The Demand for Subsidized Housing: A Case of Banda Aceh City, Indonesia

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Abstract
Objective – The Indonesian government has introduced the Housing Financing Facility (FLPP) scheme. The subsidized housing scheme is intended to help low-income families improve their welfare. Understanding how mortgage subsidies affect the demand for new houses can provide a better understanding of how housing policy affects the number of people who afford to own homes, house prices, and other social welfare outcomes. This study investigated the effects of income, housing value, education and family size on the demand for subsidized housing in Banda Aceh.

Design/methodology – The methodology used in this paper is multiple regression method which was collected from household data of 60 respondents from six sub-districts in Banda Aceh City, Indonesia.

Results – The study found that only income and housing values were statistically significant in determining the demand for subsidized housing. Meanwhile, the purchase of subsidized housing does not depend on the size and education of the family. These findings suggest that households tend to buy larger size homes as incomes rise and seek to maximize their benefits from buying subsidized homes even at higher prices, which is proxied by the value of the home, since housing is considered a housing investment.

Research limitations/implications – The policy implications of these findings are that governments should make predictions of future needs for subsidized housing based on income growth. The government should also accelerate affordable housing funding schemes, as the long-term economic growth impact of such policies is positive.

Keywords: subsidized homes, home demand, house value

1. Introduction

Since 2015, the Government of Indonesia has launched the plan to provide one million houses per year. To support the policy, low-income people are targeted to be subsidized in home ownership. The government also supports home builders through support for the construction of public facilities in subsidized housing environments. Subsidized home financing (known as Kredit Pemilikan Rumah – KPR) is a home ownership loan/financing that receives assistance and/or ease of house acquisition in the form of long-term affordable funding and house acquisition subsidies issued by the participating commercial banks. The forms of subsidies include Home Ownership Loans, Interest Difference Subsidies, Home Ownership Financing, Margin Difference Subsidies, Down Payment Assistance Subsidies, and Housing Financing Liquidity Facilities. However, from the buyer's point of view, the demand for subsidized houses is still minimal due to the relatively high final price, although home values increase over time because the house is considered a residential investment. The final price usually includes a deposited down payment that is not recorded in the subsidy scheme. From the house builders' side, they charge higher prices for subsidized houses in Banda Aceh

City than other regions due to high prices of land. House prices determine buying decisions (Rahman, 2022).

Many subsidized houses were built around the city of Banda Aceh, namely Aceh Besar district because land prices are relatively lower. This causes the location factor to also determine the interest in buying a house. In addition, the economic and social environment is often an issue for low-income residents to buy subsidized houses in locations far from their workplaces (N. D. Radwa &; Megawati, 2022). Previous studies have only focused on income, price and location, but underexplored the effects of family size and education levels. Using home value as a proxy for home price, which may lead to different outcomes, is also a further contribution of this study. The study fills that gap by including those two variables and measurements in addition to income and prices that are proxied with home values in the demand for subsidized housing.

The demand for homes differs from the demand for other goods in that homes are essentially investment goods, not consumer goods. Among the important factors that determine the demand for a home are income, demographic factors, rental prices, and interest rates (Fahmi et al., 2018). However, the demand for housing is inelastic to income in low-income groups of people (Hughes, 2020;; Ahmad et al., 2013). The difficulty of obtaining a home is high for low-income residents (Ebekozien et al., 2020). Low-income buyers might have trouble buying a home because they do not have much money, cannot save for a down payment, have a lot of debt, or have a low credit score (Fout et al., 2020). The income elasticity of the demand for housing is high and changes over time. Hedonic pricing regressions show that this high elasticity is caused by the high demand for improved water and sanitation amenities that are tied to the consumption of housing (Karmali & Weng, 2022).

In United States, potential advantage of housing subsidies for redistributive purposes rests on ensuring that the subsidy is targeted to households who are truly in need (Eriksen & Lang, 2020). Tax Incremental Financing (TIF, hereafter) and the Low Income Housing Tax Credit (LIHTC, hereafter - often pronounced “lie-tech”) are one of the programs implemented in the US to increase the supply of affordable housing (Luque, 2020). Similarly, in Indonesia, subsidized housing is a government program through the Ministry of Public Works and Public Housing of the Republic of Indonesia aimed at Low Income People (MBR) with low interest rates and light installments for the purchase of landed prosperous houses and flats. This program is run through Subsidized Home Ownership Loans (KPR), which are home ownership financing that receives assistance and/or ease of obtaining houses for the community in the form of long-term low-cost funds and subsidies for home acquisition issued by implementing banks, both conventionally and with sharia principles (PUPR, 2020). However, in Indonesia there are still many low-income people (MBR) who do not have a home. Understanding how mortgage subsidies affect the demand for new house can help us better understand how housing policy affects the number of people who own their own homes, the prices of homes, and other social outcomes. Thus, subsidized housing is becoming an important policy in many developing countries.

