

# THE EFFECT OF HOUSING SUBSIDIES ON HOUSING COSTS IN FINLAND

A Methodology Study

Bachelor's Thesis  
Tommi Turpeinen 551559  
Aalto University School of Business  
Bachelor of Economics  
Fall 2019

---

**Author** Tommi Turpeinen

---

**Title of thesis** Housing Subsidies Effect on Housing Costs in Finland - Methodology study

---

**Degree** Bachelor of Science in Economics and Business Administration

---

**Degree programme** Economics

---

**Thesis advisor(s)** Pauli Murto, Mikko Mustonen

---

**Year of approval** 2019**Number of pages** 27**Language** English

---

**Abstract**

This thesis is a literature and methodology survey discussing and analyzing Finnish studies on the effect of housing subsidies on rent. The purpose of this thesis is to achieve a basic understanding of housing subsidies' effect on rents, i.e. the incidence of housing subsidies and the methods with which the subject has been researched. The main studies discussed are by Lyytikäinen and Eerola (2019), Viren (2013) and Kangasharju (2010). I will also discuss some highly cited foreign studies for reference.

Housing subsidies are the second largest income transfer in Finland, so it is very important to study the incidence of the subsidies. The purpose of the housing subsidies is to help low-income households with their housing costs by reducing their effective rents. If the subsidies raise rent level compared to a situation without the subsidies, then government resources are not correctly allocated. Currently there are relatively few studies on the subject. This is due to the complexity of subsidy programs and that they differ greatly between countries.

The conclusion presented in this paper is that there is no clear consensus on housing subsidies' effect on rents and that recent studies have yielded different results. More studies should thus be performed to gain better understanding of the allocation of government resources.

---

**Keywords** Rental housing, subsidized housing, housing allowance, incidence

---

# 1 Contents

2	Introduction .....	1
3	Housing market and subsidies in Finland.....	2
3.1	General housing allowance in Finland.....	4
4	Incidence problem and rental market elasticity? .....	7
5	Methods used in research literature.....	8
5.1	Natural and quasi-experiment in policy analysis .....	8
6	Major studies on housing allowance effects on rent.....	10
6.1	Regression discontinuity study by Eerola and Lyytikäinen .....	10
6.2	Difference-in-differences study by Kangasharju .....	15
6.3	Panel data estimation by Viren .....	18
6.4	Foreign studies.....	21
7	Results.....	22
8	Conclusions .....	24
9	References.....	27

## 2 Introduction

Housing subsidies are vastly used as a social support for low-income families throughout the developed world. In Finland, housing subsidies are the second largest income transfer after pensions (Viren S. H., 2008). The purpose of the subsidies is to assist low-income households with their housing costs by reducing the effective price of their housing. The subsidies should leave assisted households with more resources on other consumption or to have better quality housing for the same effective price. However, if the subsidies raise the rent relative to a situation without subsidies, then the subsidies are misused.

This thesis concentrates mainly on direct housing allowances, currently the favored method of providing subsidy for living expenses in the whole of Europe (Jauhiainen S, 2019), in the case of Finland. Another way to subsidize housing is to build subsidized housing blocks, but many countries have stopped or decreased the amount of these programs due to social problems in subsidized neighborhoods. (Jauhiainen S, 2019)

The purpose of this thesis is to achieve a basic understanding of housing subsidies' effect on rents, i.e. the incidence of housing subsidies and the methods with which the subject has been studied. There are numerous studies on the incidence problem in taxation, but relatively few concern income transfers such as housing allowance. The reason is that the systems vary greatly between countries. This thesis primarily focuses on Finnish studies and reports; studies from other countries are included for reference purposes. In Finland, the level of housing benefits is very typical for European countries. The expenditure on housing allowance in Finland in 2015 was 0.6% of GDP, which is the same as the European average (Eurostat, 2019).

This thesis is a literature survey, and in order to fulfill its purpose, it attempts to answer the following research questions: does housing allowance add to rental prices and if it does, by how much, and what are the methods used when studying the subject? To answer these questions, I will thoroughly analyze the following three Finnish studies on the subject: Eerola and Lyytikäinen (2019), Kangasharju (2010) and Viren (2013). Each study used different methods and yielded different results. I will also briefly analyze some highly cited foreign studies such as Susin (2002) for USA, Gibbons and Manning (2006) for United Kingdom and Fack (2006) for France.

First, I will introduce the housing market in Finland and how it works in general. Next, I will go through the current housing subsidy methods used in Finland and how they have changed in the recent past. Then, I will examine the incidence problem in general and discuss how the elasticity of the rental market is related to the incidence problem. In the proceeding chapters, I will explain the different methods used in research literature and describe the aforementioned three studies in detail. Finally, I will discuss the results and analyze why the results differ between the studies and whether they are relevant to the current housing allowance scheme in Finland.

### 3 Housing market and subsidies in Finland

The majority of households in Finland are living in owner-occupied apartments. One third of households were living in rented apartments in 2017 (Statistics Finland, 2018). Around 36% of rented apartments were subsidized apartments by the Housing Finance and Development Centre of Finland, and the rest of the households were living in non-subsidized rented apartments.

Currently, the non-subsidized rental market in Finland is very flexible. The regulation of rental prices was lifted in mid-nineties and since then, the prices have not been subject to any restrictions (Finnish Competition and Consumer Authority, 2019). Most rental business is

performed by rental housing agencies. Usually, agencies publish fixed rental prices on the rental advertisements, and prices are almost never negotiated between the property owners and potential tenants. (Viren M. , 2013)

In subsidized apartments, the rents are based on the capital and maintenance costs of the building. The selection of tenants for the subsidized rental apartments is based on social appropriateness, which is evaluated based on the applicant's wealth, income and need for the apartment. (The Housing Finance and Development Centre of Finland (ARA), 2018)

The housing allowance is the main means of supporting housing in Finland. The housing allowance system has changed many times over time. There have been at least three major changes to the housing allowance scheme in the 2000s. Before 2015, the housing allowance dependent on the floor area, the year of construction or major renovation and the location of the building. For smaller and newer apartments, the maximum allowance per square meter was higher than for larger and older apartments. In 2002, the housing allowance reform increased the ceilings of the rent per square meter that were acceptable for allowance. After the 2015 reform, the housing allowance depends only on the location of the building and the characteristics of the household and not on characteristics of the apartment itself.

