

A Low Income Housing Needs and Affordability for Thailand's Strategic National Plan During 2017-2037

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ABSTRACT

 This paper has developed a model to forecast the housing needs and affordability of the low-income households in Thailand 2018-2037. The model has applied the baseline data from the Socioeconomic survey (SES 2015). Considering official population projections by the changing age structure and household formations based on income, forecasts can be made about housing needed by 'Renters', who are the target group of the low-income households. Given, heuristic scenarios on households' income growth over time, an initial planning model for affordable units of housing by types for renters has been proposed.

Effective government policy to mobilize social resource for this low-income household is needed. It is shown that in the long-run, as mean income rises with changing income distribution, households can rely more on the private market provision of housing supply. The model can easily be used for Strategic National Planning by changing assumptions and parameters by the National Housing Authority of Thailand. The NHA in partnership with CODI can solidly plan for the role of low-income housing policy with government intervention on interest rates, terms loan and other policy instruments such as tax exemption for the land sharing in the housing and community development.

This paper suggests meta-planning of an urban city model study where NHA, CODI will work together in partnership with other government agencies, the private sector, financial institutions, and academics

Keywords: *housing needs and affordability, low-income households, a forecasting model*

JEL: C54, O21, R21

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INTRODUCTION

The success of income growth and economic development has proved that Thailand has reached a middle-income level with foreseeable rapid urbanization in the coming decades. The National Economic and Social Development have also confirmed that Thailand has gradually entered the phase of population transition towards an aging society in the coming decades. As a result, urbanization would induce the rapidly rising housing demand. A major part of the demand is taken care by private housing markets. However, it is clear that low-income households cannot afford their basic needs in urban cities with high costs of land.

The National Housing Authority of Thailand (NHA) has drafted a strategic national plan to fulfill these needs throughout the country's urban areas. Their planning strategy would need to forecast housing needs by the income levels of the target urban population given planning environment variables like population growth, household formations, household income, as well as changing housing markets in the area. It is crucial that low-income households cannot enter the private housing market due to financial constraints such as mortgage amounts, a period of payment, or interest costs with respect to their income stream and saving ability.

The objective of this paper is to construct a simple forecasting model that will be used for strategic planning period 2017-2030. The parameters or numerical values as an assumption of the model can be flexibly handled as scenarios for planning solutions. The parameters are calibrated from the Socio-economic Survey 2015, as well as the National Accounts statistics. The model provides numerical solutions which can be fine-tuned after rounds of discussion by the planners.

LITERARY REVIEW

Christine W. et., al (2008), cited demographic changes as significance endogenous factor of housing needs in their study, the factors like aging, household formation rates, and the distribution of household characteristics are assumed to remain constant across the projection horizon. Megbolugbe (1991), on the other hand, indicates that the economic factors of household income distribution, house price, and taste are added to the demographic and the sociological attitudes of preferences, and

the perceptions of the consumer in the classical economic model of housing demand. Joseli Macedo et. al (2005), has developed a Brazilian Housing Demand Model based on the Florida Mode. The Brazil Model has maintained that the key socio-economic factors are as follows: tenure, age of head of household, size of household, income household by percentile, and cost burden. The model assumed the future trend of evolving cohabitation patterns, the family formation, and its dissolution, as well as the changing tastes in choices by households concerning various types of housing over time. The model is able to forecast the number of dwellings required for each household i.e., one unit of housing referred to as the potential housing demand. This number is referred to as the potential housing demand by Hasen et., al (2013).

In Thailand, several studies on the housing needs and housing demand models were developed. These models and provided guidelines for the National Housing Authority plan during the 8th (1997 - 2001), the 9th (2002 - 2006) and the 10th (2007 - 2011) respectively. Thomas Eric Johnson (2004), has studied housing needs. The study mainly focused on the new housing units' demand by new households replacing demolished units as a result of catastrophe or decadence. The study has applied the Mason model of the East-West Center Institute in their assessment. In order to estimate the 'effective housing demand', the study used household income data from the National Socio-Economic Survey to calculate household affordability. This model's major emphasis was the effect on the demand of the demographic change rather than economic impact over time. The Sukhothai Thammathirat University (2004), has studied housing needs during the 11th National Economic and Social Development Plan (2012 - 2016), of the Bangkok Metropolitan Region. The study applied a stock-flow model analysis focused on the housing demand's choice based on consumer behavior. The study conducted by the Thailand Development Research Institute (2009), on housing needs covered Bangkok and its vicinities with a microeconomic study of households' profiles. The Institute for Population and Social Research of Mahidol University (2014), has studied housing needs during the 12th National Economic and Social Development Plan (2017 - 2021). The bulk of studies mentioned above are either relying on a demographic factor as data input or economic factor. This study will integrate both the demographic and economic factor in the model.

Household's Profile in Thailand

Base on the Household's Socio-Economic Survey 2015, the profile of approximately 43,000 households' sample is summarized as follows:

- According to the SES 2015, the average household size is relatively small, to 2.8 persons per household (skewness = 0.817). It should be noted that household size in Thailand has become smaller than in the past.
- The mean age of household head is relatively normal with mean 53.87-year-old
- The household formation mentioned above can be further analyzed in terms of *economic behavior*.
- The most crucial determinants of housing need are '*income*' and/or '*expenditure*' of households.
- Households' income distribution in 2015 is approximately followed the *lognormal* distribution. This implies that most of the households belong to lower income ranges. The mean income is 23,464 baht per month while median income is 17,316 baht per month respectively.

The scattered plot in Figure 2, depicts the positive relationship between the rising number of earners (controlled the age of head in estimation) and the tendency of owning dwelling and land.

The determinant of ownership of a house

The 'owning ratio or ownership-ratio is the ratio between 'a number of households with the status of house ownership over the summation of households 'owning house and those with rental status is determined from right-hand variables. These are households belong to income deciles 1- 4 and those who belong to income deciles 5-10th (ΣInc_i).

