Relationship between homeownership and unemployment - evidence from Finland

Economics

Master's thesis

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Abstract

Homeownership has been empirically found to incentivize childless people to vote for school bonds that improve education (Sonstelie and Portney, 1980; Harris et al., 2001), be more involved and watchful individuals in their home region (Davis and Hayes, 1993; DiPasquale and Glaeser, 1999), participate more frequently in regional affairs and homeowners' children tend to grow up to become more successful than renters' (Green and White, 1997; Haurin et al (2002)). However, Oswald (1996, 1997, 1999) and many others after him have proposed that homeownership might impair the labor market by decreasing homeowners' labor mobility or through some other channel. One of the channels suggested is exclusionary zoning, which hampers regional development in an area where the dominant housing tenure is homeownership.

This Master's thesis addresses the relationship between housing tenure and unemployment first by a literature review of existing theoretical and empirical papers. After the literature review, this thesis continues to empirically address a model proposed by the authors of one of the most recent articles on the topic (Blanchflower & Oswald, 2013) that describes the relationship between regional unemployment and past homeownership rates.

For the empirical analysis, we construct a model to examine the relationship between regional unemployment rates and lagged homeownership rates while controlling for demographical factors and factors describing the regional labor and housing markets. The results for Finnish municipalities are quite similar to the ones obtained by Blanchflower and Oswald (2013) for US states. While regional unemployment rate is very dependent on its past values, it is also dependent on the past homeownership rates with long run elasticity ranging from 0.9 to 1.6. This suggests that there exists a strong relationship between labor market and housing market with the effect of high homeownership resulting in later high unemployment rates. The possible factors creating the relationship derived from the existing literature include externalities (i.e. exclusionary zoning, decreased consumption due to mortgage payments) and decreased labor mobility due to homeownership. The exact reason for the existence of the relationship still remains unclear and further research on the topic is necessary.

1 Introduction

After decades of unemployment research, a branch of research focusing in relationship between labor market and housing market has emerged. The relationship became popular after Andrew Oswald's publications in 1996, 1997 and 1999 describing cross-sectional analysis of OECD countries and showing a relationship between regional homeownership and unemployment. A lot of researchers became interested in the topic and consequently a vast base of research and evidence has been gathered around the relationship. However, the evidence obtained recently contradicts the initial cause-effect relationship proposed by Oswald (1996, 1997, 1999) and the exact reason for the relationship remains ambiguous.

This Master's thesis firstly reviews the existing literature on the relationship between homeownership and unemployment and secondly empirically addresses the relationship by quite closely replicating the model of Oswald and Blanchflower (2013) by utilizing data of Finnish municipalities.

This chapter's purpose is to give an overview of the thesis, its key research questions and findings. Firstly, background of the thesis is introduced to shed light into existing studies and their findings and emphasize the importance of the research of the relationship between housing markets and labor markets. Secondly, the objectives and the research questions are introduced to clarify the purpose of this thesis and argue how the thesis contributes to the studies done before. Third, the structure of this thesis is introduced.

1.1 Background

Unemployment is a phenomenon that occurs in every economy in different magnitudes. It has been one of the main topics of economic research for the last couple of decades (Pehkonen, 1997). The probable reason for the popularity of the topic is that unemployment results in individual unhappiness (for example Kassenboehmer and Haisken-DeNew (2008) or Winkelmann and Winkelmann 1998) and income loss which is an issue that every economy in the world battles against. The focus of unemployment research shifted from factors affecting unemployment to assumption of structural unemployment as the famous relationship of Phillips-curve started to break down in the 1960s. According to Pehkonen (1997), the research first focused into adverse supply and factors affecting the demand of labor (such as changes in the oil price, union power, and changes in unemployment benefits) as the cause of unemployment. Later on in the 1980s, long spell of high unemployment in the developed countries urged the researchers to seek for alternative

explanations. From there on, the unemployment research focused for example on explaining what causes differences in the natural rate of unemployment between countries.