The housing allowance is currently divided in two major categories: general allowance and allowance for pensioners (National Pension Fund (Kela), 2019). There used to be a third major category, housing allowance for students, but students were moved under the general allowance category after August 1<sup>st</sup> 2017.

Other means to subsidized housing in Finland are tax-deduction for home loan interest and so-called ARA-apartments which are rental apartments subsidized by ARA, the Housing Finance and Development Centre of Finland. The ARA-subsidy is based on the fact that the government can

borrow money from banks or other financial institutions with lower interest rate than other commercial companies. The government guarantees the loan for housing producers that fulfill certain preconditions. Tenants for the ARA-apartments are selected based on social appropriateness and financial need.

Low-income households may also apply for the basic social assistance for housing costs. Social assistance can be applied if all the earnings and assets (including general housing allowance) are not sufficient to cover everyday living expenses such as housing. (Kela, 2019)

### 3.1 GENERAL HOUSING ALLOWANCE IN FINLAND

The total expenditure on housing allowance was 2,112 million euros in 2018. It had increased by 81% in the previous 10 years. The housing allowance is the second largest transfer payment in Finland after pensions. Seventy percent of the total housing allowance was paid as general housing allowance, equaling 1,489 million euros (Kela, 2019). Housing allowance for pensioners totaled 600 million euros in 2018 (28%). The majority of the general housing allowances were paid to households living in rental apartments. Only 2.7% was paid to owner-occupied households (Kela, 2019). The expenditure on general housing allowance in 2018 was 18% higher compared to the previous year. This is because the year 2018 was the first full year during which the general housing allowance also covered students. The total housing allowance in 2018 was 5% higher compared to 2017.

Currently, the housing allowance is based on the characteristics of the household, mainly income and household size. In addition, the allowance depends on the municipality where the apartment is located (National Pension Fund (Kela), 2019). The allowance does not depend on the

characteristics of the apartment. The allowance covers 80% of the rent at maximum. The formula for calculating the amount of general housing allowance is

$$\text{Housing Allowance} = 0.8 * (\text{acceptable housing costs} - \text{basic deductible}),$$

where the acceptable housing cost is determined by Kela and depends on the municipality and the number of people in the household. If the actual housing cost exceeds the acceptable housing cost, the allowance is calculated using the maximum acceptable housing cost set by Kela. These maximums are listed in the table below.

Maximum housing costs: Rates in 2019

Household size persons	Municipality in category I, EUR per month	Municipality in category II, EUR per month	Municipality in category III, EUR per month	Municipality in category EUR, € per month
1	516	499	396	349
2	746	717	579	509
3	951	903	734	651
4	1 111	1 054	869	775
+ each additional person, EUR per month	139	132	119	114

*Figure 1 Maximum acceptable housing costs (Kela 2019)*

The basic deductible is calculated using the formula below.



$0,42 \times [T - (597 + 99 \times A + 221 \times L)]$ , where

T = the combined income of the household

A = the number of adults

L = the number of children

EUR 597 is the standard amount

In a one-person household, the basic deductible is zero if the income is €696/month at maximum.

In that case, 80% of the acceptable housing cost is paid for the recipient and the housing allowance decreases as the salary increases.

Before 2015, the housing allowance dependent on the size of the apartment and the year it was built or underwent a major renovation, in addition to its location and the household's gross income. The maximum housing allowance was capped by a limit on the compensable rent per square meter (Kela rate). The maximum rate dependent on the floor area and the construction year of the apartment (Essi Eerola, 2019). The maximum rates (Kela rates) are listed in the table below.

Floor area (m <sup>2</sup> )	Construction year		
	–1985	1986–1995	1996–
< 26	11.4	12.68	13.18
26 – 30.9	10.56	11.84	12.34
31 – 35.9	9.72	11	11.5
36 – 45.9	9.27	10.64	11.15
46 – 60.9	8.96	10.26	10.76
61 – 80.9	8.76	9.82	10.33
> 81	8.68	9.74	10.24

Notes: Table shows the KELA rate in cells defined by floor area and construction year of the dwelling in affordability region 3 in 2012. If the rent/m<sup>2</sup> exceeds the KELA rate, the excess amount is neglected when calculating the amount of HA.

*Table 1: KELA rates (euro/m<sup>2</sup> per month) as a function of floor area and construction year. (Eerola and Lyytikäinen 2019)*

Housing allowance (HA) was calculated based on the table above, using the following formula:

$$HA = 0.8 * [\min(\text{rent}/\text{m}^2, \text{Kela rate}) * \text{Floor area} - \text{basic deductible}].$$

Therefore, the Kela rate was used if the rent/m<sup>2</sup> exceeded the maximum set by Kela. The basic deductible was the same as the one currently in use.

Next, I will briefly introduce the incidence problem and its relevance to the rental market.

#### 4 Incidence problem and rental market elasticity?

The incidence problem has been widely studied in taxation, but it applies to all government income transfers and subsidies. The taxation incidence problem concerns the tax burden between consumers and producers about who is the one to eventually pay the tax? In subsidies, the incidence problem becomes a question of who will eventually receive the subsidy and how it is divided between the parties. In the case of housing allowance, it is not clear how much of the allowance is ultimately for the benefit of the low-income households and how much of other parties such as landlords through increased rents.

Similarly to taxation, the incidence of the subsidy depends on the elasticity of the supply and demand of the market. When demand is more elastic than supply, a change in price affects the quantity demanded more than quantity supplied. In this case, more of the subsidy goes to the supplier, in this setting the landlord. In an extreme case where supply is perfectly inelastic (price change does not affect supply) and demand perfectly elastic (small price decrease increases the demand infinitely) then the entire subsidy would go to supplier, i.e. the landlord.