The researchers applied the Generalized Method of Moment (GMM) after controlled by age of head to eliminate over-identification problems. By applying instruments variables on house types (Type) as well as member sizes ($\Sigma Member_h$), the endogenous biased were controlled. The estimation result indicates the following:

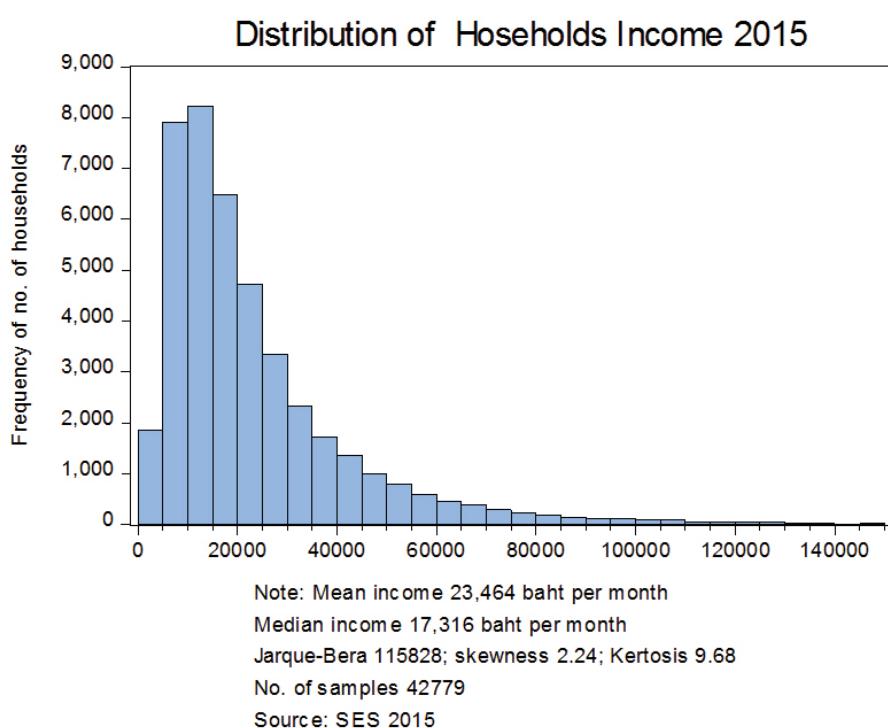


Figure 1:
Household Income followed the Log-Normal Distribution

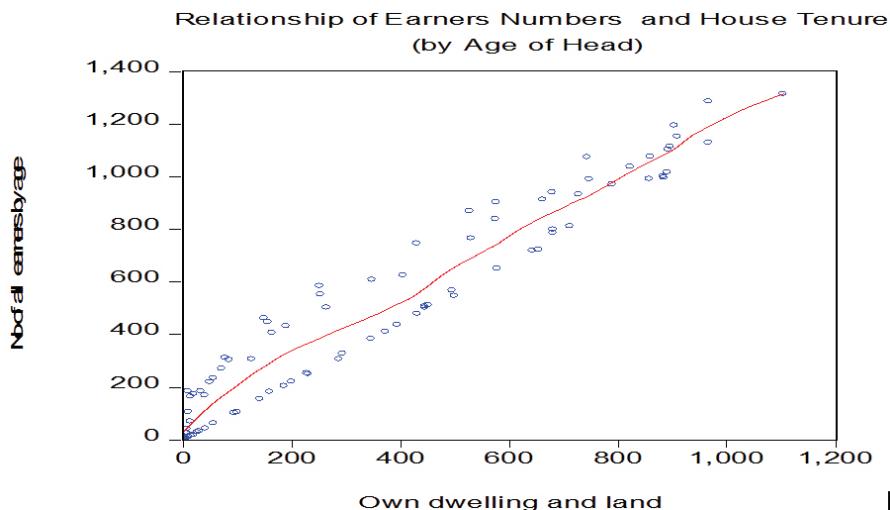


Figure 2:
Positive Relationship of Ownership Tenure Scattered plot by controlled by age of head

- That household with income 1-4 classes have a significant *negative* relationship with ownership ratio.
- The household with income 5-10 classes shows a significant *positive* relationship with the ownership ratio.
- The coefficients of ownership-ratio determined by lower income deciles (1-4th class) could not access to the housing while middle income and high-income class (5-10th class) have shown a positive tendency of ownership of the house.
- Thus, despite the small coefficients value it is the direction (sign of coefficients) of this estimation which it mattered. (Table 1)

A study by Limskul and Pattanapong (2018), applied a logistic model which included the dimensions of location found similar results. For the municipal area, the model indicates that the probability of being a home owner has a positive relationship with total income and age, but a negative relationship with members of the family. This means that as total income, age or a percentage of change in age increases, a person will have a higher tendency to own a house. In addition, as the number of members in family increases, a person will have a lower tendency to own a house in the municipal area. In short, hypothesis testing with household's data from SES 2015, has proven that those with a low income have difficulties accessing the housing market by

themselves. This may be due to their income and savings are not sufficient to afford the mortgage services in the private housing market. However, a further simulation may be needed to find the quantitative number of housing needs by the low income and screen their affordability over time, 2018-2037, during the planning horizon of NHA.

THE CONCEPTUAL FRAMEWORKS

The Setting of Variable Factors Determined the Housing Need

In the study, the characteristics of the household head determine the housing need. Heads of households were divided into four types: (1) Intact Family; household head living with their parents, children and relatives (2) Single Head Family; divorced or widowed household head (3) One Person Family; unmarried household head (4) Others. The analysis of household formation can explain the continuously changing structure of the Thai family since 1987. There is an increase in the numbers of the females who are more likely to be the head of household and not married. The size of the household also became smaller, while the number of families living with parents, children, and relatives expanded. This model can indicate with clarity the various groups of families who require new needs in housing.

Table 1: Determination of House Ownership as Ratio of Owning House – Rental House Status

Dependent Variable	Coefficient	Adjusted R-Squared	S.E. of regression	Durbin-Watson stat	J-statistic	Prob. J-statistic
<i>ownership-ratio</i>		0.989844	0.026817	2.518718	11.93173	0.611786
constant	1.004455*** (0.040335)					
Income deciles 1-4	-9.30E-05*** (3.30E-05)					
income deciles 5-9, 10_open end	0.000489*** (0.000174)					
AR(1)	0.955577***					
Method: Generalized Method of Moments						
Define i-income class by deciles i=1,2,...10 open-ended; j-house type j=1...7; and h-household member h=1..8 and over (See SES2015)						
Instrument specification: Type1 Type2 Type3 Type4 Type5 Type6 Type7						
Member1 Member2 Member3 Member4 Member5 Member6 Member7 Member8_Over						
Source: this study, applying SES 2015.						

