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Low-income Household's Public-rented Flats Preferences in Semarang City Using Conjoint Analysis

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Abstrak

This study aims to determine public flats preferences of low-income household respondents using conjoint analysis, so that it can be identified the relative importance of flats attributes and the utilities's value of attribute levels that affect respondent's choice. Survey was conducted on 35 squatter's respondents who live in the Banjir Kanal Timur Semarang Riverbanks and 86 respondents who already dwelled in Kudu and Pondok Boro public rental flats provided by the Semarang City Government. The attributes identified to describe public flats are: rental prices, accessibility and location, facilities, and ownership rights. The study show that "rental prices" and "accessibility and location" is the most important attribute in choosing the public rental flats to live in, while "facilities" was the least important. The choice behavioral models based on age, education levels, types of job, monthly income, and family size show that respondents have different preferences based on their socio-economic characteristic.

Keyword: Public-rented flats preferences, low-income household, conjoint analysis, attribute levels.

1. Introduction

Indonesia is one country that has a very big population, it even reached 264 million in 2017 (World Bank, 2018). Indonesia has several big cities such as Jakarta, Surabaya, Medan, Bandung, Bali, Semarang, and many more. As we know that urban areas are the most desired places of living for everyone because of high employment opportunities, public facilities concentration, and a better quality of life there. It encourages people to live in urban areas, it has been projected that by 2030 the urban population of developing countries will double, while the area covered by cities would triple (UN Habitat III, 2016). The condition will lead to high demand for housing, which then affecting the emergence of slums in urban areas.

Slums and urban areas are two things that can not be separated, where slums can be found in several urban areas such as river banks, coastal areas, and others. According to Indonesian's Law No. 1 of 2011 concerning housing and settlements, explained that slums are uninhabitable housing because of building irregularities, high building density, and the quality of buildings and facilities do not meet the standards. Based on physical aspects and the socio-economic of the inhabitants, slums have low quality on both aspects (Bergel, 1970).

In order to overcome the problem of limited land in urban areas, the horizontal construction of land then turned into vertical development, it can accommodate land needs, for housing known as flats or other activities. According to Indonesian's Law No. 20 of 2011 concerning to public housing, the type of flats classified into several: a) public flats (for low-income household housing needs); b) typical flats (for special needs); c) state flats (owned by the state for supporting the duties of state officer or civil servants); d) commercial flats (for profit).

Public flats are considered as the best solution in providing shelter for low-income household and dealing with the slums or squatter settlements in urban areas. In Indonesia, public rental flats or called rusunawa is a facility provided by the government in order to meet the basic needs of the low-income household, so it can be fully utilized by them. According to Indonesian's Law No. 20 of 2011 concerning to public housing, explained that low-income household called MBR (Masyarakat Berpenghasilan Rendah) is the community that has limited purchasing power, so they need government support to obtain a public housing unit. So far, Indonesia Government is considered incapable and unwilling to plan well the development of

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public flats so that around 40% of the built-up public flats have not been utilized properly (Cipta Karya, 2014). More than that, many flat units have been degraded, damaged, and leaked, it gives the impression that there has been a slum shift, from horizontal to a vertical slum.

The City of Semarang is one of metropolitan cities in Indonesia which has issues of slum areas and high rate of low-income households. Its population was more than 1.7 million in 2016 (Semarang Statistic Center, 2017). To deal with those issues there are several public rental flats in Semarang, such as Rusunawa Karangroto, Gasemsari, Pondok Boro, Plamongansari, Bandarharjo Lama, Bandarharjo Baru, Pekunden, Kaligawe, and the newly bulit is Rusunawa Kudu. In reality, not all low-income households as the consumer of the public housing have the desire to live there. The refusal of Tambakrejo residents to move to public rental flats in 2016 shows that the don't want to live in public flats, they decided to stay in their living place. It is not easy to move people who are used to live in landed house to occupy public rental flats. It has to do with individual housing preferences, in fact that not all people have the willingness to live in public housing. It also indicates that the government has not captured the public housing characteristics that people would prefer.