In the case of the rental housing market, the price elasticities for both supply and demand are relatively low. The former might be close to zero in the short term (Viren M. , 2013). In this case, it would be expected that the subsidy would be divided close to 50 – 50 between parties. The incidence of housing allowance is studied using the methods explained in the following chapter.

## 5 Methods used in research literature

The effect of housing allowance on rent cannot be studied using random assignment, that is, by dividing people randomly to treatment and control groups. Researchers have overcome this problem by using natural and quasi-experiments.

### 5.1 NATURAL AND QUASI-EXPERIMENT IN POLICY ANALYSIS

According to Encyclopædia Britannica, natural experiment is an “empirical study in which individuals (or clusters of individuals) are exposed to the experimental and control conditions that are determined by nature or by other factors outside the control of the investigators.”

(Messer, 2019)

Due to the fact that it is almost impossible to conduct or finance random experiments when studying public policy effects in economics, natural experiments are widely used (Wolpin, 2000). In the context of housing allowance, the natural experiment comes in the form of policy changes implemented by the government or other policy makers instead of the researchers themselves.

A quasi-experiment is an empirical interventional study used to estimate the causal impact of an intervention on a target population without random assignment (Wikipedia, 2019). In a quasi-experiment setting, the studied population is not assigned randomly to control and treatment groups, but they use some other criterion to assign the population. Criteria such as this include

cut-off marks or exogenous discontinuities in the data.? Quasi-experiment designs used to study housing allowance's effect on rent include the difference-in-differences approach in pretest-posttest design and the regression discontinuity design? Pretest-posttest design tests the dependent variable before and after the treatment (Dimitrov, Dimiter M.Rumrill, Jr., Phillip D., 2003). In the context of housing allowance, the pretest is done by regressing the data before the treatment (such as changing the amount of the allowance) is implemented. This is done to get a baseline for the post-treatment estimates.

Kangasharju (2010) employs the difference-in-difference approach, using the 2002 housing allowance reform as a cutoff mark. The reform increased the allowance for many households by different amounts. The difference-in-differences method is used to estimate how much the rent increased for assisted households compared to non-assisted households after the reform. The pretest-posttest design was used to evaluate whether there was a tendency for the difference of the rents between recipients and non-recipients of housing allowance to change even before the reform.

Lyytikäinen and Eerola (2019) use regression discontinuity design to study whether or not the housing allowance has an influence on rent. Regression discontinuity design is used to study causal effects of interventions by assigning a cut-off above or below where an intervention is assigned or changed. In Finland before 2015, the maximum amount of housing allowance per square meter was stepwise indirectly proportional to the size of the apartment. The main idea is to study if the rents in general also tend to increase stepwise. If they do, then the housing allowance almost certainly affect the rents, as there is no reason to expect that the relationship between rent and other housing characteristics would be stepwise.

Similar designs are also used in studies outside Finland. Susin (2002) utilizes the different levels of housing subsidy in different metropolitan areas in the United States as a natural experiment. Gibbons and Manning (2006) use the United Kingdom's housing benefits cuts in 1996–1997 as a natural experiment.

## 6 Major studies on housing allowance effects on rent

The allowance system is complex and varies between countries. Due to this, only a few studies analyze the effects of housing allowance on rents. (Viren M. , 2013) I will conduct thorough analysis on three Finnish studies which all have, interestingly, yielded different results.. The following studies are included: *Housing Allowance and the Rent of Low-income Households* by Kangasharju (2010), *Is the housing allowance shifted to rental prices?* Viren (2013) and *Housing allowance and rents: Evidence from a stepwise subsidy scheme* by Eerola and Lyytikäinen (2019). The latter seems to have used the most comprehensive methods compared to any of the other Finnish studies on the subject I will also reference studies from other countries for comparison. First, I will discuss the 2019 study by Eerola and Lyytikäinen.

### 6.1 REGRESSION DISCONTINUITY STUDY BY EEROLA AND LYytiKÄINEN

In this section, I will go through Eerola and Lyytikäinen's (2019) approach. They studied the effect of housing demand subsidies on rents using discontinuities in the Finnish housing allowance system as a quasi-experiment. The data used is register data covering the universe of housing allowance recipients in Finland. The researchers used regression discontinuity design, taking advantage of the housing allowance's stepwise dependence on floor area. One major concern

when studying HA effect on rent is reverse causality, meaning that when rent (dependent variable) is higher, the housing allowance (explanatory variable) is also higher. When reverse causality is present, the OLS regression cannot be used because it would give biased results. This issue is solved by using instrumental variable regression (IV-regression). In IV-regression, an instrument is chosen in a way that it effects the explanatory variable, in this case the housing allowance, but has no independent effect on dependent variable, in this case the rent level. The discontinuities in housing allowance are used as an instrument. From the data presented in Table 1 on page 8, it can be deduced that some of the discontinuities are quite large. For a 31 m<sup>2</sup> apartment built before 1985, it was possible to get a maximum of €9.72/m<sup>2</sup> housing allowance whereas for 30.5 m<sup>2</sup>, the maximum allowance was €10.56/m<sup>2</sup> (8.6% higher). It can be assumed that in a rental market setting, other things equal, rent for 30.5m<sup>2</sup> and 31 m<sup>2</sup> would be almost the same on average without the intervention. The instrument is valid because the discontinuities can affect the rent only through housing allowance and not directly. In the first phase of IV-regression, the cut-offs' effect on housing allowance are estimated by below regression.

$$(1) Y_i = \alpha + \sum \beta_j D_j(\text{floor\_area}_i > \text{cutoff}_j) + f(\text{floor\_area}_i) + \delta' X_i + u_i, \text{ where}$$

$Y_i$  = housing allowance per square meter

$D_j$  = zero-one dummy variable

$\beta_j$  = coefficient that can be interpreted as impact on crossing the cutoff

$f(\text{floor\_area}_i)$  = smooth function that controls for the direct impact of the floor area on rent

$X_i$  are control variables.