The foregoing studies reviewed lend credence to the population and demographic aspect. There are no explicit assumptions on how the housing needs would change over time owing to changes in households' compositions and income distribution. Thus, a rigid assumption on household composition may underestimate the demand for housing as more household's types are likely to change their compositions. Over time the Thai household's structure is likely to have less of a share in an intact' household market, while the shares of 'single head', 'one person' and 'others' type of household are likely to increase.²

Furthermore, only the mean income growth owing to economic growth was implicitly assumed in the model. Thus, without income distribution inserted into the model, the demand for low-income housing may be overestimated if mean income and_income distribution_would be more equitable. Households who can enter the private_housing market, are less

likely to rely on government subsidy and public housing. In fact, most economists are still pessimistic of stagnant mean income growth in Thailand over the next decades. Thailand is still in the middle-income trap. Besides, the income distribution may worsened. Thus, the low-income household cannot enter the private housing market and would have to rely on government assistance and public houses. These assumptions and variables are carefully taken into account in the proposed model. It is briefly explained in the conceptual framework below.

The conceptual framework for identifying housing needs and determining affordability is shown in Figure 1 below. There are fundamentally two main dynamic sets of variables that simultaneously affect the housing needs and its households' affordability. They are population and economic variables. The population's related subsets are age cohort, household sizes, formations (types), and housing ownership by tenure. The economic and human

² 'intact' household is extended family type; 'single head' is household with either woman or man as single head as result of divorced or the passing away of a spouse, 'one person' means household head with status unmarried, while the 'others' household means persons who are living together without legal status.

resource factors are the education of head of the household and its members, their employment and earning abilities, consumption expenditure, and their savings and debt.

An econometric model was deployed to analyze; 1) the population and household formation, 2) the number of dwellings, 3) the household income distribution by percentile, and 4) the housing affordability by the tenure-house types respectively. The linkage of each box by the arrows implies the conceptual framework of this schematic. It is briefly noted as follows: the dynamics of population change determines the changes in household structures based on age, size, household types that differ from an intact household. These differences can be due to divorce, a single head of the household, delayed marriage resulting in a single head of a household and others household situations. The breakaway from intact household to a smaller size would also need a new housing unit.

A household may be constrained from entering the private housing market by economic factors, especially income earned by different generations and savings plans. Besides, given the high house

price in urban areas, the household may not be able to pay for monthly mortgage services. This requires a government policy on how to assist the low income households to fulfill basic needs. Policy options under several scenarios would be tried with different financial options.

Mathematical Model

In this study, based on the households' characteristics mentioned above, the housing needs are analyzed through a statistical analysis as well as on econometric estimations for further calibrations of coefficients. The SES of 2009, 2011, 2013, and 2015 were employed respectively. For future values of populations and economic variables, the population projects from the NESDB was used as a base for an economic model forecasting the future GDP and inflation.

In determining the housing_supply, the authors applied information relating to the housing market's available units as well as from both public and private house prices. This information was gained from the National Housing Authority and from the

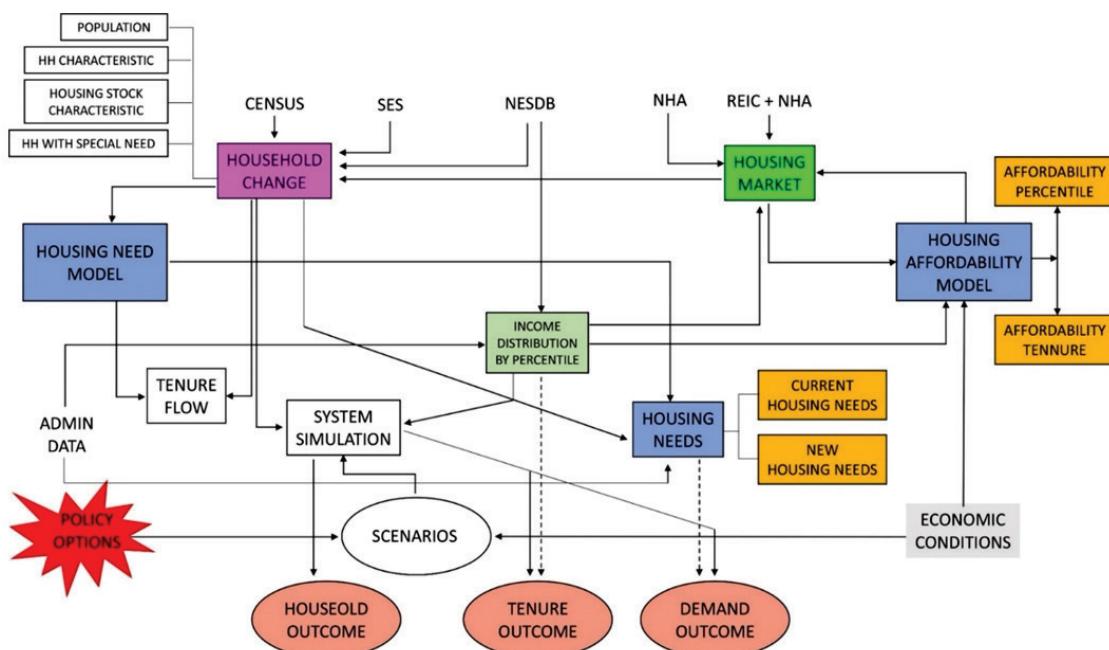


Figure 3:
A Conceptual Framework of Housing Need and Affordability for Thailand during 2017-2038

Note: CENSUS= Population and Housing Census; SES = Socio-Economic Survey; NESDB= National Economic and Social Development Board; NHA= National Housing Authority; and REIC = Real Estate Information Center a private research on housing market information.

Real Estate Information Center, the Government Housing Bank, the Bank of Thailand, and the Department of Administration Ministry of the Interior.