As individuals, low-income household have different characters, and also they work in a framework of choices from several alternatives in daily life (Zinas et al., 2012). They will choose from several alternatives, as they choose a place to live. As explained by Hensher, et al (2005) in making choices, an individual needs to consider a series of alternatives or called choice sets. Logically, they must evaluate at least two possible alternatives to make a choice. Individuals will evaluate and compare each alternatives, then choose an alternative that has maximum utility, which they will maximize the utility of all possible alternatives (Bø, E. E., 2018). That is what is done when they choose the house to live in, whether buying or renting it, how to pay for it, whether living in city centre or in suburbs, etc. The choice between two individuals will vary, where it is influenced by many factors. These influences are called attributes that relate to the description of an alternative (Hensher et al., 2005).

In this paper, we assume that public housing is a product that has several atrributes such as location, rental price, accessibility, facilities, and ownership rights. Mirkatouli, et al (2015) argues that location, access to road networks, and proximity to urban facilities are the attributes that are important in influencing housing preferences. Whether someone prefer houses in the city centre with high rental prices or houses in the suburbs with lower rental prices, depending on each individual preference. Public housing as a product that the government provides as a place to live for low-income household need to consider the low-income household preferences. Therefore, in the public housing planning process, it is necessary to use a consumer interaction approach. Consumer preferences are important in modeling people's behavior because the choice will ultimately be determined by them, whether or not to live in public housing.

As we mentioned earlier that this preference relates to the attributes of the product, identifying public rentals flats attributes that are important must be done through the literature review and discuss with experts. Public rental flats characteristics include rental prices, accessibility, location, facilities, and ownership rights. In determining to house, low-income household tends to prioritize the location that is close to places that can provide job opportunities or locations close to the economic and business center (Hartshorn, 1992; Pacione, 2001). Sania (2017) investigates one of the factors that drives the desire of low-income household to live in public housing is the location and accessibility. The statement supports Turner's opinion in 1976, which states that the distance between houses and work locations is a priority in determining the location of housing. The strategic location of housing can be measured by the proximity to the business center, workplace, and accessibility to public facilities such as education and health center (Opoku, 2010). Locations where job opportunities are low cause difficulty for them to be able to maintain their lives, so they also tend to choose housing that offer low rental price because of limited income they have. Besides that, according to Irfiyanti & Widjonarko (2014), the lack of public housing support facilities causing a decrease in their interest to occupy public housing. The ownership status and quality of housing are also considered (Hartshorn, 1992; Pacione, 2001). For them, the status of property right can provide a guarantee of the future and also as a social or prosperity symbol and investment. But the most important thing at this stage is the availability place for them to live their life.

This paper aims to determine the preferences of low-income households living in different housing types. It focuses on respondents who are living in Banjir Kanal Timur (BKT)

riverbanks squatter settlement and Semarang city public rental flats (Rusunawa Kudu and Pondok Boro). The main objective of this study is to identify the key factor that influence low-income household behaviors in their decisions on types of public flats that they prefer to live in. Four attributes of public flats have been identified based on literature review. The four attributes are rental prices, accessibility and location, facilities, and ownership right. Specifically, this study tries to identify the relative importance weight of each attribute of the public flats to respondent who are living in BKT riverbanks squatter settlements and also for those who are living in Semarang city public rental flats (Kudu and Pondok Boro). Comparisons are also made on the choice behaviors of these respondents based on their socio-economic characteristic. Preferences can be considered from the socio-economic (Hensher et al., 2005), where the socio-economic characteristics have been used as variables to study inequalities in population and their level of access to urban development (Miech & Hauser, 2001).