The variable of interest is  $B_i$  and its coefficient can be interpreted as the impact of crossing the housing allowance cut-offs. The  $(floor\_area_i)$  is a smooth function that captures the pattern of the direct impact that floor area has on the housing allowance. This is done because not all the recipients of the housing allowance receive the maximum allowance set by Kela. The smooth functions are represented by the solid lines in figure 2. The next phase of the IV-regression takes the following form

$$(2) R_i = \gamma_1 + \gamma_2 \widehat{HA}_i + (floor\_area_i) + \mu' X_i + u_i, \text{ where}$$

$R_i$  = Rent per square meter

$\widehat{HA}$  = The predicted housing allowance from the first phase.

The regression estimates the impact of HA on rents. The causality holds if the housing allowance is at least partially determined by the assignment variable (housing allowance cut-offs) from the first phase. This holds and can be confirmed from the clear discontinuities in Figure 2.

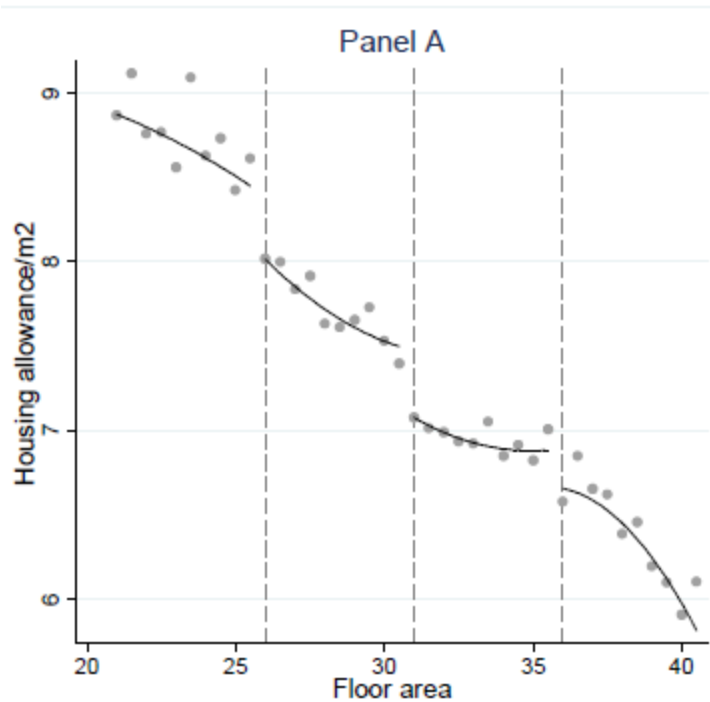


Figure 2: Relationship between housing allowance and floor area. The dots illustrate the mean housing allowance/m<sup>2</sup> and the lines are second-order polynomials fitted separately for each interval defined by the cut-offs. The vertical dashed lines depict the cut-off points where the HA decreases discontinuously. Eerola and Lyytikäinen (2019)

The causality interpretation also requires that the assignment variable cannot be precisely manipulated. If the assignment variable could be precisely manipulated, there would be discontinuities in other variables that affect the housing allowance. Manipulation is a concern if the housing allowance receivers can choose the exact floor area of their apartment. They always have incentive to choose the floor area just below the cut-offs to gain larger allowance per square meter. This is not a major concern, since the housing market would have to be thick to allow allowance receivers to target exact floor areas. There are, however, other ways of manipulating the assignment variable. Apartments just above the cut-off can falsely report the size of the unit in order to be just below the cut-off. In the long run, the construction of new apartments can take



the cut-offs into account and the new housing stock would reflect the artificial cut-offs set by the Finnish housing allowance system. Building a new housing stock takes a long time and since the policy changes constantly, it is not feasible to use the current policy to plan for housing stock.

The result of the regression was that the coefficient of interest  $\gamma_2$  was not statistically different from zero, which means that the null hypothesis that housing allowance affects rents cannot be rejected. The results are presented in more detail in the regression table, Table 2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sub-sample	HA paid to landlord	Below mean income	Above mean income	Flat in data in 5 or more years	Recipient in data in 5 or more years	Private landlord	Firm landlord
Dep var	Rent/m <sup>2</sup>	Rent/m <sup>2</sup>	Rent/m <sup>2</sup>	Rent/m <sup>2</sup>	Rent/m <sup>2</sup>	Rent/m <sup>2</sup>	Rent/m <sup>2</sup>
<i>Panel A: IV results</i>							
HA/m <sup>2</sup>	-0.017 [0.298]	-0.033 [0.125]	-0.145 [0.205]	0.11 [0.263]	0.064 [0.253]	-0.041 [0.096]	-0.504 [0.434]
1st stage F	63.0	442.5	169.0	59.3	58.3	340.0	21.9
<i>Panel B: Reduced form of IV</i>							
Floor area>25.9	-0.37 [0.288]	-0.048 [0.127]	-0.263 [0.220]	-0.617** [0.257]	-0.476** [0.193]	0.03 [0.079]	-0.393 [0.483]
Floor area>30.9	0.189 [0.266]	0.046 [0.099]	0.252 [0.171]	0.309 [0.229]	0.263 [0.245]	0.006 [0.095]	0.513** [0.223]
Floor area>35.9	0.143 [0.129]	0.03 [0.118]	0.035 [0.071]	-0.188 [0.147]	-0.158 [0.108]	0.051 [0.085]	0.144 [0.144]
N	71487	125761	147177	101497	112072	200705	72233