The Housing Needs and Affordability Forecasting Model for Thailand

The model starts with the population projection 2015-2037. Given the population by single year age 'a' and by assuming fertility rates as well as gender 's' a projection of household types (intact, one-person, single head, and other) can be made. A brief description of the projection modules used in this study is as follows:

The model starts with the population projection 2015-2037. Here also, given the population by single year age 'a' assuming fertility rates, gender's (male, female), projecting the household 'h' intact, one person, single head, and other household types respectively. The brief description of the projection modules used in this study is as follows:

1) Population Module

The number of households by type 'h' and age 'a' is determined from the population by single age population multiplied by headship rate.

$$\text{Eq1. } \text{HH}_{a,h} = hs_{a,h,s} * \text{PoP}_{a,s}$$

$hs_{a,h,s}$ = headship rate to form household type h i.e., the rate of family formation

$\text{PoP}_{a,s}$ = Population with single age a , and gender s , over the forecasting horizon, $t=2015-2037$

Number of household by type 'h' is a summation of household by single age 'a'

$$\text{Eq2. } \text{HH}_h = \sum_a \text{HH}_{a,h}$$

$\text{HH}_{a,h}$ = number of household formation by age a , type h , and the total number of household HH

$$\text{Eq3. } \text{HH}_h = \sum \text{HH}_h$$

HH_h = number of household formation by type h ,

2) Using need by the household formation (demand side)

Housing inventories at a point in time HI are determined by the number of households, assuming one household would need one house unit. Since there are vacancies of house units during the forecasting horizon, the gross house inventory stock is the summary of 'basic need' of house stock which is equivalent to a number of houses adjusted by vacant house unit, $0 < av < 1$ at a point in time. The result is *net house inventory stock*.

In reality, households may reside together in one house unit. Therefore, adjustments are made in the number housing need with '*doubling up rate*' $0 < af < 1$ to get the adjusted number of net house inventory.

$$\begin{aligned} \text{Eq4. } \text{HI} &= af * (1+av * \text{HH}) \\ \text{HI} &= \text{adjusted house net inventor stock} \\ af &= \text{doubling up rate, } 0 < af < 1 \\ av &= \text{vacancy rate, } 0 < av < 1 \end{aligned}$$

The research looked at the housing need at each time period t (year). (The change in housing inventory or *incremental housing need* in each sub-period is therefore

$$\text{Eq5. } \Delta HI_t = HI_t - HI_{t-1}$$

The housing withdrawal owing to replacement age of house stock is determined by withdrawal rate, aw at each time t , from existing house inventory HI_t .

$$\text{Eq6. } WH_t = aw * HI_t$$

The *housing 'start'* would be constructed to replace the withdrawal units to fulfill the inventory change. This *new housing needs* or *housing start* HSS_t is determined as

$$\text{Eq7. } HSS_t = WH + \Delta HI$$

3) Affordability of housing need

Affordability of housing need is not automatic. Normally, the low-income household is not able to

access the private housing market. A low-income household, such as those belonging to income deciles 1-5th class, may be faced with income and saving constraints. A low-income household may not be able to meet monthly mortgage payments with the short-term loan, high market interest rates, high

down payments, and high market's house prices. The following affordability module will be used in this study to arrive at a feasible public policy on social infrastructure investment of Thailand in the next decades. Given:

List of Variables	Description
GDPR	Gross Domestic Product at Constant Price
PGDP	GDP deflator or general price level
Ym	Average monthly mean income from SES
Ym _h	Monthly mean income of household <i>h-th</i> , (1=intact, 2=single head, 3=one person, and 4=others type of households)
Ym _{h,i}	monthly mean income of household <i>h-th</i> , income class <i>i-th</i> , i=1,2,...,10
YD _{h,i}	Disposable income of household <i>h-th</i> , income class <i>i-th</i>
@	Adjustment coefficients between monthly income reported by the NSO the National Accounts, NESDB
d _h	The coefficient of <i>total</i> average income and average income of each household <i>h-th</i>
d _{hi}	The coefficient of income distribution of household <i>h-th</i> by income class <i>i-th</i> ,
P _{hi}	The probability that any household belongs to income class <i>i-th</i> in household type <i>h-th</i>
N(Z;0,1)	Standard normal distribution with mean and variance (0,1)
Z _{hi}	Standard score of random variable of income class <i>i-th</i> , of the household <i>h-th</i> (i=1,2,...10; h=1,2,3,4)
U _h	Mean income of household <i>h-th</i> (log-normal Distribution function of income)
SD	Standard deviation of income of household <i>h-th</i>

Module 1: Household Income Projection by income class

This module identifies the income of household *h-th* by income class *i-th*. Note that the time subscript is omitted for sake of simplicity. The growth of income per head projected by Macro-econometric model or published by official sources such as the NESDB, BOT and ADB over the planning horizon during 2015-2030 can be applied for projection of the left-hand side variables.

$$\text{Eq.8} \quad Ym = @GDPR * PGDP$$

$$\text{Eq.9} \quad Ym_h = d_h * Ym$$

$$\text{Eq.10} \quad Ym_{h,i} = d_{h,i} * Ym_h$$

$$\text{Eq.11} \quad HE_{h,i} = e_{h,i} * Ym_{h,i}$$

$$\text{Eq.12} \quad HSE_{h,i} = she_{h,i} * HE_{h,i}$$

List of Variables	Description
$HE_{h,i}$	= Income of class i -th $i=1,2,3,\dots,10$ of Household h -th disposed for household expenditure
$HSE_{h,i}$	= Income of class i -th $i=1,2,3,\dots,10$ of household h -th, disposed for housing expenditure
$e_{h,i}$	= Ratio of income in each class i -th $i=1,2,3,\dots,10$ disposed in general by household h -th,
$she_{h,i}$	= Ratio of expenditure of household h -th in income class i -th $i=1,2,3,\dots,10$ disposed for housing expenditure

Module 2:
Projection of household expenditure on housing acquisition

$$\text{Eq13. } NHE_{h,i} = (1 - re_{h,i}) * HSE_{h,i}$$

$NHE_{h,i}$ = Household expenditure on housing by household h -th, income class i -th $i = 1,2,3,\dots,10$

This expenditure is inclusive of household's saving for *down payment* in hire purchase of a house.

$$re_{h,i} = \text{recurring expenditure by household } h\text{-th, income class } i\text{-th } i = 1,2,3,\dots,10$$

