 Yuan (50%), the housing units with a total distance greater than 5 km mostly less than 200,000 Yuan (83.3%). In conclusion, there is a decreasing trend of housing price with an increasing total distance to the nearest educational services. Thus, there is a negative relationship between the total distance to the educational services and the housing price.

Table 5.34 The cross tabulation of total distance to the educational services and housing price

DEDG (kilometer)	Housing Price group					Total
	< 200,000	200,000- 500,000	500,001- 700,000	700,001- 900,000	> 900,000	
< 3	0 .0%	7 12.5%	26 46.4%	19 33.9%	4 7.1%	56 100.0%
3-3.9	5 4.9%	61 59.8%	30 29.4%	6 5.9%	0 .0%	102 100.0%
4-4.9	13 38.2%	17 50.0%	3 8.8%	1 2.9%	0 .0%	34 100.0%
>5	5 83.3%	1 16.7%	0 .0%	0 .0%	0 .0%	6 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: by calculation

xii) Total distance to the nearest entertainment facilities and housing price

The total distances to the nearest entertainment facilities (park, cinema, museum, and gymnasium) from the communities were divided into 4 groups. In table 5.35, most of housing units (66.7%) with a total distance to the nearest entertainment facilities less than 3 kilometers, the price were mostly ranged from 700,001 to 900,000 Yuan. The housing units at a total distance ranged from 3 kilometers to 3.9 kilometers, the price were mostly ranged from 500,001 to 700,000 Yuan (42.2%). Most of the housing units with a total distance from 4 to 4.9 kilometers (57.9%), the price were ranged from 200,000 to 500,000 Yuan, when the housing units with a total

distance to the nearest entertainment facilities greater than 5 kilometers, the price were mostly less than 200,000 Yuan (71.4%). In general, there is a decreasing trend of housing price with an increasing total distance to the nearest entertainment facilities. Thus, there is a negative relationship with a total distance to the nearest entertainment facilities and the housing price.

Table 5.35 The cross tabulation of total distance to the nearest entertainment facilities and housing price

TDEF (kilometer)	Housing Price group					Total
	<200,000	200,000- 500,000	500,001- 700,000	700,001- 900,000	>900,000	
< 3	0 .0%	0 .0%	1 16.7%	4 66.7%	1 16.7%	6 100.0%
3-3.9	0 .0%	40 36.7%	46 42.2%	20 18.3%	3 2.8%	109 100.0%
4-4.9	18 23.7%	44 57.9%	12 15.8%	2 2.6%	0 .0%	76 100.0%
> 5	5 71.4%	2 28.6%	0 .0%	0 .0%	0 .0%	7 100.0%
Total	23 11.6%	86 43.4%	59 29.8%	26 13.1%	4 2.0%	198 100.0%

Source: Calculation

In summary, the majority of the house owners at any age level preferred the housing units which ranged from 200,000 to 500,000 Yuan, but there is no linear relationship between the age of house owner and housing price. The number of family members has a positive relationship with housing price. With an increase in the number of family members, the households would like to pay more to increase the housing space. The educational level of the house owners has a relative positive relationship with the housing price, house owners with a higher educational level can afford a higher price of a housing unit. The majority of the house owners who work in the government sector or private sector preferred the housing units ranged from

200,000 to 500,000 Yuan, the house owners who work in the private sector took the greater percentage on purchasing the housing units at a higher price level. There is a positive relationship between the average household income and housing price.

The locational characteristic of distance to CBD has a negative relationship with housing price, the farther the distance to CBD, the lower the price of housing units. On the other hand, the number of bus routes has a positive effect on the housing price, the more numerous of bus routes within 500 meters around the communities, the higher the price of the housing units. The structural attribute of floor area has a positive relationship with the housing price, the larger floor area of the housing units the higher price of housing. The age of the housing units has a negative relationship with the housing price, the older the housing units, the lower value the housing units. The housing units with south-facing orientation are mostly preferred by the sample households in Kunming, similarly, most of the households preferred the housing units on a relative low floor on the forth to seventh floor. Both the structural quality and the environmental quality around and inside the communities have a positive relationship with the housing price, the better quality of environment around and inside the communities, the higher the housing price. On opposite side, the total distance to the nearest life establishments, educational services, and entertainment facilities have a negative relationship with the housing price, the price of the housing units has a decreasing trend with an increase in total distance, respectively.