The unemployment rates increased in every OECD country from the 1960s to the early 1980s. However, since the early 1980s the development of unemployment has diverged and the spread between the unemployment rates has widened. The recent development of unemployment rates from 1998 until 2012 in the selected OECD countries is depicted in the figure below.
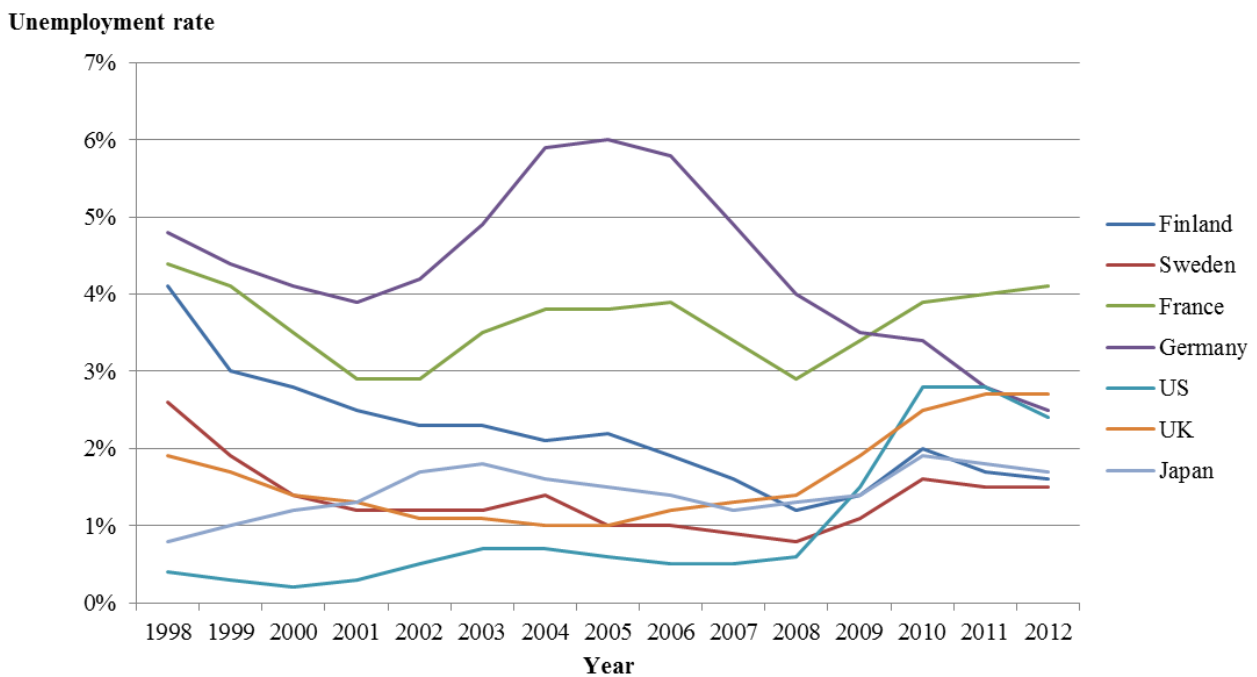
Figure 1: Long term unemployment rates in 1998 – 2012 for selected OECD countries[1]

The differences in the unemployment rates were initially pinned on structural changes in the economies, but the causality of the relationship still remained as a controversy: do structural

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[1] Long-term unemployment rate, by sex - %

Long-term unemployed (12 months and more) comprise persons aged at least 15, who are not living in collective households, who will be without work during the next two weeks, who would be available to start work within the next two weeks and who are seeking work (have actively sought employment at some time during the previous four weeks or are not seeking a job because they have already found a job to start later). (Eurostat)

differences cause the differences in unemployment or do the differences in unemployment cause the structural differences? The latter causality is usually referred as hysteresis, a phenomenon where system is affected not only by its current state but also its previous state. The idea of hysteresis as an explanation for unemployment was presented initially by Blanchard and Summers (1986). They argued that structural differences in labor markets, especially labor unions may create the differences between unemployment rates across regions.

Other ideas and explanations were also brought forward, for example Nickell and Bell (1995) turned the attention to decreasing demand for unskilled labor. Kruger and Forslund (1994) argued that unemployment might be due to a failure of active labor market policies. In the late 1990s, a new factor with a possible effect on individual's mobility in an economy was brought in front of the science community in a series of papers by Oswald (1996, 1997, 1999), who argued that homeownership might damage the labor market by decreasing labor mobility, which created a growing branch of research focusing in this relationship between housing market and labor market. Considering other empirical research concerning homeownership and showing that homeownership has many positive effects on the welfare of the society, i.e. homeownership seems to incentivize childless people to vote for school bonds that improve education (Sonstelie and Portney, 1980; Harris et al., 2001), homeowners seem to be more involved and watchful individuals in their home region (Davis and Hayes, 1993; DiPasquale and Glaeser, 1999), homeowners seem to participate more frequently in regional affairs and homeowners' children tend to grow up to become more successful than renters' (Green and White, 1997; Haurin et al, 2002), Oswald's suggestion became a very popular subject of economic research.