Module 3:
Projection of housing affordability through monthly mortgage service

Service can be allocated from household saving after recurring expenditure.

$$\text{Eq14. } MGS_{h,i} = (NHE_{h,i} / HE_{h,i})(Ym_{h,i})$$

$MGS_{h,i}$ = monthly mortgage service of household h -th in each income class i -th $i=1,2,3,\dots,10$

The capitalization factor **CF** is found to be

$$\text{Eq15. } CF = \{1 - (1+r)^{-T}\} / r$$

r = annual rate of interest in mortgage service which government subsidy can be intervened

T = term loan, year

We can evaluate the capital value of house of household h -th in each class i -th $i=1,2,3,\dots,10$

$$\text{Eq16. } AF_{h,i} = \frac{CF * MGS_{h,i}}{1 - dp/100}$$

Given the post finance parameters as follows:

$$dp = \text{Percentage of 'down payment' before mortgage service.}$$

4) Government Low-income housing Policy

$$\text{Eq17. } NH_{h,i} = p_{h,i} * NH_h$$

$NH_{h,i}$ = Number of household type h -th which belong to deciles class of $i=1,2,3,4$ where i -th is lower than affordability level with probability $p_{h,i}$

MODEL'S ASSUMPTIONS AND PARAMETERS' CALIBRATION

Demographic Change, Mean Income, Households, and Renter

The changing structure of households and income distribution in Thailand determines the demand for housing. First, by applying the projected population statistics by NESDB⁶ and with the assumption of a decline in fertilisation, the numbers clearly show that urban households are growing. Thus, urban housing policy is a very crucial issue.

Second, evaluating the data in Table 2 indicates that 5.61 million households will be 'renters' in 2018. This statistic reflects the parameters signifying the probability of being head of a household and the total numbers of the various types of households. It will increase to 7.21 million renters, rather than owners, by 2037. This is the target group of the NHA if they address the low-income deciles. Table

2 depicts the projection of the target household in this policy simulation. They are households with 'Renter' ownership status during 2018-2037. The renter status is estimated to be 5.64 million and 7.21 million households in 2018 and 2037 respectively. The parameterization of doubling up, vacancy, and withdrawal rates are assumed in this study as shown at bottom of Table 2.

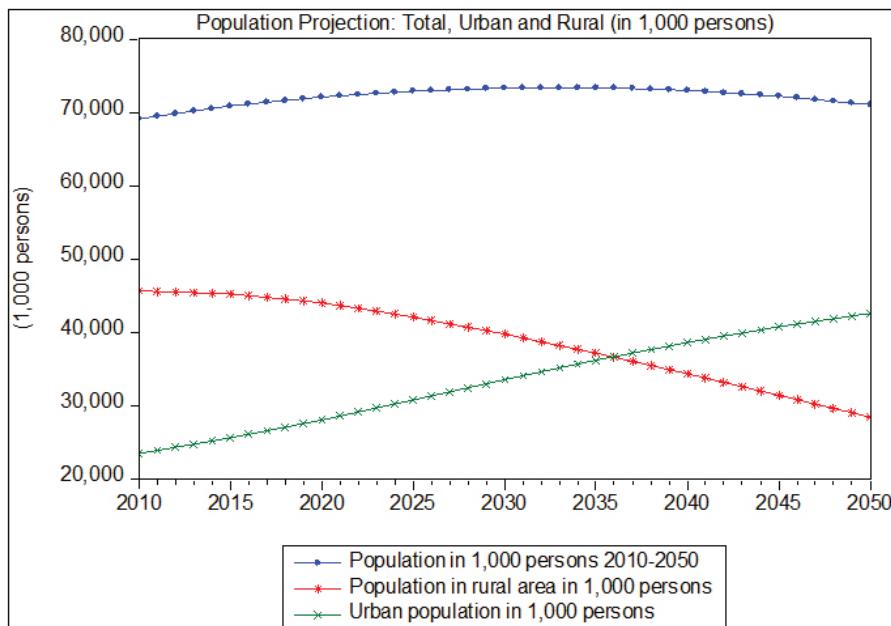


Figure 4:
Population Trend in Thailand, Urban, and Rural Area 2010-2050

Table 2: Population, Total Households, and Total Renter2018-2037

		2018	2023	2028	2033	2037
Population	persons	64,693,709	65,047,781	64,907,086	64,217,303	63,234,100
Growth rate, % p.a.		0.20	0.04	(0.11)	(0.29)	(0.44)
Total HH	units	22,366,619	24,050,905	25,665,617	27,156,407	28,216,304
Growth rate, % p.a.		1.55	1.40	1.24	1.06	0.90
of which being Renters HH units						
Intact Household		3,352,754	3,633,915	3,894,796	4,122,484	4,287,977
		1.23	0.47	1.35	1.11	0.93
Single Head Household		931,151	1,007,420	1,083,103	1,146,051	1,191,258
		2.20	0.18	1.26	1.09	0.92
One Person		1,357,630	1,475,578	1,605,550	1,697,503	1,761,962
		(1.27)		1.02	1.07	0.91
others		5,845	6,060	6,442	6,818	7,095
		4.77	(1.27)	1.02	1.07	0.91
House ownership status						
Renter HH	units	5,641,065	6,109,666	6,568,898	6,943,247	7,211,358
		2.21	(0.02)	1.23	1.08	0.90
Parameterization, rates x100 %						
doubling up		0.72	0.70	0.68	0.66	0.64
vacancy		0.02	0.02	0.02	0.02	0.02
withdrawal		0.02	0.02	0.02	0.02	0.02