Several previous studies have investigated factors that influence home demand. Among the important determinants of home demand are, among others: location, population growth, consumer income, ease of obtaining loans, public facilities, house prices (Braakmann & McDonald, 2020; Firdaus, 1997a; Mahardini & Woyanti, 2012) down payments, loans, and the burden of family dependence (Prayuda, 2012) , marital status, parents' assets, willingness to settle down, monthly income, and housing subsidy (Wang & Otsuki, 2015). Likewise, mortgage subsidies and marriage affect housing demand through both the homeownership and household formation channels (Ricks, 2021). However, research on the demand for subsidized houses is still very little. In addition, data on the supply and demand of homes in developing countries such as Indonesia is often not up to date, especially time-series data. Research on housing affordability is dominated by developed countries (Galster & Lee, 2021). Therefore, this study contributes to the research gap for the case of a city in a developing country. The purpose of this study is to investigate the determinants of subsidized housing demand by testing several main explanatory variables, namely income, house value, education and family size.

2. Literature Review, Theoretical Framework, and Hypothesis Development

Housing plays an important role in improving the socio-economic status of lower layers of society in developing countries. Therefore, housing finance for low-income people is key to improving social welfare. Housing is a major asset for the poor and provides a basis for further improvement of their economic status, not only for the poor in rural areas but also for the urban poor. Rapid urbanization requires the provision of housing for underprivileged people in urban areas. Therefore, the improvement in the social welfare could in general be greatly affected by the affordability of owning houses.

Housing finance has become a global development agenda (World Bank, 2023).. The issue of housing is not only important for developing countries, but also a crucial issue in developed countries. In the U.S., about 16 million households need rental assistance. They spend more than 30 percent of their income on housing or live in houses that do not meet standards. Due to financing constraints, they do not obtain housing assistance (Fischer, 2023). In Indonesia, a one-million house construction program was introduced by the government in 2015 with the aim of accelerating the provision of habitable houses for all Indonesians. A habitable house is a house that meets four criteria: a strong construction structure, sufficient space, good sanitation, and the availability of clean water networks. In 2021, the number of houses built reached 871,218 units, but the number of houses for low-income people was only 650,649 units (Kementerian PUPR, 2023) The gap between demand and supply needs to be narrowed. Therefore, the provision of subsidized housing is an important strategy. Like in developed countries (Fischer, 2023), there are at least three tangible benefits of providing home finance assistance, namely reducing the number of homeless households, reducing the number of poor people, and improving adult health and well-being and future success opportunities for underprivileged children.

Housing demand is determined by many factors, including loan interest rates and house prices (Ayuningtyas, 2022), and economic and social conditions, including the pandemic (Aksoy Khurami & Özdemir Sarı, 2022). House prices as the main factor determining demand are also influenced by inflation rates. Consequently, households may postpone the purchase of a house due to budget constraints and, hence make substitutions between housing and other items. Furthermore, the prices of building materials also increase because of rising general prices so that house prices are also increasing. Because house prices have a significant negative effect on housing demand (Ayuningtyas, 2022), housing subsidies would be needed to lower house prices and increase the affordability of low-income population to own homes. One of the Indonesian government subsidies, i.e., housing finance liquidity facility (FLPP), has shown a positive and significant influence on the increase in the number of subsidized houses in Indonesia (Sudarman, 2022. Meanwhile, the Loan to Value (LTV) Ratio Limit for Property Loans (KPR) as part of a monetary policy introduced by Bank Indonesia in 2021 has also had a significant positive effect on the number of housing loans (Nurrahmania & Khoiruddin, 2022).

The affordability of buying a home determines the housing market. Affordability reflects the cost of acquiring a home and housing supply. From the supply side, the factors such as titling costs, land use and infrastructure issues, construction finance, and government policies on housing, including housing subsidies, are important determinants of housing supply and house prices (World Bank, 2023). In the event of a crisis, the demand for housing may decrease due to the increase in house construction costs and, thus increase house prices. The demand for housing may also shift due to the decline in household income (Aksoy Khurami & Özdemir Sarı, 2022). Furthermore, affordability is not only influenced by the type of house, but also influenced by the choice of transportation mode. Therefore, housing and transportation costs can affect family budgets, and ultimately housing demand (Dewita et al., 2020). Thus, the efforts that need to be made are to increase the affordability of home acquisition. This can be done through policies that affect the supply side, among others, by controlling inflation and providing affordable transportation. Conversely from the demand-side, the policy should be to provide subsidies for housing acquisition, especially for low-income households.

In Indonesia, there is a wide gap between the supply of and the demand for affordable homes. The private sector tends to build houses in urban areas where purchasing power is relatively higher and targets high-income buyers, while in both urban and rural areas low-income households generally cannot afford to own houses. In such circumstances, low-income communities usually find their own way to meet housing needs (Tunas & Peresthu, 2010). Therefore, the provision of housing subsidies for low-income households is considered as an important part of government policies to improve the social welfare.