With a cross-sectional analysis of 19 OECD countries, Oswald (1996) pointed out that there exists a relationship between homeownership rate and unemployment rate in the area where the worker lives. Oswald argued that the natural rate of unemployment depends on the spatial mobility of the workers, which is affected by the tenure type of their accommodation. In 1997, he continued by providing a search model that explains the conjecture and homeownership's effect on individual labor mobility. In the model, by making relocating expensive, high homeownership rates create a spatial mismatch between skilled workers and available jobs (Oswald 1999). He provided five possible reasons for this mismatch:

- high transaction costs in selling the old apartment and moving to a new apartment,
- obstacles in moving to an area with high homeownership rate due to capital intensiveness of getting an apartment,

- mismatch between workers skills and their jobs due to immobility,
- homeowners' ability to restrict land use and drive away new start-ups and lastly,
- homeowners' tendency to commute longer times to work and thus raising the attractiveness of not working for everyone working in the same area

The evidence provided by Oswald (1996) and the model presented in Oswald (1997) and its implications have been given the name 'Oswald theorem' later on, which will be used to refer to them in this thesis as well

After the initial article, a lot more research was created around the Oswald theorem. Noteworthy papers consist of for example Nickell and Layard (1997), Goss and Phillips (1997), Battu et al. (2008), Coulson and Fisher (2002, 2009), Dohmen (2005), Head and Lloyd-Ellis (2012), Van Leuvensteijn and Koning (2004), Munch et al. (2006). The existing research is popularly categorized depending on the type of data used. In the beginning, researchers used mostly aggregate macro-level data of unemployment and housing and found results consistent with the search model of Oswald (1997). More recently however, the research has focused more on utilizing individual data of employment and housing. The evolving approaches and models have deepened and given further explanations for the phenomenon while simultaneously disagreeing with some of the Oswald's (1996, 1997, 1999) assumptions, especially some of the implications of the model.

In a nutshell, a majority of the recent papers utilizing individual data agrees that homeowners seem to have lower labor mobility i.e. lower rate of moving after work. However, the implications resulting from the lower mobility according to the model in Oswald (1997) seem not to hold with individual data. The model predicts that homeowners, as a subgroup that have lower mobility in the labor market, should have inferior labor outcomes that would appear for example as higher subgroup unemployment rate, longer unemployment spans, lower wages and higher risk of becoming unemployed. However, all of these implications have been rejected with individual data (see e.g. Munch et al., 2008; Coulson and Fisher, 2009 and Head and Lloyd-Ellis, 2011). Therefore the current view is that even though regions with higher homeownership seem to have higher unemployment rate and home owners seem to be less mobile in the labor market, they have superior labor outcomes and thus the unemployment does not affect them. In the more recent papers using individual data, there have been alternative suggestions for how the relationship between housing markets and labor markets might be formed albeit no unanimity of the reason exists.

One suggestion is that there are factors in the housing market that affect individual labor market behavior e.g. job search intensity or job commitment. The possible factors consist for example of mortgage payments, housing equity, housing market liquidity and homeowners' improved networks. Another suggestion, provided by for example two of the most recent papers on the topic Oswald and Blanchflower (2013) and Laamanen (2013), is that the housing market creates externalities that occur in the labor market. Examples of the possible externalities include for example exclusionary zoning that hampers unwanted regional development, consumption reductions due to increased expenses related to owning one's accommodation or increased job competition occurring from home purchases.

1.2 Motivation for the research

The existing empirical evidence of the relationship between housing tenure and employment is unanimous and throughout the literature the relationship is described very complex. Regardless of the mixed evidence on the implications of Oswald's (1997) model, most of the literature finds a positive relationship between aggregate level homeownership rate and unemployment. The observed relationship creates interesting implications for policy makers since the political decisions control the development of housing supply. Housing has been traditionally highly regulated through multiple means, methods ranging from the zoning regulations to subsidies given to individuals depending on their housing tenure. To be able to make accurate decisions that affect the whole economy e.g. when deciding whether to subsidize rental housing or owned housing, the decision makers should have extensive knowledge of the relationship between housing market and labor market. Thus, especially due to its unclear origin, the topic makes a good subject for empirical study.

