Housing Demand among Millennials in Indonesia: Ownership and other Factors

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This study aims to analyse the determinants of house ownership for millennials. The source of data is from the Indonesia Family Life Survey (IFLS) in 2007 and 2014. Using the Probit estimation model, variables that positively affect the probability of owning a house are age, working status, married or widower/widow, number of household members, and non-food expenditure per capita. On the other hand, variables that negatively affect the probability of owning a house are male gender, years of education, living in an urban area, and food expenditure per capita. Highly educated millenials tend to live in urban areas, where barriers to owning a house are relatively high. Thus, a special scheme of house ownership for millennials in urban areas is needed, through apartments or in the form of a flat. In addition, optimisation of the Housing Financing Liquidity Facility (FLPP) policy is needed specifically for millennials, and zoning policies that are appropriate for millennial housing.

Key words: *Housing Demand, Millennials, Own House.*

Background

Housing is one of the most important human needs (Estaji, 2014; Javad et al., 2012). Most people, especially those who have formed families, want to own a house. Various benefits can be obtained from house ownership (Tur-sinai et al., 2020; Edelstein et al., 2014). Studies in Latin America have found that the presence of a house can increases happiness (Ruprah, 2010). Moreover, the house design can also affect the satisfaction of the owner/occupant (Dimuna et al., 2019; Choudhury, 2012). Besides a place to live, the house has various functions, one of which is a tool to accumulate wealth (Goodman et al., 2018) and provide hobbies (Bank of

America Report, 2019). Dawkins (2020) in his research in the US explained that housing is one of the needs of society which is based on individual rights of constitutional social citizenship, so that it must be prioritised by a country.

However, people cannot buy a house if they do not have enough wealth and income. For funding institutions, wealth is a guarantee in applying for housing loans, while income shows an ability to pay bills regularly. Therefore, the effort to own a house is not easy for some people who do not have sufficient wealth and income, especially for young people or millennials. Millennials are defined as a group of individuals aged 23-37 years. At present, house ownership for millennials is a serious challenge. Purchasing power is one of the main issues for millennials wherever located, especially those who live in urban areas (Shuster, 2019).

Studies show that millennials tend to have a lower probability of owning a house compared to baby boomers and Gen X generations. Studies show that house ownership of millennials aged 25-34 is 8% lower than the baby boomer generation and 8.4% lower than Gen X (Jung et al., 2018). This condition is related to the millennial lifestyle that tends to prefer living in urban areas, where housing prices increased quite rapidly compared to other regions that are relatively far from urban areas (Perspectives, 2019).

Indonesia as a developing country has 63 million millennials in 2019 (Bappenas, 2019). The millennial generation as a productive age is projected to be the majority in the demographic structure (IDN Research Institute, 2019). With this large number, the problem arises regarding the extent of the millennial's capacity to meet their housing needs. Various studies also show that millennial behaviour is different from its predecessor generation regarding home purchases. Lachman & Brett's study (2015) explains that 50% of millennials rent houses, 27% own houses, and the rest are still living with their parents.

The IDN Research Institute's research (2019) show that 51.1% of millennial income is allocated for routine needs, 10.7% is allocated for saving, and only 3.3% for debt instalments such as houses or apartments. Rumah 123, an agency part of the Real Estate Association (REA) that conducted a survey in 17 districts/ cities in Indonesia, also mentioned that the millennial generation who have a family spend on average 50% of their expenditure only for daily consumption. This is the reason why millennials find it difficult to own a house.

Furthermore, there are several obstacles faced by millennials in big cities in Indonesia in owning houses, including: (i) millennials only hope to have their own house, but they still focus on daily consumption, (ii) the increases in house prices are not proportional to the increase in wages/ incomes, (iii) interest rates for house purchases are still not in accordance with millennial's affordability, (iv) many millennials are self-employed so they do not have salary

slips despite large incomes (IDN Research Institute, 2019). For this reason, it is interesting to examine the determinants of house ownership for millennials in Indonesia.

This study aims to examine the determinants of house ownership for millennials. House ownership is basically influenced by hedonic variables (Bartik, 2013; Rosen et al., 2008; Lin, 2005; Ingram, 1997). Based on the concept of hedonic variable, there are several variables that are considered, namely: characteristics of the household head, age of household head, sex of household head, employment status of household head, marital status of the household head, level of education of the household head, number of household members, dummy location (urban-rural, Java or outside Java), per capita expenditure for food and per capita expenditure for non-food.