Subsidized housing for low-income group of the population is usually defined as the provision of houses for tenants who have incomes at a certain level or below for which rent is made low or paid by the government, usually based on the median income in a particular area (World Bank, 2023). However University of York (2021 shows that the provision of housing for low-income tenants is unsustainable. Moreover, the resulting reduction in residential investment in social housing has also led to higher reliance on housing provision by the private sector. In Indonesia, the definition of subsidized housing is broader. In general, subsidized housing is defined as the provision of houses at affordable prices. In other words, subsidized housing is targeted at the affordability of low-income households to own homes. According to the Regulation of the Minister of Public Works and Public Housing of the Republic of Indonesia Number 1 of 2021 concerning Criteria for Low Income People and Requirements for Ease of Construction and Acquisition of Houses, the house in question is a building that functions as a habitable residence, a means of family welfare improvement, a reflection of the dignity of its residents, and an asset for its owner. Houses are classified into two types: Public Houses and Self-Help Houses. The first are houses meant to meet the housing needs of low-income households. The latter are houses built on the initiative and efforts of the households themselves. While low-income households are defined as those who have low purchasing power, and therefore need government support to acquire housing. Accordingly, the Indonesian government programs are generally targeted at improving the affordability of home ownership, not home rentals as are common in developed countries.

In most cases, those who qualify to benefit from the subsidized housing program are low-income households, while unsubsidized housing is intended for more well-off residents and considered not only as housing, but also as a means of investment. The sale and purchase of houses without subsidies occurs on the open market without direct financing intervention by the government. In developed countries such as the US, housing subsidies by the federal government are directed to renters and given in the form of vouchers, direct payments, or tax credits (Anonymous, 2023). However, in Indonesia the government goal is to improve the affordability of housing acquisition by low-income households. There are four subsidized housing programs (Kementerian PUPR, 2023), namely: (1) KPR Housing Financing Liquidity Facility (FLPP) where housing assistance provided by the government to low-income households (MBR) in the form of affordable down payment, fixed mortgage rate of 5%, 20 years of instalments, and exemptions from value added taxes, insurance premiums, and fire insurance; (2) Interest Difference Subsidy Mortgage (SSB) in which the nominal instalment set by the bank is relatively low because of reduced margin or instalment interest rate within a certain period; (3) Down Payment Assistance Subsidy (SBUM) in which the government provides additional down payment assistance through mortgage provider banks so that the total amount of down payments paid are made affordable for debtors and mortgage provider banks are to reduce the mortgage ceiling paid in instalments plus interest or margin every month; and (4) Savings-Based Housing Financing Assistance (BP2BT) where government assistance is provided to low-income households who have at least six months of savings in the amount equivalent to 5% of the house price.

The desire to buy a house by households is influenced by macro- and micro variables. From the micro side, individual and household characteristics determine the demand for the house. The motive for buying a house is influenced, among others, by income and house prices (Firdaus, 1997a), occupation and age (Fahmi et al., 2018). Rising consumer real incomes can increase the demand for homes. Whereas the demand for housing also rises because of rising educational attainments of home buyers or owners (Gong & Yao, 2022; H. Wang et al., 2022). Demographic characteristics and socio-economic status, including education and family size, are among important determinants of household housing outcomes (Li et al., 2022).In addition, the location of the home can also affect consumer demand for the home. The strategic location of housing can increase the demand for such housing. Furthermore, population growth, both naturally and unnaturally, also increases the demand for housing. The ease of obtaining a loan determines whether a relatively expensive home can be obtained through a loan easily. Facilities and infrastructure, namely various public and social facilities such as educational facilities, infrastructure, health, religion, and various others, attract interest in owning a house in a certain location or area.

The burden of high housing costs in one area can result in residents buying homes in another area and rent subsidies can also help recipients to buy overpriced properties, and can contribute to affordability issues for buyers (Braakmann & McDonald, 2020). The property market is an alternative for people to own and buy a house both on credit and cash.

Some governments in developing countries have implemented a number of demand-side programs to improve homeownership access for the underprivileged. From the perspective of social safety networks, the main reason for the importance of providing housing service assistance is the assumption that housing is a basic need that is the responsibility of the government to participate in providing housing, especially in difficult situations. Providing access and assistance to people who are economically disadvantaged through funding in the housing sector can alleviate the difficult situation that is being faced as a result of government policies to increase prices.

Prayuda (2012) suggests that the variable that plays a significant role in the ability to buy a home is the variable housing down payment loan. Mahardini & Woyanti (2012) emphasize importance of price, income, location, and amenities affects the demand for housing. Furthermore, Mendrofa et al. (2018) concluded that price and location are two important factors that determine the demand for homes by low-income people. However, Howard & Liebersohn (2021) and Hu (2022) house location takes a significant role in determining the demand for houses. Therefore, in Indonesia many subsidized houses are built in suburban areas because land prices are relatively cheaper so that the selling price of houses can be affordable for them.