Notes: Panel A shows IV regression results on the effect of HA/m<sup>2</sup> on rent/m<sup>2</sup> and net rent/m<sup>2</sup>. The excluded instruments are the three dummies for floor area cut-offs. Panel B shows coefficients on the dummies for crossing floor area cut-offs from a regression of Rent/m<sup>2</sup> on floor area group dummies and controls. All specifications include as controls 2<sup>nd</sup> order polynomials of floor area allowed to vary between cut-offs, construction year dummies interacted with affordability region, dummy for integer values of floor area interacted with affordability region, municipality-year fixed effects, postcode fixed effects, age of recipient, age squared, household income (pre-allowance), income squared and household size dummies. Standard errors clustered at discrete values of floor area are in brackets. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

Table 2 Estimated effect of HA on rents in sub-groups, Eerola and Lyytikäinen (2019)

As can be seen from the first row, the coefficients of HA/m<sub>2</sub> ( $\gamma_2$  from equation 2) are not statistically different from zero, so the null-hypothesis of housing allowance affecting rents cannot be rejected. The only value whose range does not include zero is that depicted in column (5), for recipients that have received housing allowance for more than 5 years. This indicates that housing allowance might affect the rent when its duration is known to be long. Yet, the coefficient is not statistically significant even in the 10% level, so the conclusion might not hold.

## 6.2 DIFFERENCE-IN-DIFFERENCES STUDY BY KANGASHARJU

In his study, Kangasharju (2010) uses the 2002 reform that increased the housing allowance but had little effect on the eligibility of the allowance. He uses the reform as an instrument in IV-regression. Before utilizing the reform, however, he uses OLS-regression to gain a baseline for the estimates using the income distribution data from 1994–2003. In OLS-regression, he regresses the logarithm of monthly rent on an allowance indicator and covariates in the following way:

$$(3) \ln(\text{rent}/\text{m}^2) = \alpha_1 \text{Allowance} + X'\beta_1 a + \varepsilon, \text{ where}$$

*Allowance* is a zero-one indicator of housing allowance and the coefficient  $\alpha_1$  can be interpreted as the effect of the program.  $X$  refers to a set of observables that include the disposable income of assisted and non-assisted households. The disposable income is net earnings calculated: disposable income = gross earnings – taxes paid + transfers received (including housing allowance). If the incidence of the allowance was to fully fall on the recipient, then the assisted and non-assisted households with same disposable income would pay the same rent. The coefficient  $\alpha_1$  would be zero, and the differences in disposable income and other relevant covariates would explain the differences in rent. In OLS-regression, the expected value of the unobservable error term  $\varepsilon$ , has to be zero. This is not necessarily the case in this framework. There is a strong possibility that unobservable characteristics correlate with the allowance status and rents. This issue is taken into account by testing how much the result would change if the selection of unobservables is the same as the selection of observables. This would be an extreme case where the observable variables would have collected at random (Taber, 2016). The other extreme case is the perfect OLS assumption that the expected value of unobservables is zero, meaning that the observable variables ( $X$ ) would have been perfectly chosen and all the variables would correlate with the dependent variable ( $\ln(\text{rent}/\text{m}^2)$ ). It is very likely that the true effect of the framework is somewhere between the extremes. In this setting, the coefficient  $\alpha_1$  was approximately 7% (0.067 log points) and therefore significant. This means that recipients of the housing allowance with same disposable income as the non-recipients would pay 7% higher rents on average.

In the following part, Kangasharju treats the reform of 2002 as a natural experiment. The initial approach is to use difference-in-difference estimation regression.

$$(4) \ln(\text{rent}/\text{m}^2) = X'\beta_2 + \sigma_2 \cdot \text{After} + \delta_2 \cdot \text{Allowance} + \alpha_2 \cdot (\text{Allowance} \cdot \text{After}) + \varepsilon,$$

The coefficient of interest is the  $\alpha_2$  which reveals the effect of the program. The *After* variable is a dummy variable. After the reform of 2002, its value is one?  $X'$  are control variables. In the regression results,  $\alpha_2$  was 0.048, and due to a low number of observations, it is significant only on the 9% level. Quantitatively, this means that one euro's worth of increase in allowance increased the rent by 43 cents.

The next approach is to utilize IV-regression using the increase in rent ceilings as an instrument. The first part of the regression regresses logarithm allowance by changes in the 2002 rent ceiling and in the control variables.

$$(5) \ln(\text{Allowance, Euros}/\text{m}^2) = X'\beta + \sigma \cdot \text{Change} + \delta \cdot \text{After} + \alpha \cdot (\text{Change} \cdot \text{After}) + \varepsilon,$$

$X'$  = Control variables

Change = Change in the rent ceiling during 2001-2002

After = Dummy variable representing the period after the change

Change\*After = Interaction term.

Increase in rent ceilings is a valid instrument because it can affect the rents only through changed allowance and not directly. The next phase of IV-regression is to regress the rent/m<sup>2</sup> on the predicted allowance calculated in the first phase.

$$(6) \ln(\text{Rent}/\text{m}^2) = X'\beta + \sigma \cdot \text{Change} + \delta \cdot \text{After} + \alpha_2 \cdot \ln(\widehat{\text{Allowance}}, \text{Euros}/\text{m}^2) + \varepsilon,$$

The coefficient of interest is  $\alpha_2$ , which captures the effect of the allowance change on the rent level.

In the regression, the coefficient  $\alpha_2$  is 0.57 and it is statistically significant, indicating that a one

euro increase in housing allowance would increase rents by 57 cents. In this study, the null hypothesis can be rejected.

### 6.3 PANEL DATA ESTIMATION BY VIREN

Viren (2013) uses the panel data of 50,000 households that have received housing allowance at some point during the period 2000–2008. The panel data is provided by the Finnish National Pension Fund and based on register data of actual lease agreement contracts, which means that the validity of the data is very high. Because the panel data contains only households that have received housing allowance, Viren uses the Finnish Income Distribution survey (FIDD) to test the “law of one price” in the rental housing market. The “law of one price” in this context means that the rent levels for receivers and non-receivers of housing allowance should be the same.