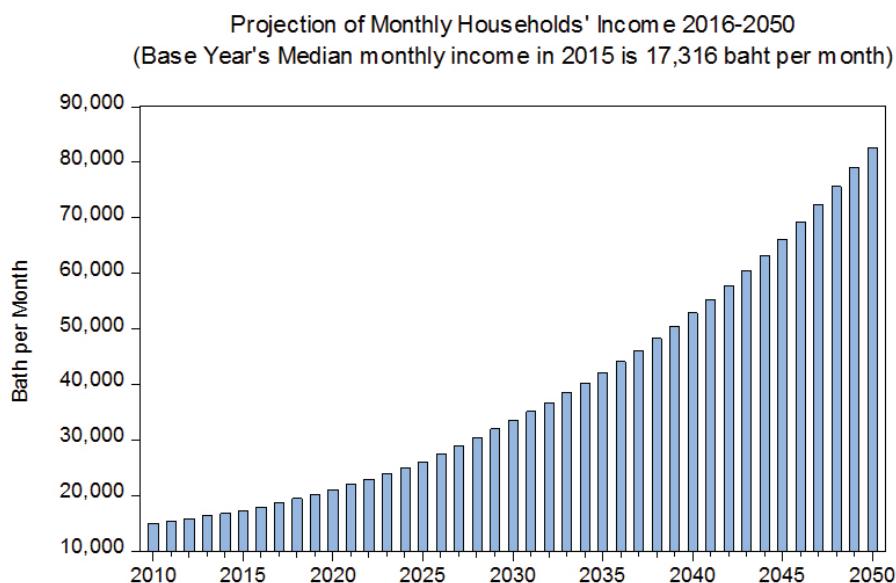


Figure 5:
Projection of Monthly Households' Income 2016-2050

Table 3: Distribution of household mean income classified by income groups (Quintiles) 2018 - 2037

(Unit: Baht per month per household)

Year	Low-income groups			Middle-income group	High-income group
	HH1 (P10-20)	HH2 (P20-40)	HH3 (P40-60)	HH4 (P60-80)	HH5 (P80-100)
2018	13,487	25,312	41,358	63,012	145,821
2019	14,170	26,580	43,431	66,158	153,052
2020	14,885	27,904	45,595	69,440	160,587
2021	15,664	29,346	47,952	73,014	168,784
2022	16,496	30,885	50,468	76,825	177,516
2023	17,371	32,501	53,110	80,825	186,672
2024	18,286	34,188	55,868	84,998	196,213
2025	19,268	35,997	58,824	89,469	206,427
2026	20,292	37,883	61,906	94,129	217,063
2027	21,373	39,871	65,155	99,039	228,258
2028	22,514	41,967	68,581	104,211	240,046
2029	23,699	44,141	72,134	109,575	252,257
2030	24,930	46,397	75,822	115,139	264,911
2031	26,218	48,757	79,678	120,953	278,121
2032	27,600	51,285	83,809	127,179	292,257
2033	29,043	53,924	88,122	133,676	306,997
2034	30,573	56,720	92,689	140,554	322,593
2035	32,198	59,688	97,540	147,856	339,140
2036	33,922	62,834	102,679	155,591	356,660
2037	35,754	66,176	108,141	163,809	375,264

Note: Growth of overall income is calculated by Macro-Econometric Model, measured in terms of constant price. It is translated into the average monthly income of the household in terms of current prices and later distributed over time into income classes (percentiles and quintiles). The percentiles, quintiles as well as deciles are used in this study depending on the context of explanation. They are transformable among them i.e., percentile 10 is deciles 1 and percentile 10-20 is quintile 1 *inter alia*.

The prediction of mean income in Figure 5 is a projection of the mean monthly income of households. A Macro-econometric Model was applied to forecast the GDP growth and household income per the year 2010-2050. The mean income at a current price of households is derived after minor calculations with the assumptions on inflation overtime 2018-2037.

In addition, Table 3 shows the projection of the mean income of households where the target is a low-income group of households. They are households who belong to mean income class of HH1 (percentile 10-20), HH2 (percentile 20-30) and HH3 (percentile 40-60). The mean income of these households may prove to be lower than the affordable level of house price in the private market.

House's Price Assumption

The recent house price survey found that the average lowest price for a single house is THB 2,868,246; THB 1,942,150 for a townhouse; THB 2,213,478 for twin house and THB 1,400,789 for a condominium as reported for the year 2015. Given, the inflation rate increases by 2-3 percent per year, the future house affordability in these types of houses in the private housing market is still too hard to manage for low-income households.

By surveying house prices that would be affordable for low-income households, it was found that their access to the mortgage market is limited to low priced condos of 28 square meters and medium-priced condos of 43 square meters. The 28 square meters

condo was priced unrealistically low as it was an average of both government and private house costs. These may be located in a remote area of a province where the cost of land was still cheaper than urban areas. The size of 28 and 43 square meters condos has shown a policy intervention trend as compared to low-medium priced townhouses. The former was a supply provisioned by a public organization like NHA while the latter is from the private market. Both are subjected to the normal trends of rising cost of construction.

While luxury condos and luxury detached houses are beyond the reach of the middle-income class, the medium-priced townhouses and condos are still good alternatives. For low-income household, the choice is still open for low price townhouses of 68 square meters and perhaps medium-priced condos of 43 square meters as well.

EMPIRICAL RESULT OF MODEL FORECASTING

Affordable Housing Needs of the Low-Income Households

The price of affordable housing needs to include the given interest rates for house loans and the length of the installment period at MLR 6.75% , the commercial bank rates in 2017. This information is used as a benchmark and given in the referred house prices listed above. It indicates the rising price index tendency in future housing costs. The number of housing needs is categorized by either buying or renting in accordance with the new housing needs. The estimates can be classified as follows: (Table 4)

The model projection for housing needs and affordability in the whole country, in particular the urban areas, has the following policy implications:

- 1) Households which belong to the medium-high income levels (deciles 5-10th) can enter the