5.3 The regression of the hedonic pricing model

5.3.1 The descriptive of the variables

This study identified the housing price as the dependent variable and 12

housing characteristics as the independent variables, which are the distance to CBD (DCBD), the number of bus routes within 500 meters around the communities (BR), floor area of housing (FA), housing age (Age), orientation of the housing (Orientation), the floor of the housing (Floor), structural quality (SQ), environmental quality around the communities (ENQ), inner environmental quality of the communities (IENQ), total distance to the nearest life establishments (TDLE), total distance to the nearest educational services (TDES), and the total distance to the nearest entertainment facilities (TDEF) to construct hedonic pricing model in Kunming. The descriptive statistics of the variables show as follows:

Table 5.36 The descriptive of the variables

Characteristics (unit)	Minimum	Maximum	Mean	Std. Deviation	Variance
Price (Yuan)	178000	1200000	5.04E5	195803.286	3.834E10
DCBD (kilometer)	.50	5.00	2.9672	1.19970	1.439
BR (line)	2.00	21.00	6.3586	2.83876	8.059
FA (square meter)	43.00	177.00	78.6899	19.94636	397.857
Age (year)	1.00	17.00	6.7828	3.20387	10.265
Orientation	.00	1.00	.6717	.47078	.222
Floor	1.00	16.00	4.8788	2.89327	8.371
SQ (point)	1.00	5.00	3.1818	.82921	.688
ENQ (point)	1.00	5.00	3.2677	.77004	.593
IENQ (point)	1.00	5.00	3.3182	.77050	.594
TDLE (kilometer)	2.00	5.50	3.3535	.77477	.600
TDES (kilometer)	2.00	6.00	3.8965	.78736	.620
TDEF (kilometer)	2.00	7.00	4.2222	.91995	.846

Source: Calculation

In table 5.1, the housing price (P) ranged from 178,000 yuan to 1,200,000 yuan with the mean of 504,000 Yuan. The distance to the Center Business District (DCBD) was scaled by each 500 meters approximately, which ranged from 0.5 to 5 kilometers. The mean of the distance was 2.97 kilometers. The number of bus routes (BR) around the communities within 500 meters ranged from 2 to 21 lines. The average number of bus routes was around 6 lines, which indicated that the public

transportation access was relatively convenient for the sample residents in Kunming. The floor area (FA) of the housing ranged from 43 to 177 square meters with an average floor area was 78.69 square meters. The age of housing units (AGE) differed from 1 year to 17 years. The newest units had been built only one year prior while the oldest units were already 17 years old. The orientation (Orientation) of the housing is regarded as the dummy variable, the south facing housing is set as 1 and the other directions set as 0. The floor of the housing units ranged from the first to sixteenth floor. The mean of the floor was approximately 5 which indicated that most of sample housing units were at a relatively low level.

The structural quality, environmental quality around and inner communities were measured according to the five-point Likert scales (5=highest quality, 1=lowest quality etc.). The average score of these three qualities were 3.18, 3.27, 3.32 respectively. This indicated that the housing samples were of relatively fair quality in these three characteristics.

The total distance to the nearest life establishments, education services and entertainment facilities were ranged from 2 to 5.5 kilometers, 2 to 6 kilometers and 2 to 7 kilometers, respectively. The mean distance of these three characteristics were 3.35 kilometers, 3.90 kilometers, and 4.22 kilometers, respectively.