Viren uses the panel data in a supply-and-demand framework to get the equilibrium rent. The supply and demand side formulas are presented below as

$$(7) \text{ Supply quantity } Q_s = S(R_h/MC)$$

$$(8) \text{ Demand quantity } Q_d = D(Y/P, A/P, N, R_h/P),$$

$Q_s$  is the supply for rental housing services

$R_h$  is the rental price level

$MC$  is the marginal cost of housing

$Q_d$  is the quantity demanded

$Y$  is the income (excluding allowance)

$A$  is housing allowance

$N$  is the size of the household

P is the general price level.

Viren sets the equations as equal to solve the system in terms of rental level.

$$(9) \text{ Supply quantity } R_h = R_h(Y/P, A/P, N, MC/P).$$

The formula to be regressed is

$$(10) (RH/P)_{it} = a_{0i} + a_1(MC/P)_{it} + a_2N_{it} + a_3Space_{it} + a_4Age_{it} + a_5(Y/P)_{it} + a_6Max_{it} + u_{it}.$$

The term Max is the maximum achievable housing allowance and its parameter  $a_6$  is the coefficient of interest. Maximum achievable housing allowance is indexed to market rents and adjusted annually. Since Max does not depend on the actual rent level and it is set by the government and not by the tenant or the landlord, it can be considered as an exogenous variable. The exogeneity can be at least partially contested, because the tenant can choose the apartment type in order to utilize the maximum housing allowance available. Additionally, Max is adjusted annually based on the developments of the rental market. The same is true for the housing allowance. There is high probability of two-way causality. When the rent level (dependent variable) increases, the Max (independent variable) allowance increases as well. The results of the regressions are listed in the table below.

**Table 1** Estimates of rent level equation from panel data

	1 <i>level</i>	2 <i>level</i>	3 <i>level</i>	4 <i>log/m<sup>2</sup></i>	5 <i>level/m<sup>2</sup></i>	6 <i>level/m<sup>2</sup></i>	7 <i>level/m<sup>2</sup></i>
Max/P	.331 (15.91)	.420 (50.87)	.326 (15.55)	.230 (27.04)	.609 (42.63)	.786 (20.98)	.780 (45.79)
uc	.144 (6.07)	.424 (11.87)	.174 (7.21)	.098 (11.04)	.195 (3.78)	.083 (1.47)	-.035 (0.18)
Space	.023 (23.56)	.022 (73.66)	.023 (23.27)	-.329 (44.87)	-.177 (26.28)	-.121 (9.63)	-.021 (26.96)
N	-.027 (5.36)	-.035 (10.55)	-.026 (5.19)	.195 (1.31)	-.113 (12.57)	-.179 (11.48)	-.102 (5.68)
N of children	.007 (1.67)	.011 (3.20)	.009 (2.00)	.349 (2.74)	.054 (7.86)	.062 (8.60)	.106 (5.66)
Y/P	.357 (6.37)	.923 (14.43)	.437 (7.41)	.006 (5.95)	.041 (4.15)	.032 (3.17)	.778 (5.43)
Age of the house	-.506 (19.10)	-.365 (33.49)	-.505 (19.01)	-.181 (17.71)	-.038 (6.25)	-.032 (5.07)	-.002 (0.35)
old tenant	-.094 (2.11)	-.186 (16.16)	-.084 (1.83)	-.072 (3.47)	-.003 (3.06)	-.003 (2.55)	..
No change		-.119 (30.64)	-.037 (11.30)	-.013 (11.39)	-.065 (9.12)	-.060 (8.30)	..
Helsinki dum	.007 (14.08)	.006 (35.73)	.007 (13.91)	.003 (16.95)	.021 (17.23)	.020 (17.09)	.003 (30.29)
R <sup>2</sup>	0.955	0.771	0.956	0.900	0.897	0.895	0.463
SEE	0.2445	0.4770	0.2437	0.0903	0.0053	0.0053	0.0112
DW	1.47	0.31	1.47	1.44	1.47	1.48	1.53
Fixed effects	CS +local	CS	CS +local	CS + local	CS + local	IV, CS +local	local only

The dependent variable is real rent (in equations 4-7, however, it is real rent per square meter). In the case of rent per square meter, the Max variable is also expressed in terms of square meters. Numbers inside parentheses are robust-values. CS denotes cross-section fixed effects, "local" denotes the presence of municipality dummies). All estimates, except for equation 6, are OLS estimates. Equation (7) is estimated for new rental contracts only. In IV estimation, lagged values of rent and housing allowance plus the current value of house prices are the additional instruments. "old tenant" indicates tenants that moved to the apartment before the end of 1985. Helsinki dum indicates a dummy for the city of Helsinki.

*Table 3: Regression results*

The main take from the results is that the coefficient of the Max/P parameter is positive and highly statistically significant. The lowest estimate 0.331 means that at least 33% of the housing allowance is shifted to the rents according to this study.

## 6.4 FOREIGN STUDIES

The results from studies from other countries are not directly applicable to Finland due to very different housing subsidy schemes. The vast majority of the studies conclude, however, that the housing subsidies increase rents, the only question is by how much.

Susin (2002) studied the housing subsidies in the context of the US voucher system. He uses the difference of voucher schemes between different states as a natural experiment. His conclusion is that states that gave higher housing allowance experienced higher increases in rents, the price effect being approximately 16%.

Gibbons and Manning (2006) used the 1996–1997 reduction of housing subsidies as a natural experiment in a difference-in-difference framework. The reduction was applied only for new lease agreements and did not affect the old agreements, i.e. the rule was not applied to all tenants. The researchers used the new tenancies as a treatment group and the old tenancies as the control group. They compare the differences in rents between treatment and control groups before and after the change. The conclusion is that the reduction of housing subsidy by 10–15% reduced the rents by 6–11%, meaning that almost 60% of the housing subsidy's incidence is on the landlord.