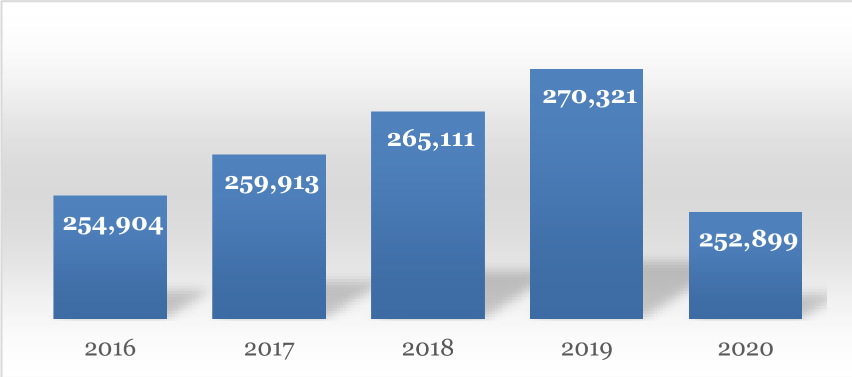
3. Research Method

3.1 Data and Sample

The research used the 2019 cross-sectional data collected from the city government of Banda Aceh. The location covered is the entire residential area in Banda Aceh City, both Perumnas (residential complex) and non-Perumnas areas. In addition, the study also utilized the aggregated data published by Banda Aceh Agency of Statistics covering the period from 2015-2020. In 2020 Banda Aceh City had a population of

252,899 people with a tendency to increase from year to year (see Figure 1). The distribution of population by subdistrict can be seen in Table 1. With an area of only 61.36 km², the distribution of population is almost evenly distributed by sub-district, except that concentration is seen in 3 sub-districts; Syiah Kuala, Kuta Alam, and Baiturrahman.

Figure 1. Population development of Banda Aceh City



Source: Indonesian Statistics, Banda Aceh City, 2021

Table 1. Total population of Banda Aceh City by sub-district, 2016-2020

District	2016	2017	2018	2019	2020
Meuraxa	19,388	19,770	20,166	20,561	26,681
Jaya Baru	25,012	25,503	26,013	26,525	25,939
Banda Raya	23,459	23,919	24,398	24,878	25,228
Baiturrahman	36,013	36,721	37,455	38,192	32,513
Lueng Bata	25,114	25,607	26,119	26,633	24,336
Kuta Alam	50,618	51,614	52,645	53,679	42,505
Kuta Raja	13,107	13,365	13,632	13,900	15,291
Syiah Kuala	36,477	37,193	37,938	38,682	32,969
Ulee Kareng	25,716	26,221	26,745	27,271	27,257
Banda Aceh City	254,904	259,913	265,111	270,321	252,899

Source: BPS Kota Banda Aceh, 2020

The capital of Aceh Province is the center of government and trade so that residents from the surrounding area and other regencies/cities carry out daily activities in the city. It is estimated that around 300,000 people travel on a roundtrip (commuting) mainly from the Aceh Besar district that surrounds it. Meanwhile, from the available data, it can also be seen that there is also immigration from outside the city, whose numbers rise and fall depending on economic activity (see Table 2).

This study collected primary data using questionnaires. Respondents were selected from residents who purchased subsidized houses in the city of Banda Aceh. A total of 60 respondents were randomly selected from respondents whose numbers were determined by subdistrict (see Table 3). Number of samplings are selected according to purposive sampling. Purposive sampling can be used for some specific purposes (Singh & Masuku, 2014). A small and carefully chosen sample may be used to increase the depth of understanding in purposive sampling technique. The respondents chosen are people who are most likely to give relevant and useful information, based on the study's goals and objectives (Campbell et al., 2020; Palinkas et al., 2015). The number of respondents selected was 60 respondents because the target respondents were limited to those who bought subsidized houses.

Table 2. Number of residents in by gender

Year	Man	Woman	Sum
2015	3 722	3 552	7 274
2016	4 133	3 939	8 072
2017	2.192	1.904	4.096

Source: Banda Aceh City in Numbers, 2018

Table 3. Number of respondents by sub-district

District	Number of respondents	Percentage
Ulee Kareng	12	20.0
Lueng Bata	18	30.0
Kuta Raja	7	11.7
Kuta Alam	6	10.0
Baiturrahman	6	10.0
Meuraxa	11	18.3
Sum	60	100.0

Source: Field Data, August,2019 (Processed)

The determination of the number of respondents by sub-district is proportional to the number of subsidized houses built as a result of direct observation, not the total population, according to the sub-district. The most respondents in this study were in Lueng Bata District with 18 respondents because in that district there was a lot of subsidized housing construction, while the fewest respondents were in Kuta Alam and Baiturrahman Districts with 6 respondents.

3.2 Data Analysis

Previous studies have focused on macro and micro factors that determine housing demand. However, empirical studies that employed demographic characteristics such as education and family size, rather than socio-economic status such as household income and macro variable such as home prices, are scant. Based on the recent studies (Ayuningtyas, 2022; Fahmi et al., 2018c; Firdaus, 1997b; Gong & Yao, 2022; Hughes, 2020b; Li et al., 2022; H. Wang et al., 2022; World Bank, 2023), this study formulates the econometric model as follows.

$$\boldsymbol{DSH_i = \beta_0 + \beta_1 INC_i + \beta_2 HV_i + \beta_3 EDU_i + \beta_4 FS_i + u_i}$$

where:
DSH = Demand for subsidized homes
INC = Income
HV = Home Value
EDU = Education
FS = Family Size
μ = disturbance factor (disturbance term)

The data are analyzed through two approaches: descriptive analysis and inferential analysis. In the descriptive analysis, tendencies and descriptive statistics of frequency ratios will be expressed. While in the inferential analysis a simple regression equation will be estimated and interpreted.