As a research subject, Finland is interesting since it has historically subsidized both homeowners and renters. Subsidy for homeowners has however been gradually reduced since 2011 as the interest deductibility for mortgages has been lowered 5 %-points yearly. In 2014, Finnish homeowners could deduct 75 % of their mortgage interests in their taxation whereas in 2013 the corresponding amount was 80 %. However, there still exist rights to tax reductions for the sales profits when an individual sells an apartment in which she has been residing for at least two consecutive years and other housing subsidies for low income individuals and students.

The subsidies for renters in Finland consist mainly of similar housing subsidies for low income individuals as for the homeowners. In addition, the Finnish government subsidizes property developers with low-cost debt if they agree to supply rental apartments with rent ceiling and other

restrictions. The amount of rental apartments with rent restrictions has stayed relatively steady between 350 000 and 400 000 households living in them during 2005 – 2012.

In this paper, we first go through the existing literature related to the relationship between homeownership and unemployment and after that, focus on the relationship in Finland and study whether the evidence concerning the relationship between unemployment rates and past homeownership rates in the US states provided by Oswald and Blanchflower (2013) can be replicated with Finnish data. This is done by using data collected from Statistics Finland between years 2005 – 2012.

The research question of this thesis is:

1. Does a relationship between regional unemployment rates and past homeownership rates exist in Finnish municipalities?

1.3 Structure of the thesis

The thesis is structured as followed: the second chapter focuses on a review of existing literature of homeownership rate's effect on unemployment and categorizes the existing theories and their key findings. In the third chapter, a statistical model used to estimate the relationship between homeownership and unemployment is introduced. The fourth chapter then describes the data used in the empirical study and the results of the empirical study are represented and finally, in the fifth chapter conclusions are drawn from these results and connect them to the existing literature while also giving possible further research possibilities. The summary of the references used is included in the end of this thesis.

2 Relationship between homeownership and unemployment

This chapter discusses existing literature concerning the relationship between unemployment and homeownership. It starts with the initial series of papers by Andrew Oswald in the late 1990s and goes on to show how the research has developed after the initial work. In the end of this chapter, conclusions of the vast existing literature are derived and some contradictions and their explanations are represented.

2.1 Oswald's theorem

Although Oswald is considered to have started the branch of unemployment research that is based on the relationship between homeownership and unemployment, it was already discussed by Nickell (1980) and McCormick (1983), when they researched reasons for recent high unemployment rates in the UK and found initial evidence that housing policy might have something to do with unemployment. By his cross-sectional analysis of unemployment statistics, Nickell (1980) found out that residing in subsidized council housing was more likely for unemployed people. McCormick's (1983) focused on public housing and its implications on the labor mobility and unemployment regionally with similar results.

The first actual model to address the relationship was provided when Oswald (1996, 1997) hypothesized regional homeownership rates and unemployment rates are positively related and provided a search model on which the relationship is based on. Oswald described that the natural rate of unemployment depends on the mobility of the workers, which in turn is affected by their housing tenure choice. Later on, he summarized the theorem that "by making relocating expensive, high homeownership rates create a spatial mismatch between skilled workers and available jobs" (Oswald, 1999). Based on his statistical analysis with data from 19 OECD countries between years 1960 – 1990, Oswald found a positive relationship between homeownership and unemployment in countries but also between different regions of multiple countries. His analysis shows that the elasticity of the relationship is 0.2 which in other words means that countries or regions with 10 % higher share of homeownership have 2 % higher unemployment rate.

Oswald (1999) provides five different reasons to the observed relationship. Firstly, homeownership is more expensive than rental housing. The transaction costs for selling an apartment and moving to a new one are high and thus limit the mobility of homeowners. Consequently, he argues that in case of unemployment, homeowners may prefer commuting to new job instead of moving residence closer to the new workplace. This makes homeowners more vulnerable to economic turmoil and its

effects on labor outcomes in comparison to renters. He also argues that the high cost of homeownership restricts younger unemployed people from moving out from their childhood home, especially in countries such as the UK and Spain, where rental sector is relatively small.