Fack (2006) finds that in the case of France, one additional euro increases rents by 78%, the highest amount presented in the studied research literature. She studied the 1991–1993 reforms in France that extended the subsidy program to new parts of the population. The reason for this, she claims, is the very low housing supply elasticity in France. Her main method of study is the difference-in-difference framework, used similarly by Gibbons and Manning.



## 7 Results

As stated in the previous chapters, the results from the studies differ substantially. There may be multiple reasons for the differences. One cause for the differences in results can be the difference in the data used in the studies. All three of the Finnish studies use register data, for which reason one can conclude that the quality of the data is high. Eerola and Lyytikäinen (2019) and Viren (2013) used data provided by the Finnish National Pension Fund (FNPF). Viren's data covers 50,000 households from the period 2000–2008. The data used by Eerola and Lyytikäinen covers the period 2008–2013 and more than 200,000 households. The “Statistics of Income Distribution” data used by Kangasharju (2010) is provided by Statistics Finland and it covers slightly over 12,000 households. The sample size used by Eerola and Lyytikäinen is by far the largest, but all the studies use sample sizes over than 10,000. In that respect, it is not possible to judge the quality differences of the studies. Interestingly, when Eerola and Lyytikäinen used the same data as Kangasharju, they did not find clear evidence of rent effects, as opposed to Kangasharju who found that one euro increase in housing allowance increases rents by a minimum of 60 cents.

The other main reason for the differences is the different methodologies used in the studies. Kangasharju's (2010) main approach is difference-in-differences estimation. He used the housing allowance increase in 2002 as an instrument in instrumental variable estimation. One issue in the estimation can be the small sample size in the year 2002. The total sample size was 1,322 and the sample size of households receiving housing allowance was only 201. The regression result was that the rents for housing allowance receivers increased by 0.048 log points faster than for non-receivers. Due to a low number of observations, however, this is only statistically significant at the 9% level. He addresses this issue by introducing years from both before and after the reform of

2002 into the data? After this, the regression result is 0.051 and is statistically significant at the 5.2% level.

Viren (2013) used the increases in the housing allowance during 2002 and 2005 as a natural experiment in OLS framework. He regressed the effect of maximum achievable housing allowance (Max) with other rent level variables? His conclusion is that at least 30% of the increase in housing allowance shifted to rents. The exogeneity can be at least partially contested because the tenants have the possibility to choose their apartment to gain maximum utility from the housing allowance. Another potential problem with OLS-regression is two-way causality. The housing allowance is annually adjusted based on general rent level, which means that the dependent variable (rental prices) can affect the independent variable (housing allowance). The dataset consists only of households that received housing allowance, so there is no proper control group.

Eerola and Lyytikäinen approached the issue by using regression discontinuity design (RDD) in instrumental variables estimation. They used the stepwise dependence of housing floor area on housing allowance as an exogenous instrument. The instrument is valid if the housing allowance is at least partially determined by the instrument and the instrument cannot be precisely manipulated. The former can be confirmed from Figure 2; there are clear discontinuities in the housing allowance amounts. The latter can be contested. It could be possible for tenants to manipulate the instrument by choosing their housing just below the cut-off points, or for landlords by falsely reporting the floor area of the apartment as being just below the cut-off point. This manipulation concern is addressed by Eerola and Lyytikäinen by additional balancing and tests in the regression. The main result from the study is that there were no clear discontinuities in the rents of housing allowance receivers around the cut-off points, meaning that there is no indication of housing allowance affecting rents.

The studies from outside of Finland used similar methods as the Finnish studies but the validity of their data could be lower compared to the Finnish studies. They used survey data, provided by their respective national institutions, as opposed to register data that was used in the Finnish studies.

To conclude, I would argue that the highest quality study was performed by Eerola and Lyytikäinen (2019), on account of the data and methods used. The quality was high in all of the studies, but Eerola and Lyytikäinen were the most convincing in addressing the potential problems inherent in previous studies and used the most comprehensive methods.

## 8 Conclusions

When I began writing this thesis, I was certain that the housing allowance increases rents and the interesting question was by how much. It is a very plausible idea that when more money is introduced to the system, the prices would increase. All but one of the studies I analyzed came to the same conclusion that housing subsidies affect rents by various degrees. Interestingly, the only study (Eerola and Lyytikäinen 2019) concluding differently (that there is no clear evidence of subsidies affecting rents) was the one that used, in my opinion, the most comprehensive dataset and the best research methods.

One explanation for the result that the housing allowance does in fact not feed into rents might be that allowance is temporary. The median duration of housing allowance was 25 months. This means that half of the housing allowance recipients received the allowance for a maximum of 25 months. The duration depends highly on the age of the recipient as seen in Figure 3.

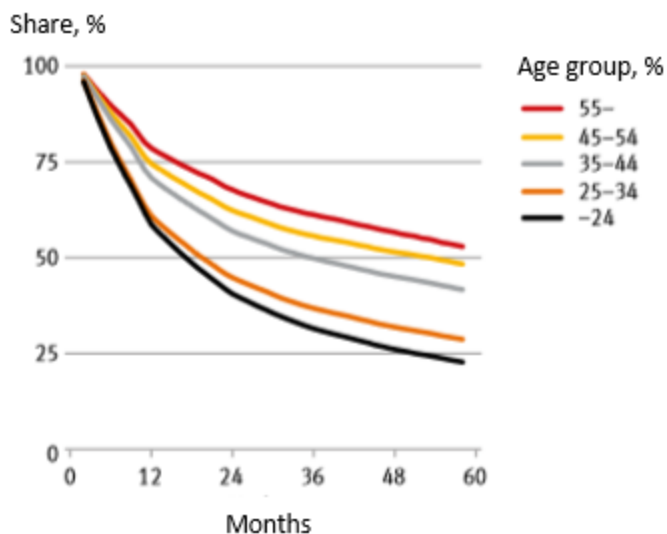


Figure 3: Share of people receiving housing allowance Kela (2019)

In general, young people (younger than 35) received the allowance for a shorter time than older people as seen in the picture above. Housing allowance receivers must also be able to afford to live in the apartment after they stop receiving the allowance. It might be that in the absence of housing allowance, the rents would be at the same level as now, but the receivers would have fewer resources for other means of consumption, or they might have to finance the rent temporarily by resorting to loans. If this is the case, the housing allowance is working as intended.