5.3.2 Regression of the models by three functional forms

This study applied the multiple regression with Ordinary Least Square (OLS) method to estimate the relationship between housing price and each related characteristics by hedonic pricing model with the three functional forms that linear, log-log and semi-log functional forms.

Model 1: linear functional form

$$P = \beta_0 + \sum_{i=1}^{n=12} \beta_i Z_i + \varepsilon \quad (i=1,2,3,\dots,n)$$

Model 2: log-log form/ double log functional form

$$\ln P = \beta_0 + \sum_{i=1}^{n=12} \ln \beta_i z_i + \varepsilon \quad (i=1,2,3,\dots,n)$$

Model 3: Semi-log functional form

$$\ln P = \beta_0 + \sum_{i=1}^{n=12} \beta_i Z_i + \varepsilon \quad (i=1,2,3,\dots,n)$$

The regression results show as follows:

Table 5.37 The model summary of three functional forms

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.
1	.969 ^a	.939	.935	50063.253	235.707	.000 ^a
2	.987 ^a	.973	.972	.06597	566.035	.000 ^a
3	.985 ^a	.969	.967	.07082	489.187	.000 ^a

Model 1 Dependent Variable: P

Model 2 and 3 Dependent Variable: lnP

In table 5.37, the regression result shows that R square is 0.939 and adjusted R square is 0.935 by the linear functional form, R square is 0.973 and adjusted R square is 0.972 by log-log functional form and R square is 0.985 and adjusted R square is 0.969 by the semi-log functional form. The results of all three functional forms show that housing price can be explained by the model very well.

Table 5.38 The regression coefficient of the linear functional form

Model 1	Unstandardized Coefficients		Standardized Coefficients	t	VIF
	B	Std. Error	Beta		
(Constant)	123343.114	74719.744		1.651	
DCBD	-46216.359	7540.230	-.283	-6.129***	6.432
BR	11104.140	1956.247	.161	5.676***	2.424
FA	4836.622	203.166	.493	23.806***	1.291
AGE	-2439.291	2244.773	-.040	-1.087	4.066
Orientation	-6203.038	8955.193	-.015	-.693	1.397
Floor	571.058	1323.448	.008	.431	1.152
SQ	15578.534	8297.140	.066	1.878*	3.721
ENQ	26610.537	8117.882	.105	3.278***	3.071
IENQ	21156.831	8268.430	.083	2.559**	3.190
TDLE	-14260.380	7250.672	-.056	-1.967*	2.480
TDES	-5306.145	6537.842	-.021	-.812	2.083
TDEF	-12732.095	5946.423	-.060	-2.141**	2.352

a. Dependent Variable: P

Note: *** significant level at 0.01; ** significant level at 0.05; * significant level at 0.1

In table 5.38, it can be concluded that 8 variables entered into the model. There are 3 variables that have a negative relationship and 5 variables that have a positive relationship with the housing price. The variables of housing age, housing orientation, the floor level and total distance to the educational services are proved to be insignificant.

The distance to CBD has proved to have a negative relationship with the housing price at 0.01 level of significance. When the distance to CBD increases by one kilometer, it would cause the housing price to decrease by 46216.359 Yuan. The number of bus route has a positive relationship with the total housing price at 0.01 level of significance. Each additional bus route within the 500 meters around the communities would prompt a 10752.708 Yuan rise in the total housing price. The

floor area has a positive relationship with housing price at 0.01 level of significance. One square meter increase in floor area, the housing price increases by 4836.622 Yuan.

The structural quality, environmental quality around the communities of the housing, and inner environmental quality of the community have a positive relationship with the housing price with the significant level at 0.1, 0.01 and 0.05, respectively. When the quality of which improves one level, the housing price increases by 15578.534 Yuan, 26610.537 Yuan, and 21156.831 Yuan, respectively.