The demand for subsidized houses (DSH) is defined as a house whose down payment is subsidized by the Banda Aceh City government, measured by the number of units multiplied by area, measured in meters. This measurement is different from simply house size or housing space and number of rooms that were used in the above-mentioned studies. Accordingly, the demand for a subsidized house is measured as the number of houses purchased by the community that are used as residences and measured as square meters.

Previous recent studies (for example Ayuningtyas, 2022; Gong & Yao, 2022; and H. Wang et al., 2022) have used mixed measurements for income, education, and family size. However, this study employed different measures. Income (INC) is the total income per month received by respondents calculated in rupiah units. Likewise, the value of a house is expressed in rupiah, assumed to be a proxy for house prices. In this case, the value of the house is measured as installments per month per square meter, that is, the total installments per month divided by the area of the house in square meters. Education (EDU) is the educational achievement of respondents as measured as the level of education completed; starting from the junior high school level / equivalent to the Strata 2 (S2) level, namely junior high school, high school, S1, S2, etc. Then, the completed level of education is converted into the number of school years. For example, graduating from junior high school/equivalent is counted as having studied 9 years, graduating from high school/equivalent for 12 years, and so on. Family size (FS) are the number of dependent persons in one respondent's family, that is, those who live together under one roof of a building, not limited to direct family members such as biological children.

Assuming that the demand for houses is the demand for investment, (residential investment), then the influence of income is predicted to be positive and the influence of "house prices", which in this case is proxied by the variable value of houses per meter, is also positive. Theoretically, housing demand is different from demand for consumer goods. Home demand is a demand for the stock of housing capital which is negatively related to the relative price of the house to the aggregate prices. It can be assumed that the stock of the house follows the characteristics of diminishing marginal product, hence the change in house stock, which in this case is assumed to be a home investment (i.e. flow variable), is getting smaller. In other words, if house prices increase then the demand for housing investment also increases, that is, a positive relationship. This is because with rising house prices, the demand for house stock decreases, which is a negative relationship between demand for house stock and house prices. The implied assumption here is that the general prices (inflation) are fixed, so the demand for house stock is determined only by the price of the house.

Based on the above thinking, the hypotheses of this study are that income, housing value, education, and the number of family members have a positive effect on the demand for subsidized houses. Housing value is the proxy for house price. However, because housing can be considered as a residential investment which leads to rising return measured by housing value, its effect on home demand is hypothesized to be positive.The estimation of the equation of home demand to explanatory variables uses data in logarithms, except for the number of family size variable.

For the validity of the estimation results, the study conducted the following tests: Validity and Reliability Tests, and classical assumption tests for linear regression. Meanwhile, to determine the significance, a simultaneous significant test of the F-test and the significance test of each coefficient for the explanatory variable, t-test, were carried out.

4. Results

4.1. Residents and demand for subsidized houses in banda aceh

As the capital of Aceh Province, all economic activities, health services, entertainment and shopping centers in Banda Aceh City directly influence the communities around the city of Banda Aceh, including residences or houses. People who carry out their activities in the city of Banda Aceh tend to choose to live in suburban areas, because in that area there is still a lot of land available to build housing. Housing developers, especially subsidized housing developers, tend to offer and build subsidized housing in the suburban area of Banda Aceh because the land price tends to be relatively cheaper than the price of land in the downtown area of Banda Aceh which affects the price of subsidized houses offered by developers.

Banda Aceh City has a fairly high population growth rate among districts/cities in Aceh province. Figure 2 shows the total population growth of Banda Aceh in 2015-2019. It can be seen that the population in the city of Banda Aceh from year to year is increasing, while it decrease in 2020 due to Covid-19 Pandemic. High population growth is driving high demand for homes as well.

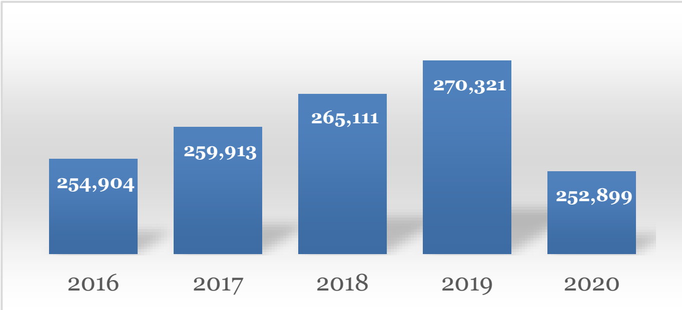


Figure 2. Banda Aceh City Population Development, 2016-2020

Source: Indonesian Statistics – Banda Aceh City

From the data available and often lagging behind time, less than half of households have their own place of residence (see Table 4). Even the percentage in 2014 was lower than in previous years. It is estimated that this condition has not changed much until the year of the study. Meanwhile, more than 30 percent of households are tenants. Thus, it is estimated that about half of households are potential buyers of homes, including subsidized homes. They are households that contract houses, rent (usually not for a long period of time), and those who live hitchhiking in the homes of parents or relatives.