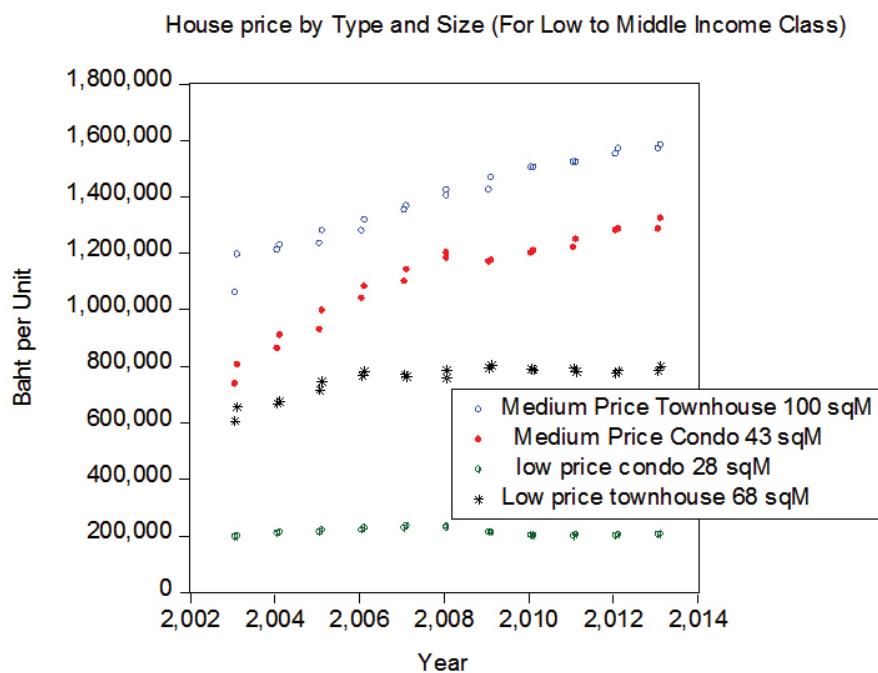


Figure 6:

House price by type and size

Source: Agency for Real Estate Affairs 2013 (www.area.co.th)

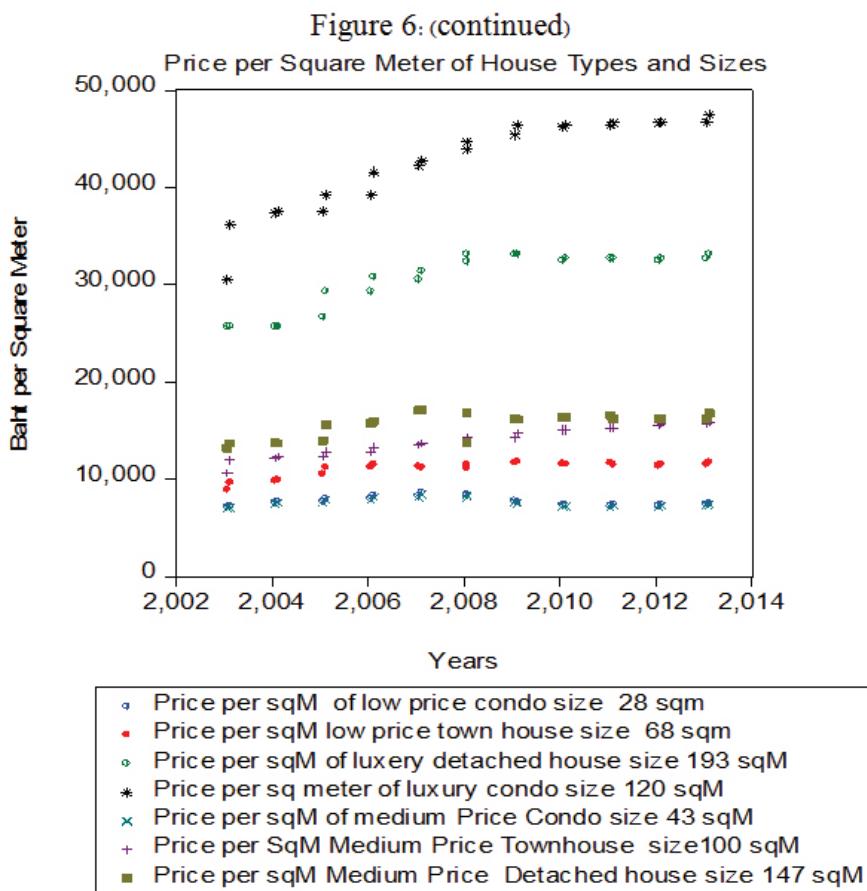


Figure 6: (continued)

House price by type and size

Source: Agency for Real Estate Affairs 2013 (www.area.co.th)

private housing market. For them various types of housing, from the detached house, condo, and townhouse, all with larger sizes and pricing is attainable. In 2018, households in percentiles 70 or higher can access a private market, while in 2037 it happens that percentile 50 or higher would be eligible. The income growth overtime has help increased mean income and affordability, with assumed prudential house price policies. is.

- 2) On the contrary, low-income households (deciles 1-4th) cannot access the housing market by themselves and require assistance from the government in 2018 through to 2037. Some may have to rely on a rental house. Assuming growth of income over time, the rental number declines over time. The ability to buy will increase and some can enter the private house market.
- 3) The type of housing can range from low priced condos of 28 square meters, to townhouses for those who can afford to service the mortgages (deciles 4th), to the rental houses of various forms for low income (deciles 2-3rd). The lowest income deciles households may need special treatment by the government.

POLICY DISCUSSION

Policy Discussion

Currently, the National Housing Authority of the Thai Government has promoted public rental housing to provide opportunities for low-income people to access housing located in the urban areas. This was done to compensate for of the rising cost of urban

Table 4: Housing demand classified by types of purchase or rent in 2018 and 2037

land and to balance and minimizing the time cost from traveling from house to urban jobs. The NHA has initiated the partnerships with stakeholders both at local and national levels. Low income families now have a better chance of becoming house owners. Some can accomplish this by either by improving and/or repairing their homes and re-accessing rental housing.

The NHA's has followed the basic need concept to house low-income households. The NHA has covered 7.2 million households (or 27 percent of total households' numbers) who still do not have house ownership. The NHA has initiated the cooperation with CODI (Community Organization of Development Initiative) and private housing markets to actualize the housing policy. Here, CODI will take care of 1.4 million low-income households (mean income <P20), while NHA will find a housing solution for the lower middle-income group (mean income of P20-P50). The rest of the 2.9 million households would be subsidized to enter the private housing market (mean income P50-P60). The role of CODI has been significant in restoring the livelihood of the poor and low-income households in the urban area for several decades. Recently, CODI cooperated with landowners and initiated a 'land sharing' settlement with rent, and resettling low-income households from their encroachment along the canals in BMR. It has obtained funding sources from the government as well. The NHA has initiated its own housing provisions. The housing projects were successful in housing middle-lower income classes with low-interest rates and long-term mortgage loans. Both CODI and NHA have relied on government subsidies as funding and policy instruments for loans and perhaps on other public instruments as well.