One argument for housing subsidies affecting rent is the case where the landlord knows exact amount of allowance the tenant is receiving. Almost a third of the allowances are paid directly to the landlords. (Taloussanomat, 2019) This means that at least third of the landlords know exactly how much allowance the tenant receives and can adjust rents accordingly.

One issue that was not considered in any of the studies was that the housing allowance does not necessarily depend on the actual earnings of the recipient. For entrepreneurs and self-employed, the housing allowance is not based on real income but the earned income under the Self-

Employed Persons' Pensions Act (YEL). The earned income is declared by the entrepreneur and it can be anything above the minimum €7,799/year. The minimum makes the receiver eligible for the full housing allowance no matter the real income.

Another thing not addressed in any of the Finnish studies was the role of social assistance. The housing allowance covers, at maximum, 80% of the housing cost, but some low-income households are eligible for social assistance that covers the rest of the housing costs. I believe that social assistance can very plausibly affect the rents and should be accounted for in the studies.

The large and ever-increasing amounts of money governments are spending on housing subsidies are creating a need for a clear understanding on the incidence and the correct allocation of the subsidies. Hence, more research should be conducted on the subject.

## 9 References

- Bureau, U. S. (2019, December 9). *American Housing Survey (AHS)*. Retrieved from <https://www.census.gov/programs-surveys/ahs/about.html>
- Dimitrov, Dimitar M. Rumrill, Jr., Phillip D. (2003). Pretest-posttest designs and measurement of change. *IOS Press Work*, vol. 20, 159-165.
- Essi Eerola, T. L. (2019). *Housing allowance and rents: Evidence from a stepwise subsidy scheme*. VATT Institute for Economic Research. doi:10.1111/sjoe.12396
- Eurostat. (2019, November 1). *Expenditure on social protection benefits by function*. Retrieved from Eurostat: [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Expenditure\\_on\\_social\\_protection\\_benefits\\_by\\_function,\\_2015\\_SPS17.png](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Expenditure_on_social_protection_benefits_by_function,_2015_SPS17.png)
- Fack, G. (2006). Are Housing Benefits an Effective Way to Redistribute Income? Evidence from a Natural Experiment in France. *Labour Economics* 13(6), 747-771. doi:10.1016/j.labeco.2006.01.001
- Finnish Competition and Consumer Authority. (2019). *Renting*. Retrieved October 1, 2019, from <https://www.kkv.fi/en/facts-and-advice/buying-and-selling/renting/>
- Gibbons, S. a. (2006). The incidence of UK housing benefit: Evidence from the 1990s reforms. *Journal of Public Economics* 90, 799-822.
- Jauhiainen S, S. E. (2019). *In support of housing. General housing allowance from the perspective of recipients and landlords and in European comparison*. Helsinki: Kela.
- Kela. (2019, October 2). *Housing costs and basic social assistance*. Retrieved from <https://www.kela.fi/web/en/social-assistance-housing-costs>
- Kela. (2019, September 30). *Maksetut yleiset asumistuet*. Retrieved September 30, 2019, from [http://raportit.kela.fi/ibi\\_apps/WFServlet](http://raportit.kela.fi/ibi_apps/WFServlet)
- Messer, L. C. (2019, November 24). *Encyclopedia Britannica* . Retrieved from <https://www.britannica.com/science/natural-experiment>
- National Pension Fund (Kela). (2019, September 30). *Housing Benefits*. Retrieved from <https://www.kela.fi/web/en/housing-benefits>

- Statistics Finland. (2018, October 10). *Rental living becoming common – small dwellings most often rented*. Retrieved from [https://www.stat.fi/til/asas/2017/01/asas\\_2017\\_01\\_2018-10-10\\_tie\\_002\\_en.html](https://www.stat.fi/til/asas/2017/01/asas_2017_01_2018-10-10_tie_002_en.html)
- Susin, S. (2002). Rent vouchers and the price of low-income housing. *Journal of Public Economics* 83, 109-152.
- Taber, C. (2016). *Using Selection on Unobserved Variables to Address Selection on Unobserved Variables*. University of Wisconsin. Retrieved November 4, 2019, from <https://www.ssc.wisc.edu/~ctaber/718/obsunob.pdf>
- Taloussanomat. (2019, August 30). Retrieved from Kela maksaa satoja miljoonia euroja suoraan vuokranantajille – asumistukien määrä noussut 81% kymmenessä vuodessa: <https://www.is.fi/taloussanomat/art-2000006221188.html>
- The Housing Finance and Development Centre of Finland (ARA). (2018). *Asukasvalinta ARA-vuokra- ja osaomistusasuntoihin*. Retrieved from <https://www.ara.fi/fi-FI/ARAasuntokanta/ARAvuokraasunnot/Asukasvalinta>
- Wikipedia. (2019, 10 22). *Natural experiment*. Retrieved from [https://en.wikipedia.org/wiki/Natural\\_experiment](https://en.wikipedia.org/wiki/Natural_experiment)
- Wikipedia. (2019, 10 22). *Quasi-experiment*. Retrieved from Quasi-experiment: <https://en.wikipedia.org/wiki/Quasi-experiment>
- Viren, M. (2013). *Is the housing allowance shifted to rental prices?* *Empir Econ* (2013) 44: 1497. doi:<https://doi.org/10.1007/s00181-012-0589-x>
- Viren, S. H. (2008). Nostaako asumistuki vuokria? *Kansantaloudellinen aikakauskirja*, 226-235.
- Wolpin, M. R. (2000). Natural "Natural Experiments" in Economics. *ournal of Economic Literature*, Vol. 38, 827-274.