Literatures Review

In the literature, buying a house is rational decision. Individuals will consider the costs and benefits of buying or not buying a house (Painter et al., 2001). If the benefits outweigh the costs, then the decision to purchase a house will be made. Conversely, individuals will take other options, such as rent, if the costs are greater than the benefits.

The ability of individuals or households to have a house is motivated by various reasons. There are number of studies that have examined the determinants of house ownership. A study by Painter et al., (2001) shows the variables of race, sex, education, and marital status have positive and significant effects on house ownership. The higher the age, income, and education, then the higher the probability of owning a house. Another study that examined the determinants of house ownership found that the more household members, the higher the income and marital status of the household head, then there is a higher probability of owning a house. The variation in the number of household members and home ownership status reflects the level of satisfaction of individuals or households to potentially own a house, while income indicates the level of purchasing power (Kan, 2000; Rapaport, 1997). This aspect of marital status is also seen specifically by the study of Hendershott et al. (2009) who found that marital status, both now and in the past, affected the probability of owning a house. These findings also show that past conditions contributed to house ownership because greater wealth accumulation occurred in married couples.

The existence of financial institutions is also very important in supporting house ownership. Gathergood & Weber's study (2017) shows that financial literacy increases probability of house ownership among young households. Gathergood & Weber's study (2017) shows that household owners and tenants in the UK and Wales have different characteristics, both young and old. The house owners generally have higher incomes, liquid savings, are less likely to

experience credit constraints, and have higher literacy. Most young households buy a house using a mortgage. However, this is a complex financial instrument and this complexity often becomes a barrier for young households who are less able in that process. For young people, they are usually less likely to experience loss of income, have little desire to take risks, and a low level of patience in house ownership. The study also found that there is a negative relationship between level and price volatility on the probability of house ownership.

There are also other options besides owning a house, such as renting. The decision of households to own or rent a house depends on four factors, namely household income, the relative price between renting and owning a house, the stability of demand for housing from a household, and the type of house desired (Carliner, 2015). In general, house ownership is better than rental status. However, tenants also get satisfaction from low maintenance obligations and low uncertainty, because they avoid high transaction costs and other equivalent factors.

Several studies have also linked house ownership with millennial groups. The characteristics of millennials in America are that they are well acquainted with technology, are of various races and ethnicities, have relatively adequate education, do not marry at young age, and generally delay the desire to own a house (Goodman et al., 2015; Mertens et al., 2014). House ownership for millennials is one of the most important things in the long run and failure or delay in achieving house ownership can increase the inequality of wealth among millennials (Jung et al., 2018). Further research by Jung et al. (2018) explains that house ownership among millennials is influenced by the behaviour and views of the millennial generation itself in terms of meeting the needs of the house and the characteristics and preferences of house ownership. Mitchell et al (2016) explain that government intervention in spending on the millennial generation is needed in the development process and the application of micro-market transformation. This shows that millennial's expenditure needs to be directed towards things that are productive and are investments, especially in housing ownership for them.

Another study shows that there is an intergenerational pattern where young people have a higher probability of owning house if their parents also have a house. Parents' wealth increases the probability of young people owning a house. This difference in intergenerational transfers can explain why there is a persistent disparity in house ownership based on racial and ethnic groups (Jung et al., 2018). Furthermore, the age variable is also very important in estimating the determinant of house ownership. Abramsson & Andersson's study (2016) shows that as we get older, there is also gradual change from a large house to a small house, from owning a house to being in a rental house.

Data and Method

This study uses data from the Indonesia Family Life Survey (IFLS). The IFLS data is multi-level, multi-topic, and longitudinal data, such that the sample covered 83% of the population in Indonesia in 1993 (Strauss et al., 2016). The IFLS data consists of five waves that began in 1993, 1997, 2000, 2007, and 2014. The IFLS data used in this study are the fourth wave (in 2007) and the fifth wave (in 2014). By utilising two-wave panel data, this study can compare determinants of house ownership in 2007 and 2014. In addition, this study can also examine the factors that influence the dynamics of house ownership status by using a sample of households that did not have a house in 2007, then seeing the changes in 2014. The unit of analysis used in this study is households headed by millennials (aged 20 - 35 years).