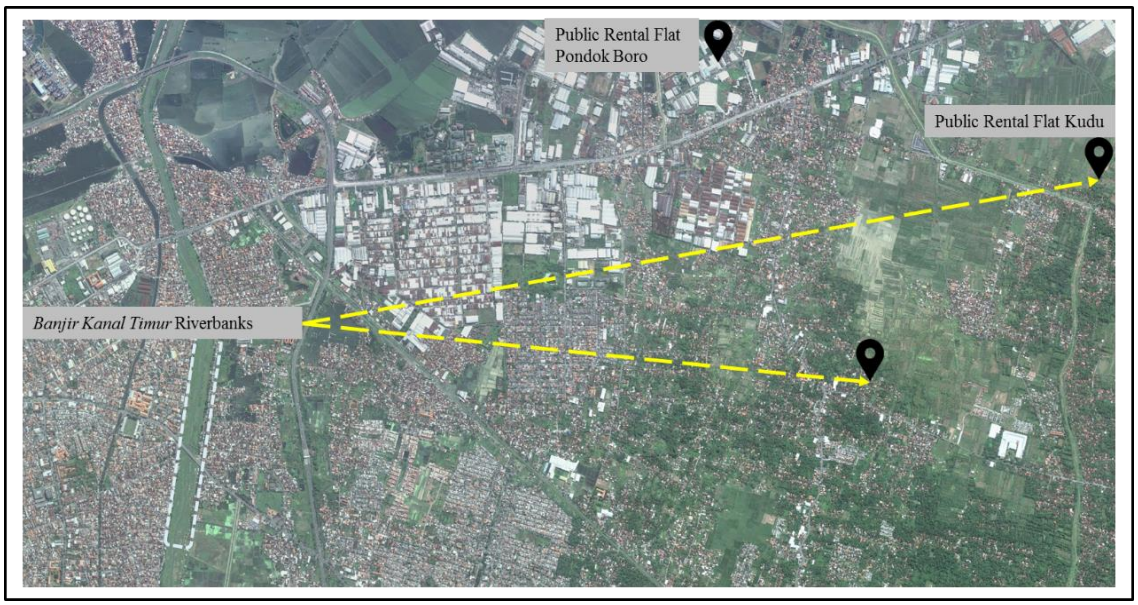

Figure 1. Location of study.

2. Methodology

Conjoint analysis is one type of multivariate analysis which is used to determine the relative importance of attributes. The assumption is that every product is evaluated as a bundles of attributes. Conjoint analysis is used to develop a path-worth or utility function. The basic model of conjoint analysis (Green & Srinivasan 1990; Louviere 1988) can be formulated as follows.

$$U(X_I) = \sum_{z=1}^{s} \sum_{j=1}^{kz} w_{zj} c_{zj}$$

Where:

$U(X_i)$ = overall utility of an alternative

w_{zj} = the weight of path-worth utility contribution associated with the *j*th level or value (j=1, 2, ...k_z) of the *z*th attribute (z=1, 2, ...*s*)

kz = the number of levels of attribute *z*

s = the number of attribues, where c_{zj} = 0 if attribute *z* is not present in alternative X, but c_{zj} = 1 is present

Conjoint analysis is a statistical method used to predict choice behavior (Molin et al., 1999), specifically it can be used to understand what consumers want or prefer on a product or service. In the context of public flats preference, this method is carried out based on respondents evaluation in each public flats profiles. Respondents were asked to express the overall preference in each profile by ranking (Orzechowski, 2004; Coolen & Hoekstra, 2001).

In this study, the conjoint analysis provides a technique for generating the profiles of the hypothetical public housing presented in the questionnaire. All four attributes identified in this study have been described. The choice is assumed to be influenced by their attributes. The number of levels for each attribute was restricted to two, which helps to minimize the respondent evaluation of public flats profile, so it can estimate the parameters with reasonable accuracy. The details of the attributes and its level are given in table 1.

Table 1. Attributes and levels.

Attributes	Levels	Explanation of attributes
Rental prices	Less than Rp100,000 More than Rp100,000	The respondent's financial ability to spend a certain amount of money to pay for a public flats rent per month
Accessibility and location	City centre Suburban area	Affordability of public flats location to work location and public facilities (education, supermarket and trade centre, recreation, etc)
Facilities	Good support facilities and fully furnished Lacked support facilities and Un-fully furnished	The availability of support facilities (road network, drainage system, sanitation, clean water, waste system, electricity, public and green space, etc) and furniture
Ownership rights	Privately owned Rental right	The ownership rights of public flats

Alternative combinations of public rental flats are generated from each attribute levels and performed by the orthogonal array (factorial class design that is possible to make efficient estimates of all major influences) method provided in the SPSS 17.0 program. Based on four attributes and its level, the total number of combinations should have been 16. But having 16 profiles in the questionnaire will be difficult for the respondent to evaluate each profile because there are too many choices. Then, the alternative combination is simplified with an orthogonal contrast design, that generate only 8 profiles of public housing. The orthogonal design allows us to assess the relative importance weight of different attributes of public housing through a reduced sample size of the profiles. The orthogonal arrays enable all the main effects to be measured on an uncorrelated basis (Hwa and Chin, 2012).