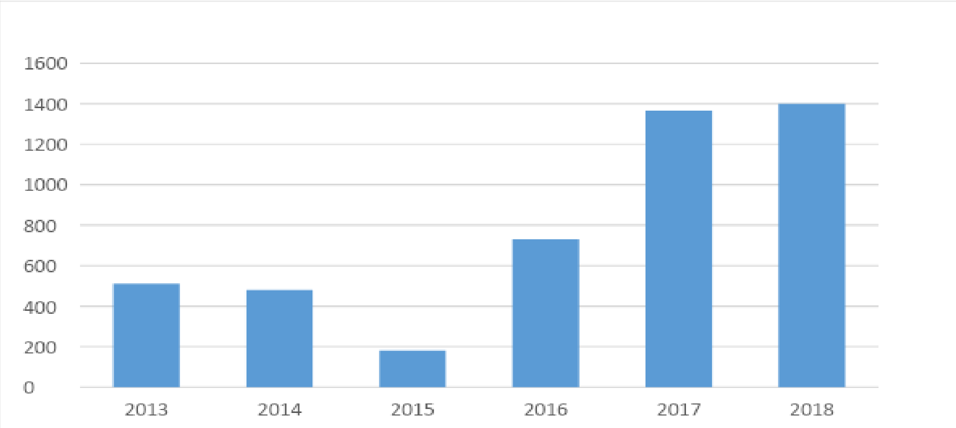
Table 4. Percentage of households based on residential building tenure status (percent)

Status of Mastery of Residential Buildings	2012	2013	2014
Own	54,29	48,43	48,37
Contract	28,98	28,53	30,59
Rent	0,60	0,69	1,58
Rent-Free	5,29	5,35	4,90
Service	6,80	8,45	6,21
Parent/Relative/Sibling's House	4,04	8,07	7,27
Other	-	0,48	1,09

Source: BPS Kota Banda Aceh

The increase in population and households has resulted in an increase in demand for houses. Figure 3 shows the available data on the demand for subsidized houses in Banda Aceh City in 2013-2018. The demand for subsidized houses has increased dramatically since 2016. Although housing subsidy programs such as the Housing Financing Liquidity Facility (FLPP) and Interest Difference Subsidy were introduced in 2010, a marked increase in demand for subsidized housing has occurred since 2017.

Figure 3. Demand for Subsidized Houses in the City Banda Aceh in 2013-2018



Source: Banda Aceh City Investment and One-Stop Integrated Service (2018)

4.2 Characteristics of respondents of subsidized home buyers

4.2.1 Buyer's age

The ages of respondents were divided into four groups. Table 5 shows that the majority of subsidized home buyers are in the age group of 41 and older, accounting for about 80 percent. This is quite original because in the age group over 40s, home buyers are those who are relatively well established from an economic point of view and on average also already have children so they need their own residential house. There is a tradition in Aceh where young families who do not have children or the number of children is still small, they live together with their parents or in-laws, unless the parents or in-laws live in other cities or areas.

At the age of 41-50 years, respondents also anticipate the increasing needs of the family and make investments for the future.

Table 5. Respondent's Age

Age	Frequency	Percentage (%)
20-30	2	3.3
31-40	10	16.7
41-50	19	31.7
>51	29	48.3
Total	60	100.0

Source: Field Data, August,2019 (Processed)

4.2.2 Gender of the buyer

Male respondents were predominant as subsidized home buyers (Table 6). This is reasonable because in Indonesia men are the main breadwinners in the family and culturally also hold the responsibility to meet household needs, including housing.

Table 6. Respondent's Gender

Gender	Frequency	Percentage
Man	42	70.0
Woman	18	30.0
Total	60	100.0

Source: Field Data, August,2019 (Processed)

4.2.3 Buyer Income

Table 4.4 shows the income of the sample respondents divided into 5 groups of total income. The majority of respondents to subsidized home buyers are those who are classified as income between Rp. 2,600,000-Rp. 3,500,000 per month, followed by the income group of Rp. 600,000 - Rp. 1,500,000. Subsidized houses are intended for low-income people. More than 80% of them belong to the income group below or equal to Rp. 4,500,000. While the income group above it tends to choose to buy a larger type house or build its own house.

Table 7. Respondents Incomes already bought a subsidized house

Income groups	Frequency	Percentage
600.000-1.500.000	11	18.3
1.600.000-2.500.000	6	10.0
2.600.000-3.500.000	27	45.0
3.600.000-4.500.000	6	10.0
>4.600.000	10	16.7
Total	60	100.0

Source: Field Data, August,2019 (Processed)

4.2.4. Installment capability

The installment capability referred to herein is the cost chosen as an indication of the ability to incur costs by the respondent per month to pay subsidized house installments. In Table 8 it can be seen that the total installments vary greatly. The majority of respondents stated that the ability to pay installments ranged from Rp. 1,100,000 to Rp. 1,500,000, which is 30 percent of respondents. It can also be seen that about 87 percent of subsidized home buyers are those whose installment ability is Rp. 2,000,000 or lower.

Table 8. Total Installments of Respondents

Ability to installment per month	Frequency	Percentage
600.000-1.000.000	17	28.3
1.100.000-1.500.000	18	30.0
1.600.000-2.000.000	17	28.3
>2.100.000	8	13.3
Total	60	100.0

Source: Field Data, August,2019 (Processed)

4.2.5 Buyer education

Table 9 shows that the average subsidized home buyer respondent's education level is the S-1 undergraduate level. The group of buyers with an S-1 level of education in general is the majority of workers who have begun to be economically established.