The analytical model used in this research is Probit Regression. This model is used when the dependent variable is binary. In this case, the dependent variable has values 1 and 0 (having a house = 1, not having a house = 0). This model estimates the probability of y = 1, as a function of independent variables x, which are formulated in the following equation:

$$P\,(y = 1|x) = G(\beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k) = G(\beta_0 + \boldsymbol{x\beta}).$$

Where G is the function that gives a limit on the probability prediction between 0 to 1: 0 <G (z) <1, for real numbers z. In the probit model, G is the standard normal cumulative distribution function (CDF), which is shown by the equation:

$$G\,(z) = \,\Phi\,(z) \equiv \int_{-\infty}^{z} \emptyset\,(v)dv,$$

Where $\emptyset\,(z)$ is the standard normal density with the equation $\emptyset(z)=(2\pi)^{\wedge}(-1/2)\;\exp[(-]z^{\wedge}2/2)$. To see the effect of the independent variable on the dependent variable in probit regression, the Average Marginal Effect (AME) is calculated with the following equation (Woolridge, 2013):

$$n^{-1} \sum_{i=1}^{n} g(\hat{\beta}_0 + x_i \hat{\beta})$$

Results and Discussion

A statistical descriptive of the variables used in this study is presented in Table 1. There are 4137 household respondents who are headed by individuals aged 20 - 35 in 2007, or the head

of millennial households. As for 2014, the number of respondents increased to 4421 households. Although the IFLS data is panel, it is possible that there is a change in the number of households caused by the household split-off or attrition that occurred between 2007 and 2014.

Characteristics of the respondents of the study are that most household heads are male, the household head is working, the household head is married, and more than 50% each lived in Java and urban areas. Meanwhile, the average length of schooling of household heads is 9.63 years, the average age of household heads is 28.8 years, the average number of household members is 3.19 people. Compared to 2007, some characteristics experienced an increase in mean or proportion in 2014.

Table 1: Statistical Descriptive for Variables

Variables	2007				2014			
	Mean	SD	Min	Max	Mean	SD	Min	Max
dummy own house or others	0.47	0.50	0	1	0.48	0.50	0	1
age of HH head in years	28.80	4.19	20	35	29.51	4.19	20	35
dummy male of HH head	0.87	0.34	0	1	0.87	0.33	0	1
working status of HH head	0.92	0.26	0	1	0.93	0.26	0	1
years of schooling HH head	9.63	3.78	0	18	10.29	3.68	0	22
marital status of HH head								
unmarried	0.15	0.36	0	1	0.14	0.35	0	1
married	0.82	0.38	0	1	0.84	0.37	0	1
widow	0.02	0.15	0	1	0.02	0.15	0	1
number of HH member	3.19	1.46	1	14	3.21	1.46	1	13
dummy urban	0.57	0.50	0	1	0.62	0.49	0	1
dummy java or outside java	0.56	0.50	0	1	0.51	0.50	0	1
log food expenditure per capita	12.55	0.71	9.932	15.44	13.24	0.72	10.859	15.86
log non-food expenditure per capita	11.87	1.02	8.136	15.64	12.74	0.94	9.420	16.56
number of observations	4137				4421			

The comparison of characteristics between house owners and non-owners can be seen from Table 2. The house owners have higher characteristics in the average age of household heads, the proportion of male household heads, the proportion of household heads having working status, the proportion of household heads having married status, and the average number of household members. Meanwhile, the house owners have lower characteristics in the average

years of education of the household head, the proportion of households living in cities, the proportion of households living in Java, and the average food expenditure per capita and non-food expenditure per capita.

The comparative characteristics data in Table 2 mostly show significant differences between house owners and non-house owners, both in 2007 and in 2014. This is an early indication of the existence of certain factors that affect the status of house ownership in these millennial households. From these comparative data, there are two variables that attract attention, namely the years of education of household heads and the proportion of household heads who live in urban areas. Apparently, the data show that house owner respondents have lower years of schooling compared to respondents who do not have a house. In other words, the higher level of education tends to favour the lower ownership of a house. This certainly invites attention, considering education is usually a reflection of a person's or household's ability to accumulate wealth, so that they can easily buy a house. It should be suspected that individuals with high education tend to prefer living in urban areas, where there are relatively high housing prices.

Another interesting thing is that the proportion of households that have a house in urban areas are lower than households in rural areas. The higher cost of buying a home in urban areas is one of the causes of low home ownership in urban areas.