The orthogonal designs for the hypothetical public flats selected are given in Table 2. The respondents were asked to mark their preferences by ranking from 1 to 8 amongst the hypothetical public housing apartment. Rank 1 shows that the respondent prefers that public housing apartment over others, while rank 8 was the least desirable. The rankings obtained from respondent then analyzed using conjoint to identify the path-worth utility of each attributes that indicate respondents preference on public rental flats.

Table 2. Orthogonal Design of the public flats.

Housing	Rental prices	Accessibility and Location	Facilities	Ownership rights
A	More than Rp100,000	Suburban area	Good support facilities and fully furnished	Privately owned
B	More than Rp100,000	City centre	Lacked support facilities and Un-fully furnished	Privately owned
C	More than Rp100,000	Suburban area	Good support facilities and fully furnished	Rental right
D	Less than Rp100,000	Suburban area	Lacked support facilities and Un-fully furnished	Privately owned
E	More than Rp100,000	City centre	Lacked support facilities and Un-fully furnished	Rental right
F	Less than Rp100,000	City centre	Good support facilities and fully furnished	Rental right
G	Less than Rp100,000	City centre	Good support facilities and fully furnished	Privately owned
H	Less than Rp100,000	Suburban area	Lacked support facilities and Un-fully furnished	Rental right

The questionnaire were distributed directly to the study area by visiting respondents living in BKT Riverbanks squatter settlement and Semarang City public rental flats (Kudu and Pondok Boro). The study assumed one living place is occupied by one family. Convenience sampling was used, respondents were chosen based on their availibility. The total number of respondents was 121, consists of 86 respondents who are living in Semarang public rental flats (Kudu and Pondok Boro) and 35 respondents who are living in BKT riverbanks squatter settlement.

3. Resullt

The importance weight of each attributes are generated by taking the utility range for the particular attribute and dividing it by the sum of all the utility ranges. Each of the attributes have a value that reflects the relative importance in influencing the choice of public flats. The relative importance weight of each attribute are shown in Figure 2.

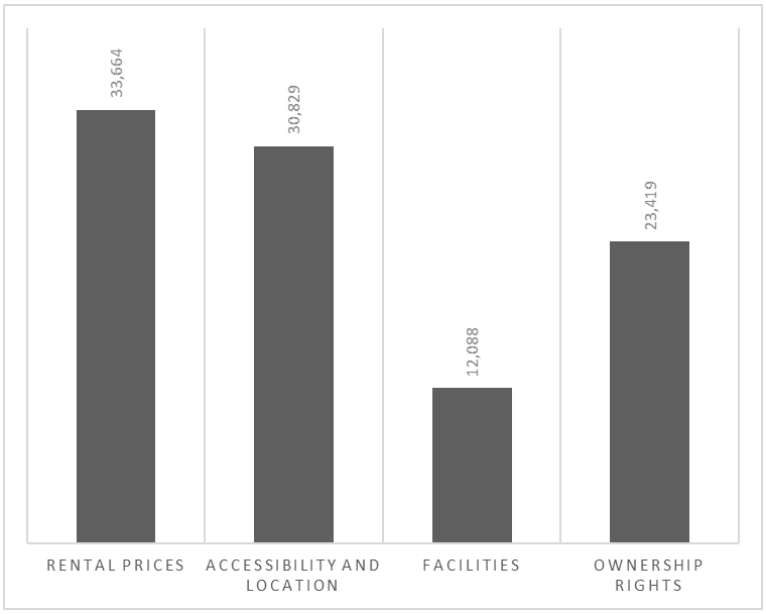

Figure 2. Relative importance weight of each attributes.