Table 9. Buyer education

Education	Frequency	Percentage
SMA	13	21.7
S1	36	60.0
S2	11	18.3
Total	60	100.0

Source: Field Data, August, 2019 (Processed)

4.2.6 Number of dependents of the buyer's family

Viewed from the point of view of the size of the family or the number of family dependents, Table 10 shows that buyers with the number of dependents between 2-3 are the most prominent. In general, buyers with a dependent amount between 2 to 6 people account for almost 90 percent. In this case, respondents with a small number of dependents (2-3 people) will tend to choose subsidized houses because of the relatively small size of the subsidized houses, but those with dependents of up to 6 people also tend to choose subsidized houses.

Table 10.
Number of Dependents of Respondents

Number of Dependents	Frequency	Percentage (%)
0-1	6	10.0
2-3	37	61.7
4-6	16	26.7
>6	1	1.7
Total	60	100.0

Source: Field Data, August,2019 (Processed)

4.2.7 Area of the purchased house

Judging from the area of the house purchased, the majority of respondents chose a house that was between 40-50 m2 (see Table 11). Furthermore, in general, it can be said that the type of house between an area of 40 to 60 m2 was chosen by about 83 percent of buyer respondents. The selection of the area of the house depends on the income and installment ability of the buyer.

Table 11.
Area of the house purchased

House Area	Frequency	Percentage (%)
40-50 m2	32	53.3
51-60 m2	18	30.0
61-70 m2	5	8.3
>71 m2	5	8.3
Total	60	100.0

Source: Field Data, August,2019 (Processed)

4.3 Estimation results

Table 12 shows a statistical summary of the variables used in the study. A sample of 60 respondents was sufficient to represent the distribution of data. The mean and median for all variables are not in great dispute, and therefore it can be concluded that there is an almost symmetric central tendency. This can also be seen in the distribution of data indicated by a standard deviation that is not too large. Thus there are no far-flung observations (outliers) in the data.

The monthly income of the observed respondents ranged from Rp. 1,000,000 to Rp. 6,000,000. With an average income of Rp. 3,178,333 and an average monthly installment of Rp. 1,585,000, it can be concluded on average that subsidized home buyers are able to spend about half of their monthly income to pay off subsidized houses. With an average installment per meter of almost Rp. 30,000 per month, it can be estimated that the type of house that is feasible and can be purchased (affordable) follows the growth in per capita income of the population.

Table 12.
Summary of Statistics

Statistics	Income	Total Installments Per Month	Education	Dependents	House Area (m2)	Monthly Installments per m
Mean	3178333.3	1585000.0	15.5	2.9	52.1	29901.6

Standard Error	158525.9	66673.4	0.3	0.1	1.5	530.3
Median	3000000.0	1500000.0	16.0	3.0	49.0	30958.5
Mode	3000000.0	1000000.0	16.0	3.0	40.0	33333.0
Standard Deviation	1227936.4	516449.7	2.0	1.2	12.0	4107.4
Kurtosis	-0.6	0.0	-0.4	0.2	0.0	-1.3
Skewness	0.2	0.6	-0.8	0.1	0.9	-0.2
Range	5000000.0	2000000.0	6.0	6.0	43.0	14244.0
Minimum	1000000.0	1000000.0	12.0	0.0	40.0	23256.0
Maximum	6000000.0	3000000.0	18.0	6.0	83.0	37500.0

Source: Field data (processed)

The coefficient of flatness of the curve (Kurtosis) is negative for the variables of income, education, and installments per month. This indicates that the distribution of the variables is platykurtic (not pointed, more blunt than the normal distribution), but the distribution is somewhat even and there is no extreme frequency. Meanwhile, kurtosis values for variables The dependents are greater than zero, meaning they are more tapered than the normal distribution. Thus, the aforementioned variables are distributed close to normal. The variable of total installments per month and the area of the house is normally distributed. The Skewness value, which is close to zero and is between the absolute values of 0.5 and 1, also indicates normality, although it is somewhat skewed.

The estimation results of the subsidy house demand equation as set forth in Section III.2 are shown in Table 13. All variables are in logarithms, except for the variable number of family members.

Table 13. Subsidized Housing Demand Estimation Test Results (DSH)

Variable	Estimation Coefficient	t-stat	p-value
Constant	-5.4915	-3.1634	0.0025
Income (INC)	0.1418	1.9518	0.0561**
Home Value (HV)	0.6767	3.3978	0.0013*
Education (EDU)	0.1358	0.7966	0.4291
Family Size (FS)	-0.0309	-0.5019	0.6177
R-squared	0,42	Mean dep. var.	3,397850
Adjusted R-squared	0,38	S.D. dep. var.	0,218091
S.E. of regression	0,171293	Durbin-Watson stat.	2,056287
Sum squared resid	1,613779		
Log-likelihood	23,33667		
F-statistic	10,16043		
Prob. (F-state.)	0,000003		