Table 2: The Characteristics of House Owner and Non-Owner

	2007				2014			
	Own house	other	t	p	Own house	other	t	p
age of HH head in years	30.11	27.65	19.686	0.00	30.68	28.42	18.530	0.00
dummy male or female HH head	0.89	0.84	4.580	0.00	0.89	0.85	4.287	0.00
working status of HH head	0.95	0.90	6.070	0.00	0.95	0.90	6.747	0.00
years of education of HH head	8.65	10.48	-16.019	0.00	9.67	10.85	-10.816	0.00
marital status of HH head								
unmarried	0.03	0.26	-21.057	0.00	0.03	0.24	-21.373	0.00
married	0.94	0.72	19.943	0.00	0.95	0.73	20.426	0.00
widow	0.02	0.02	-0.153	0.88	0.02	0.03	-1.083	0.28
number of HH members	3.76	2.69	25.253	0.00	3.73	2.73	24.271	0.00
urban	0.38	0.74	-25.259	0.00	0.46	0.76	-21.495	0.00
dummy java or outside java	0.52	0.59	-4.747	0.00	0.47	0.55	-5.750	0.00
log food expenditure per capita	12.32	12.76	-20.639	0.00	13.06	13.41	-16.361	0.00
log non-food expenditure per capita	11.60	12.10	-15.843	0.00	12.55	12.92	-12.888	0.00
number of observations	1939	2198			2125	2296		

Analysis of determinants of house ownership in 2007 and 2014 are presented in Table 3 (Model 1 and Model 2). The analysis shows that the older the household head, the higher probability of owning a house. For every one-year increase in age, the probability of owning a house increased by 1.63% in 2007 and 1.35% in 2014. Meanwhile, the probability of men owning a house is lower than women in 2007 and 2014 with the marginal effects 9.9% and 8.5%, respectively. Married household heads also have higher probability of owning a house in 2007 and 2014 with marginal effects 16.6% and 23.1%, respectively. The results of this study are in line with research conducted by Dengah et al., (2014), Delauney et al. (2011), Wu & Lin (2002), David Blau et al. (1997), and Ingram (1997). Like the previous study, if the number of household members are increased, the probability of owning a house is also higher. For every additional one household member, the probability of owning a house will increase by 6.4% in 2007 and 6.5% in 2014. Conversely, households living in cities have a lower probability of owning a house than those living in rural areas, with a difference of 28.5% and 24.9% respectively in 2007 and 2014. The coefficient of marginal effects in 2014 is lower than 2007 indicating a decrease in the probability gap over the two periods.

Table 3: The Regression Result of Determinant of House Ownership

Variables	Model 1	Model 2	Model 3
	2007	2014	2014*
age of HH head in years	0.0160***	0.0134***	-0.00286
	(0.00184)	(0.00193)	(0.00364)
dummy male of HH head	-0.0969***	-0.0857***	-0.0772*
	(0.0257)	(0.0262)	(0.0420)
working status of HH head	0.0690**	0.0426	0.0661
	(0.0348)	(0.0362)	(0.0494)
years of education of HH head	-0.00999***	-0.00603***	0.00869**
	(0.00208)	(0.00211)	(0.00406)
marital status of HH head			
married	0.162***	0.216***	0.102**
	(0.0294)	(0.0303)	(0.0421)
widow	0.0803	0.123**	-0.0774
	(0.0542)	(0.0549)	(0.101)
number of HH member	0.0665***	0.0671***	-0.000717
	(0.00647)	(0.00638)	(0.0133)

Variables	Model 1	Model 2	Model 3
	2007	2014	2014*
dummy urban	-0.266***	-0.239***	-0.193***
	(0.0155)	(0.0155)	(0.0272)
dummy java	0.00551	-0.00210	-0.0323
	(0.0140)	(0.0143)	(0.0255)
log food expenditure per capita	-0.0513***	-0.0477***	-0.0233
	(0.0143)	(0.0134)	(0.0244)
log non-food expenditure per capita	0.0173*	0.0390***	0.0362**
	(0.00980)	(0.0107)	(0.0173)
number of observations	4038	4182	1603

*p < 0.1, ** p < 0.05, *** p < 0.01
*house ownership status in 2014 using household observation that have not owned a house in 2007.