The outcome shows that “rental prices” which represent the relative low rental prices or less than Rp 100,000 offered by public flats compared to other public flats is the most important attribute that influences the respondent’s decision. Out of the overall value of 100%, “rental prices” has contributes 33,66% to respondent’s choice. Low rental price is one of basis argument on the selection of public flats as a place to live (Khomarudin, 1997). It confirms a study by Kotler and Amstrong (2004) which stated that price is the main factor of consumers buying a product. Most likely people will buy the product if the price offered is lower than the product’s value, because it can obtain greater utility. If the rental price offered is greater than the ratio of housing’s expenditure, then it would be not affordable for the low-income household. They would prefer public flats that offer the rental price equal to their proportion of housing’s expenditure.

“Accessibility and location” is the second most importance attribute, as important as “rental prices”. It is shown by its gap of the relative importance weight, where “Accessibility and location” has contributes 30,83% to respondent’s choice. Respondents think that living in the suburbs area will spend more on transportation costs (Guerra and Kirschen, 2016; Isalou et al., 2014; Vidyattama et al., 2012). It is because when transportation costs were added, housing in the suburbs area become less affordable than housing in the city center (Saberi et al., 2017). “Ownership rights” is the third important factor that contributes to 23,42% of respondent’s choice, it may indicate they want to state about their housing ownership rights. If the family does not have “ownership rights”, they will be feeling not safe, thereby it can reduce their

interest in expanding, maintaining, or improving their living place (Turner, 1972: 169). The attribute "facilities" does not have much influence over the choice of public housing compared to other attributes. It does not matter whether a public flats has good facilities and fully furnished or not, it won't affect on respondents choice on which public flats they wish to live in.

This study also used conjoint to analyze the choice behaviors based on the respondent's socio-economic characteristics such as age, education level, types of job, monthly income, and family size. Choice behavior may vary amongst respondents based on their socio-economic characteristics. Table 3 shows the statistics of respondent's characteristics.

Table 3. Respondents Statistic.

Demographic	Characteristic	Number of respondent	Percent (%)
Age	<29	6	4.96
	30-49	82	67.77
	>50	33	27.27
Education level	No formal education	11	9.09
	Primary school	67	55.37
	Secondary school	27	22.31
	Senior high school	16	13.22
Job	Odd jobs	38	31.40
	Factory workers	23	19.01
	Private workers	13	10.74
	Entrepreneur	31	25.62
	Fisherman	5	4.13
	Others	11	9.09
Income	<Rp 2,000,000	52	42.98
	Rp 2,000,001-Rp 4,000,000	67	55.37
	>Rp 4,000,001	2	1.65
Family size	<2 family members	42	34.71
	3-4 family members	68	56.20
	>4 family members	11	9.09

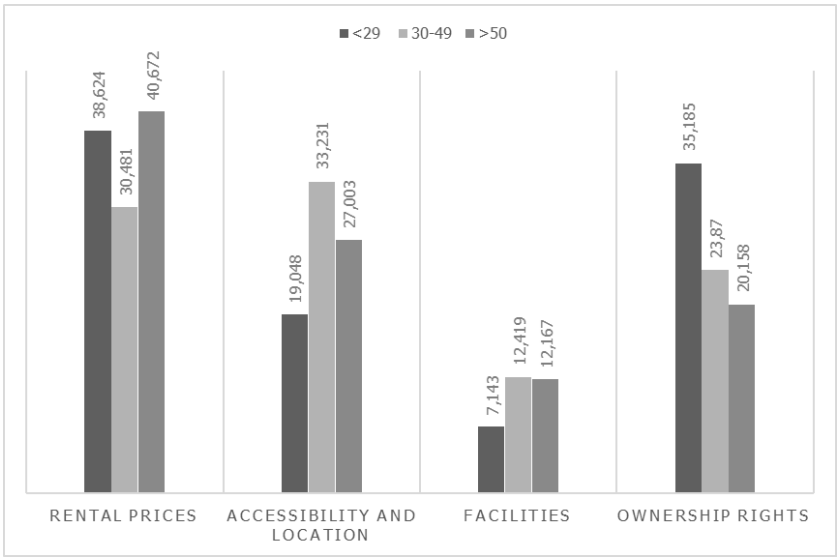

Figure 3. Choice of public flats by age.