The total distances to the nearest life establishments (e.g. supermarket, restaurant, bank, post office, hospital) and entertainment facilities (e.g. park, cinema, museum, gymnasium) from the communities has proved to have a negative relationship with the total housing price at the significant level of 0.1, and 0.05, respectively. When the total distance increases one kilometer, it would cause the housing price to decrease by 14260.380 Yuan and 12732.095 Yuan, respectively.

There are two identifications of the Variance Inflation Factor (VIF) which is used to detect the severity of multicollinearity, one considered that it should be less than 10 (Hair et al.,1995) while the other suggest that VIF should be less than 5 (A.H.Studenmund, 2006). The VIF of the distance to CBD is greater than 5 but less than 10 in an acceptable level, the distance to CBD is an essential characteristic effecting on housing price which is necessary for the model.

Table 5.39 The regression coefficient of the log-log functional form

Model 2	Unstandardized Coefficients		Standardized Coefficients	t	VIF
	B	Std. Error	Beta		
(Constant)	9.368	.164		57.179	
ln(DCBD)	-.167	.017	-.235	-9.578***	4.202
ln (BR)	.095	.020	.093	4.736***	2.671
ln(FA)	.910	.024	.535	38.390***	1.355
ln(Age)	-.124	.017	-.175	-7.082***	4.253
ln(Floor)	-.007	.008	-.011	-.838	1.222
ln(SQ)	.052	.026	.040	1.991**	2.835
ln(ENQ)	.071	.027	.048	2.622**	2.321
ln(ENQ)	.113	.030	.073	3.764***	2.599
ln (TDLE)	-.016	.034	-.010	-.472	2.838
ln (TDED)	-.118	.031	-.064	-3.866***	1.928
ln (TDEF)	-.101	.032	-.059	-3.138**	2.492
Orientation	.018	.012	.022	1.573	1.372

a. Dependent Variable: lnP

Note: *** significance level at 0.01; ** significance level at 0.05; * significance level at 0.1

In table 5.39, there are 9 variables entered into the model, of which 4 variables have a negative relationship and 5 variables have a positive relationship with the housing price. The distance to CBD has a negative relationship with the housing price at a significant level of 0.01. If the distance to CBD increases by 1%, the housing price would decrease 16.7%. On the other hand, the number of bus routes has a positive relationship with the housing price at the significant level of 0.01. When the bus routes within the 500 meter around the communities increases 1%, the housing price would rise by 9.5%. The VIF of the variables are all less than 5 by the log-log functional form in an acceptable level.

The floor area has a positive relationship with the housing price at significant level of 0.01. With a 1% increase in floor area, the housing price would increase by 98.8%. The housing age has a negative relationship with the housing price at the

significant level of 0.01. When the housing age increased by 1%, this would lead 12.3% decrease on the housing price.

The structural quality, environmental quality around the communities, and inner environmental quality of the community have a positive relationship with the housing price. When the quality of housing unit improved 1% in level, the housing price would increase by 5.2%, 7.1%, and 11.3%, respectively.

The total distance to the nearest educational facilities (kinder garden, primary school, middle school, university) and entertainment facilities (park, cinema, museum, gymnasium) from the sample housing units has a negative relationship with the housing price. When the total distance increased 1% from the nearest educational services and the entertainment facilities, the housing price would decrease by 11.8% and 10.1%, respectively.

Table 5.40 The regression coefficient of the semi-log functional form

Model 3	Unstandardized Coefficients		Standardized Coefficients	t	VIF
	B	Std. Error	Beta		
(Constant)	12.607	.106		119.274	
DCBD	-.085	.011	-.261	-8.000***	6.432
BR	.012	.003	.087	4.366***	2.424
FA	.010	.000	.496	33.999***	1.291
AGE	-.019	.003	-.156	-6.033***	4.066
Orientation	.003	.013	.003	.222	1.397
Floor	.000	.002	.002	.170	1.152
SQ	.022	.012	.047	1.898*	3.721
ENQ	.022	.011	.044	1.954*	3.071
IENQ	.048	.012	.093	4.070***	3.190
TDLE	-.029	.010	-.057	-2.795**	2.480
TDED	-.022	.009	-.045	-2.424**	2.083
TDEF	-.032	.008	-.076	-3.851***	2.352

a. Dependent Variable: lnP

Note: *** significance level at 0.01; ** significance level at 0.05; * significance level at 0.1