Using households that did not have a house in 2007 and characteristics in 2007, this study also examined the determinants of household ownership in 2014, as presented in Model 3. Some variables are consistent with previous findings, namely dummy male, marital status, years of schooling, dummy urban, and non-food expenditure per capita. Meanwhile, the variable number of household members is not significant.

Conclusion and Recommendation

In the first analysis, this study looks the differences in socio-demographic characteristics between house owners and non-house owners in millennials. The average of age, proportion of male, proportion of working status, proportion of marital status, and the average number of household members are higher in the millennial group of house owners than non-house owners. Meanwhile, the average years of schooling, the proportion living in urban areas, the proportion living in Java, as well as the average food expenditure per capita and non-food expenditure per capita of households are lower for house owners than non-house owners.

This study aims to examine the determinants of home ownership in millennials. The findings of this study indicate that variables of age, working status, married or widower/ widow, number of household members, and non-food expenditure per capita have a positive effect on the probability of households owning a house. Conversely, the variables like male gender, years of education, urban living, and per capita food expenditure negatively affect the probability of the household owning the house. The finding of negative influence on the year of schooling variables of households head and dummy households living in urban areas are thought to be

related to millennial characteristics of highly educated people who tend to live in urban areas and choose to live near the workplace, where barriers to having a house are relatively high. In addition, highly educated millennials tend to be slower to accumulate capital to buy houses compared to those with low education.

Based on the results of this study, the policy that needs to be implemented is the need for a special scheme of home ownership for millennials through apartments or in the form of low-cost housing (flats) and low-cost rental (flats) in urban areas. In addition, optimisation of the Housing Financing Liquidity Facility (FLPP) scheme is needed specifically for millennials. Local governments also need to conduct appropriate zoning for millennial housing, either through optimisation of the millennial housing backlog for rural-urban areas in Java and outside Java. This is expected to overcome the limited environmental problems in The Moving to Work (MTW) program that has been carried out by Walter et al. (2020), in addition to overcoming traffic congestion due to different population mobility between workplaces and their homes.

REFERENCES

Abramsson, M., & Andersson, E. (2016). Changing preferences with ageing – housing choices and housing plans of older people. Housing, Theory and Society, 33(2), 217–241. https://doi.org/10.1080/14036096.2015.1104385

Bartik, T. J. (2013). The estimation of demand parameters in hedonic price models. Journal of Political Economy, 95(1), 81–88.

Carliner, G. (2015). Determinants of home ownership. Land Economics, 50(2), 109–119.

Choudhury, A. H. (2012). Effect of tax-rate on zone dependent housing value. Journal of Economics and Economic Education Research, 13(2), 111-123.

David, B., Tom, D., and Tom Mroz, B. S. (1997). Housing demand and community choice: An Empirical Analysis, Journal of Urban Economics, 42(2), 243-260.

Dawkins, C. (2020). The right to housing in an ownership society the right to housing in an ownership society. Housing and Society, 47(02), 1–22. https://doi.org/10.1080/08882746.2020.1722055

Delauney, N., Burton, J., & Talpade, S. (2011). Supply and demand analysis of single-family residential units in Carroll County, Georgia. Business and Economics, 9(1), 1–9.

Dengah, S., Rumate, V., & Niode, A. (2014). Effects of Percapita Income and Population Density towards Housing Property Development in Manado. Efisiensi, 14(3-October).148-154.

Dimuna, K. O., & Olotuah, A. O. (2019). Evaluation of Residents' Satisfaction with Building Features in Some Public Housing Estates in Benin City, Nigeria. Academic Journal of Interdisciplinary Studies, 8(2), 117–125. https://doi.org/10.2478/ajis-2019-0023

Edelstein, R., Qian, W., Tsang, D., Kaganova, O., Dengah, S., Rumate, V., Niode, A., Beracha, E., Skiba, H., & Holmans, S. (2014). Housing demand and need (England). Journal of Real Estate Finance and Economics, 43(2), 71–81. https://doi.org/10.1007/s11146-011-9360-x

Estaji, H. (2014). Flexible Spatial Configuration in Traditional Houses , the Case of Sabzevar Flexible Spatial Configuration in Traditional Houses , The Case of Sabzevar. January.