*Notes: *Significant at 1%, **Significant at 10%*

The main variables determining demand, in this case the demand for subsidized homes - income and the value of the house as a proxy for house prices, have a significant positive influence. These results are in accordance with the theoretical predictions set forth in Part III. The higher the income of the population the greater the demand for subsidized houses. However, the difference from the demand for homes from the demand for other goods is that the demand for homes is a demand for residential investment that increases following the rise in the value of homes. Any 1 percent increase in income could lead to a 0.14 percent increase in demand for homes. In other words, if residents' incomes double, then demand for homes could rise by 14 percent. Any increase in the value of houses per square meter by 1 percent can increase the demand for subsidized houses by 0.67 percent. The increase in the value of the house in this case can be interpreted as an increase in the rental value (rent) of the occupied house. When the house is occupied, the occupants are the owners of the assets who enjoy the increase in the rental value of the house, even though the house is inhabited by itself. The higher the value of the house per meter the greater the incentive to buy a subsidized house.

The positive effect of income on subsidized housing demand is consistent with demand theory in which income increases shift to the right of the demand curve. Study by (Sedhana, 2006) concluded that the higher an income in an income group, the higher the interest of that group or community. Vice versa, if a group is low-income then the demand for that group in demand for homes is also getting lower. The findings of this study are also in line with the results of the study (Bhastary, 2016) and (Mahardini & Woyanti, 2012) Where income is an important determining factor in the decision to buy or demand a home in addition to factors of location, price and facilities. The significantly positive effect of income on housing demand is also consistent with the findings by Firdaus (1997b) and Aksoy Khurami & Özdemir Sarı (2022).

The findings on the effect of house prices, which in this study were proxied with home values are consistent with the findings (Mahardini & Woyanti, 2012) which states that house prices have a positive influence on home demand. The positive direction of the price effect contradicts the previous findings by Firdaus, 1997a) because in this study the house price should be considered as the expected price indicating the future potential value of the house, and therefore motivate potential buyers to buy houses.

Surprisingly, education and family size are found insignificant. This findings are in contrast to (Gong & Yao, 2022; Prayuda, 2012c; H. Wang et al., 2022). It suggests that subsidized housing is usually owned by relatively uniformly young individuals (see Table 5) without substantial differences in educational attainment (see Table 9) and family size (see Table 10). Another explanation is that the house is a basic need of everyone regardless of their level of education. Although education should essentially have an influence, its influence is indirect.The higher the level of education of a person, the greater the chances of getting a good job and the better the income will be. Low-educated people with low incomes are more likely to choose to rent a house or live in a parent's house. Meanwhile, highly educated people with better jobs and incomes tend to own a house, not only because their income allows, especially with government subsidies but also their ability to pay higher home installments. They are even very likely to tend to build a house from scratch or buy a larger and more comfortable house.

. The explanation for the insignificant effect of family size is that as the number of dependents increases, so do the family's living needs that must be borne. The head of a family with a large number of dependents is more likely to choose to rent a house or live in a parent's house. It may happen that with the increase in the number of family members, they tend to choose larger, comfortable homes instead of subsidized ones which are relatively small in size. These findings are in line with the results of the study (Bhastary, 2016). However, the insignificance of the effect of the number of dependents on the demand for subsidized housing applies within certain limits, namely the restrictions set by the government on who is entitled to a subsidized house.

5. Conclusion, Implication and Limitation

The main findings of the study are twofold. First, income has a significant positive effect on the demand for subsidized homes. If residents' incomes double, then the demand for subsidized housing could rise by 14 percent. Subsidized houses are purchased by the majority, more than 80 80% of respondents, residents with incomes below or equal to Rp. 4,500,000. Second, the value of houses per square meter as a proxy for house prices has a significant positive influence on the demand for subsidized houses. Any increase in the value of houses per square meter by 1 percent can increase the demand for subsidized houses by 0.67 percent. Home as a residential investment is different from the demand for other goods. The increase in the value of the house in this case can be interpreted as an increase in the rental value (rent) of the occupied house. The increase in the value of a house is an increase in the value of fixed assets, and therefore the higher the value of the house per meter the greater the incentive to buy a subsidized house.

Meanwhile, the level of education and the number of family dependents did not have a significant effect on the demand for subsidized housing. One of the reasons that can be put forward is that the house is a basic need for everyone regardless of their level of education and the number of family members. The decision to buy a subsidized house depends only on the income and value of the house.

The policy implications of these findings are that governments, including local governments, in planning the amount of housing subsidies in various subsidy financing schemes should predict an increase in the per capita income of the population and gradually provide subsidies for housing of a broad type. Just like in developed countries, housing subsidies will be continuously necessary because the affordability of home buyers is affected by population income inequality. Housing development as a residential investment in addition to the interests of justice can also have a positive impact on the national capital stock which is also related to long-term economic growth.

This study has limitations in terms of data, namely using cross-series data and limited samples. Up-to-date housing data, including subsidized homes, is not immediately available. Similarly, time frame data is not available enough. Subsequent research on the demand for subsidized houses will provide more complete knowledge if using time series data or cross-data with cross-site observations, for example districts/cities and provinces in Indonesia.

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