As shown in Figure 3, respondents who are under 29 years old and above 50 years old very consider the rental price. Those under 29 years old are classified as young generation and not financially ready, while for those above 50 years old or relatively old by age, their financial and productivity also decrease. So, the low level of their productivity was the main reason they were very considerate the rental price of public rental flats. The second attribute prioritized by the age group above 50 years old is accessibility and location, aside from low rental prices, they also want apartment that have good access and location or close to their relatives. Different condition for those between the ages of 30 to 49 years old, they are more likely to consider accessibility and location as their first priority. This age group tends to have high productivity

and mobility, they prefer to live in a place that has a strategic location and high accessibility. Finally, facilities of the public flats is the less important to respondents regardless of their age.

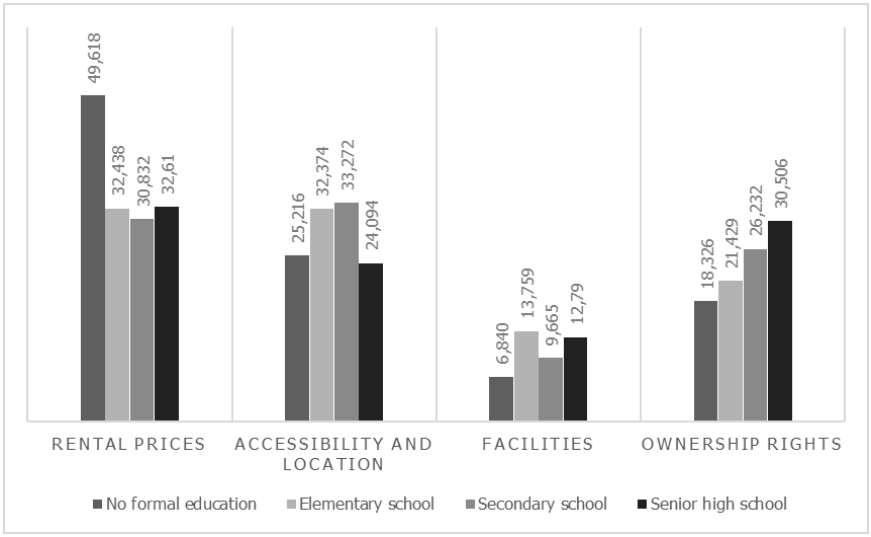

Figure 4. Choice of public flats by education level

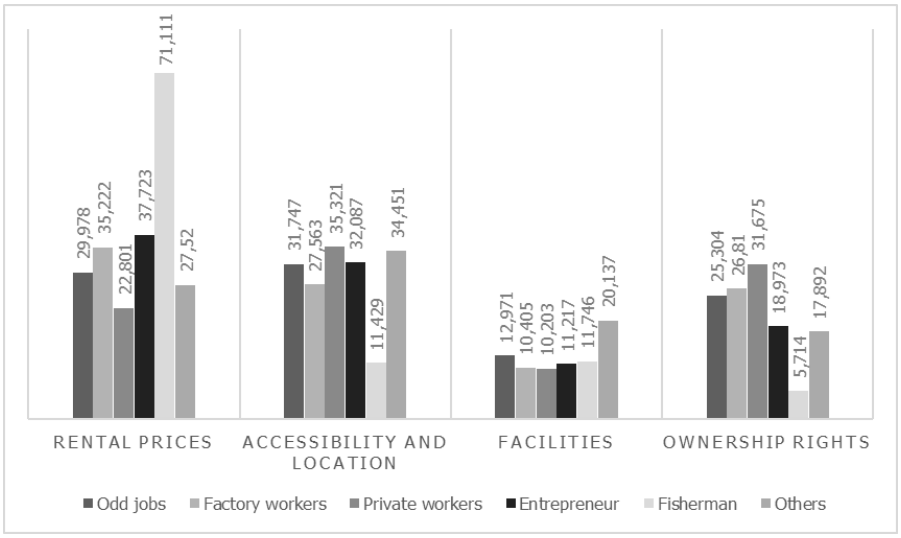

Figure 5. Choice of public flats by types of job

Respondents who have no formal education or those who get primary education and higher education very prioritize “rental price” on their public flats choice. The difference is those who have no formal education and those who get a primary education consider “accessibility and location” on their second importance attribute, while those who get higher education prefer on “the ownership rights” as their second importance attribute. Figure 4 also indicates that education level has correlation with consideration of attribute “ownership rights”. It can be seen that the higher level of education, the relative importance weight of “ownership rights” in choosing public flats is higher. The higher level of education, then their knowledge of importance of having a house as an investment asset is increases. Meanwhile, the attribute facilities is less considered by respondent based on their education level.