In table 5.40, there are 10 variables entered into the model, 5 variables have a negative relationship and 5 variables have a positive relationship with the total housing price. Same as the linear functional form, the VIF of the distance to CBD is greater than 5 but less than 10 in an acceptable level, this is an essential characteristic effecting housing price, which cannot be ignored.

The distance to CBD has a negative relationship with housing price at a significant level of 0.01. When the distance to CBD increased one kilometer, the housing price would decrease by 8.5%. The number of bus routes has a positive relationship with the housing price at 0.01 level of significance. If there is one more bus route within 500 meters around the communities, the housing price would raise by 1.2%. The floor area has a positive relationship with the housing price at 0.01 level of significance. One square meter increase would cause the housing price to increase by 1.0%. The housing age has a negative relationship with the housing price at 0.01 level of significance. If one year increases in the housing age, the housing price would decrease by 1.9%.

The structural quality, environmental quality around the communities, and inner environmental quality of the communities have a positive relationship with the housing price. If the quality of which improved by one level, the housing price would increase by 2.2%, 2.2% and 4.8%, respectively.

The total distances to the nearest life establishments (supermarket, restaurant, bank, post office, hospital), the educational facilities (kinder garden, primary school, middle school, university), and entertainment facilities (park, cinema, museum, gymnasium) from the communities have a negative relationship with the housing price. The total distance increases one kilometer from the life establishments,

educational services and entertainment facilities, the housing price would decrease by 2.9%, 2.2%, and 3.2%, respectively.

In conclusion, the results of the model regression demonstrates that the linear functional model rejected the characteristics of Age, Orientation, Floor and TDES while accepted the characteristics of the FA, DCDB, BR, ENQ, IENQ, SQ, TDEF and TDLE. The log-log functional form rejected the characteristics of the Floor, TDLE, and Orientation and accepted the characteristics of the FA, DCDB, Age, BR, IENQ, TDED, TDEF, ENQ and SQ. The semi-log functional form rejected the characteristics of the Floor and Orientation and accepted the characteristics of the FA, DCDB, Age, IENQ BR, TDEF, TELE, SQ, TDED, and ENQ.

Comparing the results of three functional forms, the rank of the independent variables which significantly impact on housing price can be shown as follows:

Table 5.41 The ranking of the accepted variables by three functional forms

Semi-log functional form		Log-log functional form		Linear functional form	
1	FA	1	FA	1	FA
2	DCDB	2	DCDB	2	DCDB
3	AGE	3	AGE	3	BR
4	IENQ	4	BR	4	ENQ
5	BR	5	ENQ	5	IENQ
6	TDEF	6	TDED	6	SQ
7	TDLE	7	TDEF	7	TDEF
8	SQ	8	ENQ	8	TDLE
9	TDED	9	SQ		
10	ENQ				

Source: By reorganizing

In table 5.41, it can be summarized that there are 10 variables entered into the model for the semi-log functional form, 9 variables entered into the log-log functional

form, and 8 variables entered into the linear functional form.

The floor area is the most significant characteristic affecting the housing price. It took the first place among all three functional forms, followed by the distance to CBD, which plays the second important role on determine the housing price. Even though the housing age was rejected by linear functional form, it took the third place in log-log and semi-log functional forms. Furthermore, number of bus routes was the third significant characteristic in liner functional form, the fourth in log-log functional form and the fifth in semi-log functional form. Although, other characteristics were differently significant in three functional forms, they contribute to the housing price in Kunming as well. The floor and orientation of the housing units were rejected by all three models, which indicated that these two characteristics were insignificant.