Suggested housing policy which relates to the research model is as follows:

- 1) The NHA can apply the module to compute housing needs over time in the national economic planning by NESDB. The model's parameters on doubling up, vacancy, and withdrawal can be adjusted in the projection of housing needs. The feasibility of housing affordability can be exercised from assuming government provision of interest rate subsidy, tax exemption for land sharing effort of the private landowner in the urban city, negotiation with the government housing bank as well as

commercial banks to extend the term-loan. Thus, the mortgage per month would not be a heavy burden affecting income and saving abilities.

- 2) The model has exhibited a long-term projection where the category of renters would be reduced either by affordability due to the mean income rising and/or mortgage subsidies mention above. The ultimate target is to meet the needs with affordable housing via the private housing market. This is to allow the market demand and supply of housing to function with distant monitoring from the government. The CODI is responsible for the lowest income group. They are those who are still not be able to access to market. NHA will, therefore, monitor the housing market by its own instruments and policies by given laws and authority as promoters. For this sake the model can be used to simulate the policy options.

Suggestion for further study

This study constructed a forecasting model to project housing needs and affordability for Thailand 2018-2037. Given population projections, estimates can be made concerning the household's numbers, which can be matched with future mean or median income distributions. These projections are made in relation to heuristic assumptions of economic growth rate and inflation at the macroeconomic level.

The model can predict new housing needs, after given housing withdrawal, vacancy rates, and doubling up rate in the housing needs calibrations by income class. Given the mortgage service cost i.e., long-term interest cost of housing loan, calibrating the threshold is done to determine where low income residents can afford to participate in the private housing market. The rest of those households, who would not be able to enter the private market, must be taken care by public funding and subsidies.

In the study, the physical aspects of the housing provided for the aging population have not been analyzed. Also, not analyzed is the public finance model to estimate the cost of the low-income housing policy by the three partnerships. The output and outcome of the housing policy will have both social costs and social benefits. The net social benefit would be an important issue to study.

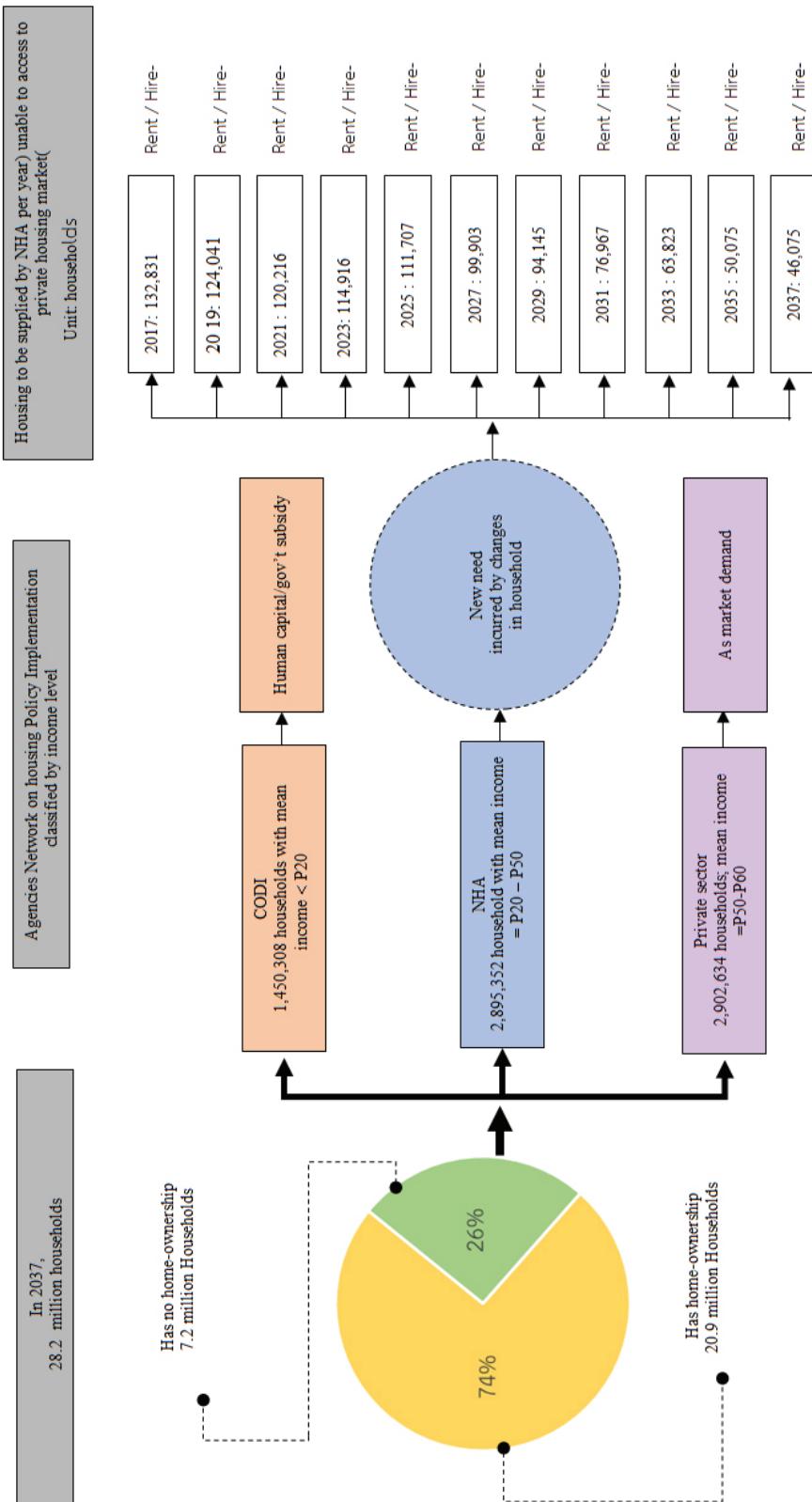


Figure 7:
Housing Demand Forecasting Model for Thailand's Strategic National Plan during 2017-2037

In this study, the concept of settling low income households in the urban areas would be integrated with urban community development. A development where the young and the aging population would be synchronized to live juxtaposed to one another. The community would be alive and sustained with a mega plan of community-housing-jobs-environment-transportation. This is a meta-analysis which would need a team of inter-disciplinarians. The NHA, CODI, and other government agencies, academics as well as developers would be working together in social partnerships for future habitat. This will be suggested for further study.

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