Figure 5 indicates that respondent’s choice behavior based on types of job is very diverse. Those who work odd jobs really consider the accessibility/location and rental prices. Their job did not provide a fixed income monthly, so they want to live in a strategic place that offer high job opportunities and offer low rental prices. We can also see that “rental prices” is the most importance attribute of all the attributes for those who work as fisherman. Choice behavior pattern based on types of job is difficult to describe, each type of job have their own preference. But, in general, accessibility/location and rental prices are the two main attributes of respondents prioritize in choosing public flats based on their jobs.

Figure 6 indicates that respondents who have monthly income more than Rp 4,000,000 would give high priority to accessibility and location, they would not mind about the rental price offered. It is good for them to pay more in rental price if the apartment located in the city center. The higher level of income then their ability to pay increases, so the rental prices is no longer be their problem. While for those who earn less than Rp 2,000,000 per month, they actually more consider about the rental prices than other attributes. Their low income had caused their ability to pay housing rent tp decrease. From the picture we can also see a pattern on the attribute "rental prices", "accessibility and location", and "facilities". The higher level of income, the consideration of attribute "rental prices" will decrease, while the consideration of attribute "accessibility or location" and "facilities" will increase. In addition to locations closes to the city center, respondents who earn more than Rp 4,000,000 per month also prefer to the better facilities of the apartment than those who earn below Rp 2,000,000 per month.

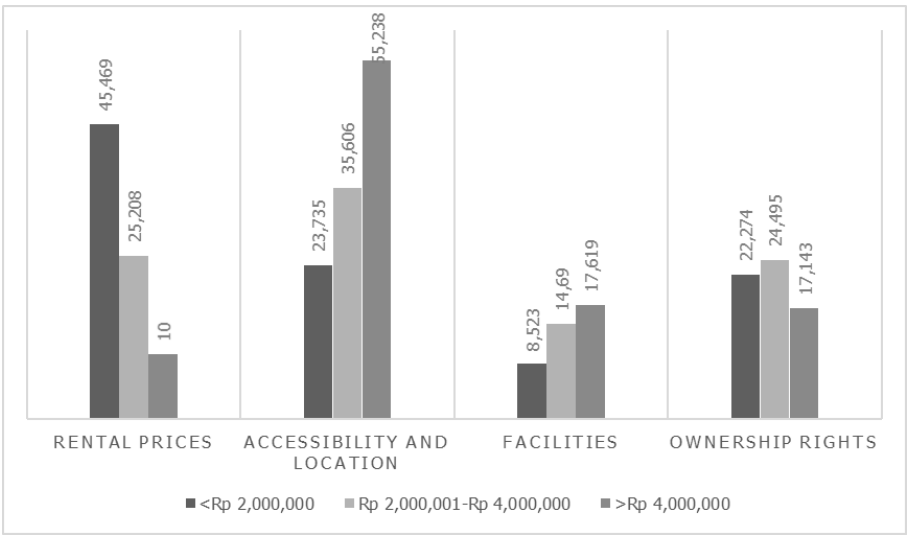

Figure 6. Choice of public flats by monthly income.