Gathergood, J., & Weber, J. (2017). Financial literacy: A barrier to home ownership for the young? Journal of Urban Economics, 99, 62–78. https://doi.org/10.1016/j.jue.2017.02.001

Goodman, L. S., & Mayer, C. (2018). Homeownership and the American dream. Journal of Economic Perspectives, 32(1), 31–58. https://doi.org/10.1257/jep.32.1.31

Goodman, L., Pendall, R., & Zhu, J. (2015). Headship and Homeownership What Does the Future   Hold?   June. https://www.urban.org/sites/default/files/publication/53671/2000257-Headship-and-Homeownership-What-Does-the-Future-Hold.pdf

Hendershott, P. H., Ong, R., Wood, G. A., & Flatau, P. (2009). Marital history and home ownership: Evidence from Australia. Journal of Housing Economics, 18(1), 13–24. https://doi.org/10.1016/j.jhe.2008.09.002

IDN Research Institute. (2019). Indonesia Millennial Report.

Ingram, G. K. (1997). Housing demand in the developing-country metropolis. The World Bank,11(1), 135–144.

Javad, S., Poor, A., & Jusan, M. M. (2012). Exploring housing attributes selection based on Maslow ' s Hierarchy of Needs. 42(July 2010), 311–319. https://doi.org/10.1016/j.sbspro.2012.04.195

Jung, C., Zhu, J., Goodman, L., Ganesh, B., & Strochak, S. (2018). Millennial Homeownership Why Is It So Low, and How Can We Increase It? July, 1–67. https://www.urban.org/sites/default/files/publication/98729/millennial_homeownership.pdf

Kan, K. (2000). Dynamic modeling of housing tenure choice. Journal of Urban Economics, 48(1), 46–69. https://doi.org/10.1006/juec.1999.2152

Lachman, M. L., & Brett, D. L. (2015). Gen Y and housing: What they want and where they want It. https://books.google.com/books?id=xfORrgEACAAJ

Lin, V. C.-C. (2005). Hedonic model of court auction residential housing market in the taipei metropolitan area. July.

Mertens, K., Gould, I., & Ellen, A. (2014). Do housing choice voucher holders live near good schools ? Journal of Housing Economics, 23, 28–40. https://doi.org/10.1016/j.jhe.2013.11.005

Mitchell, K., & Sparke, M. (2016). The new Washington consensus: Millennial philanthropy and the making of global market subjects. Antipode, 48(3), 724–749. https://doi.org/10.1111/anti.12203

Painter, G., Gabriel, S., & Myers, D. (2001). Race, immigrant status, and housing tenure choice. Journal of Urban Economics, 49(1), 150–167. https://doi.org/10.1006/juec.2000.2188

Perspectives, D. I. (2019). Generasi milenial dalam bagi sumber daya manusia indonesia atau ancaman ? September.

Rapaport, C. (1997). Housing demand and community choice : An empirical analysis. Carol Federal Reserve Bank of New York Research Department, 42, 243–260.

Rosen, S., Journal, T., Feb, N. J., & Rosen, S. (2008). Hedonic prices and implicit markets : Product differentiation in pure competition. 82(1), 34–55.

Ruprah, I. J. (2010). Does owning your home make you happier? Impact Evidence from Latin America. OVE Working Papers, 22.

Shuster, B. (2019). The millennial mindset. May, 263–283. https://doi.org/10.4018/978-1-5225-9906-7.ch009

Strauss, J., Witoelar, F., & Sikoki, B. (2016). The fifth wave of the Indonesia family life survey: overview and field report (Vol. 1). Santa Monica, CA: RAND.

Tur-sinai, A., Fleishman, L., Romanov, D., Systems, H., Max, T., Yezreel, S., College, V., & Valley, Y. (2020). The accuracy of self-reported dwelling valuation. Journal of Housing Economics, 48(November 2019), 101660. https://doi.org/10.1016/j.jhe.2019.101660

Walter, R. J., Colburn, G., Yerena, A., Pederson, M., Crowder, K., Walter, R. J., Colburn, G., Yerena, A., & Pederson, M. (2020). Constraints and opportunities for innovation in the Moving to Work Demonstration Program. Housing and Society, 47(01), 1–21. https://doi.org/10.1080/08882746.2019.1706067

Woolridge, J. M. (2013). Introductory econometrics a modern approach. South-Western.

Wu, W. C., & Lin, S. J. (2002). Housing demand with random group effects. International Real Estate Review, 5(1), 133-45.