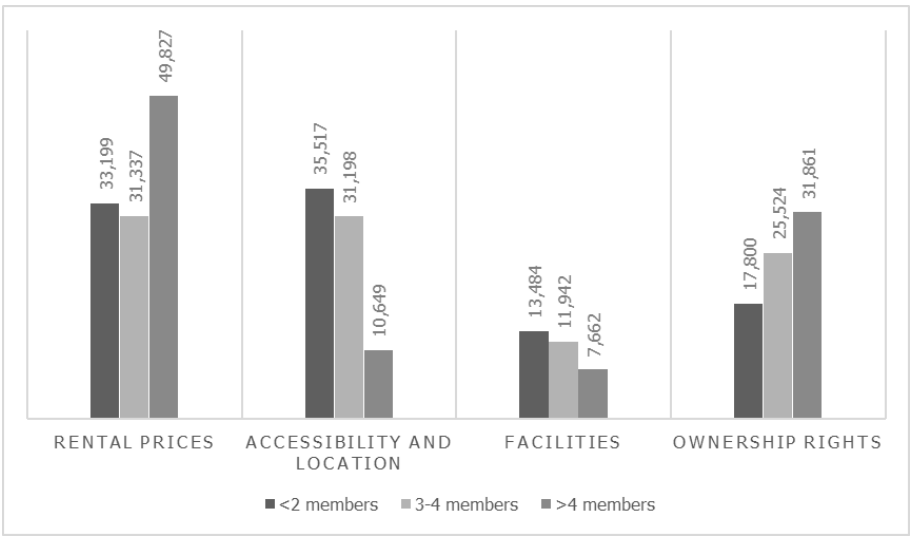

Figure 7. Choice of public flats by family size

As shown in Figure 7, those who have more than 4 family members (generally consists of husband and wife with two children or more) obviously prefer the public flats that offer low rental price. This group has the level of expenditure on family needs greater than those who have less than 4 family members, it causes the lower proportion of income that can be spent to pay for rent. The second important factor for them is "the ownership rights" of the flats, while facilities was the least important to them. For respondents who have less than 2 family members (generally consists of husband and wife without children), accessibility and location is the most important attribute followed by rental prices and ownership rights, while facilities is the least important. From the picture, we can see that the more number of family members, the tendency

to live in public rental flats located in city center or supported by good facilities will decrease. But they would prefer to privately owned a house, due to their motivation to make better life for their family members (especially their child) in the future.

4. Conclusion

In general, "rental prices" is the most important attribute in choosing the public rental flats to live in. Similar study conducted by Irfiyanti & Widjonarko (2014) stated that one factor that influences the low interest of low-income household to live in public rental flats was the expensive rental prices. In reality, some public rental flats that have been built have a low occupancy rate. It happens because not all low-income household have the high ability to pay the rental prices. The ability to pay is related to monthly income and their living cost, and their income is often used to estimate their socio-economic conditions. Based on the survey, it is known that most of respondents work in informal sector, such as factory workers, fisherman, and others. Expenditure on housing costs is the largest component after food expenditure. According to Miah (1990), the amount of expenditure for housing costs is a maximum of 20-30% of total income, but there are some people whose expend less than that.

In addition to rental prices, accessibility and location is the second attribute that is as important as the rental prices attribute. Similar findings as done by Sania (2017) and also Sabri & Wiranto (2016), where good accessibility of the location can increase the satisfaction and their desire to live in. As the statement of Prof. Totok Rusmanto (City Planning expert at Diponegoro University, Semarang), that there was a mistake in the concept of public rental flats in Semarang City in the locations context. Most of public rental flats are located far from the initial living place of the community who will be relocated. Whereas it should be built in areas close to slums, so that the community do not object it, then the development is expected to be optimal.

The choice behavioral models based on age, education levels, types of job, monthly income, and family size show that respondents have different preferences based on their socio-economic characteristic. This segmented models provide important information based on the characteristic of the respondents in the study area. It is very important to identify the choice of consumers based on the attributes before the decision of building a public rental flats is made, as each area may have different consumer choices. It is important to provide information about low-income household public flat's preferences, in the hope that policies made can accommodate low-income household needs.

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