The second reason is closely related to the first one: the capital intensiveness of homeownership. In areas where homeownership is the dominant tenure choice, it may be difficult for an unemployed individual to move in to without the proper capital required to buy housing or meet the credit constraints required to buy one. Thus homeownership may block unemployed individuals' mobility into the area to find jobs, which increases unemployment in the region.

The third reason that Oswald (1999) provides is that in an economy where labor mobility is low e.g. because of homeownership, the employed individuals may end up doing jobs that they are not optimally suited for. This mismatch between skills and jobs can be seen obviously harmful for the economy. Further on, Oswald argues that this inefficiency leads to increased costs in production and lower income in the economy which consequently leads to companies demanding for less labor and higher unemployment.

Fourth, having invested in the local community, homeowners may use their local political power to affect zoning and restrict land use according to their views. Fischel (2004) argued that homeowners may use zoning regulations as means of insurance against risks affecting the value of their home by slowing down the development in the area where they live in. This may create negative externalities for entrepreneurs and discourage establishing new businesses which may consequently lead to fewer new companies in the area dominated by homeownership.

Lastly, Oswald (1996) hypothesized that homeowners tend to commute more frequently and for longer distances than renters. In addition to the inefficiency in commuting long time to work, this may cause traffic congestion which by creating negative externalities makes commuting to work more difficult and harmful for a large amount workers. Oswald argues that this affects individuals similarly to unemployment benefits since it makes unemployment relatively more attractive in comparison to having a job. By making commuting more difficult and costly, the traffic congestion makes employment less attractive for individuals, which has the same effect as making unemployment more attractive and thus possibly leading to increased unemployment in the region.

2.1.1 Oswald's (1997) search model

In order to explain the empirical evidence that Oswald (1996) provided, Oswald proposes a search model in his follow-up working paper from 1997. The search model suggests that in an economy

"when a subset of population is less mobile than others, this less mobile group will have lower probability of employment, longer unemployment spells and lower wages than more mobile renters" (Coulson and Fisher, 2002). This chapter is closely based on Oswald (1997) and its model and while describing the search model provided in the paper, the chapter includes some direct references to the text.

In Oswald's model the economy consists of two regions that are linked by a road. Because of the circumstances and for simplification, the people have to live in one of the regions. Real shocks affecting demand occur in the economy and ex ante the magnitude and location of these shocks are uncertain. In the model, productivity is denoted by p and measured in the real selling price of the output of the economy. It is distributed among the regions according to density function $g(p)$. The prices in the economy lie in the range of $[0, p_2]$. For simplifying reasons, it is assumed that one of the regions will determine its prices with a draw from this range, and with certainty, the other region will have selling price equal to zero. This implies that the region with random draw from the range of $[0, p_2]$ will prosper economically and the other region will suffer from a depression. However, Oswald (1997) emphasizes that it is ex ante uncertain which of the regions will flourish by getting the draw from the distribution and which region will have the recession.

Before the demand shock occurs, the population of the economy has to allocate themselves across the regions by choosing to locate in one of the regions without knowing the later post-draw of their choice. The individuals of the economy can either buy or rent their accommodation. For simplification, landlords renting apartments earn zero supernormal profits and there are no imperfections in the capital markets i.e. changes in liquidity, which results in the financial return of renting and owning one's housing being equal. Nevertheless, homeownership awards individuals with a direct additional supplement to utility which is denoted by i in the model and could be described for example as 'pride of ownership'. Oswald (1997) describes that this utility may arise from the pride of owning one's housing or alternatively for example possibilities to modify an owned housing unit in a way that is not possible for rental units or from financial security incorporated in owning one's housing. One way or the other, the utilities of homeowners and renters are formed by the following two equations:

$u(y^h + i)$ *(utility of homeowners)*

$u(y^r)$ *(utility of renters),*

where y denotes the respective income of the individuals.

Thus far, homeowners gain higher utility from the 'pride of ownership' denoted by i. However, in this model renters gain in ex-post flexibility of their choice. It is assumed, that renters can move from one region to another with zero costs when they wish. This implies that if a real shock affecting demand in their region results in a depression, they can move into the flourishing area with no costs of moving. In contrast, to move in another region, homeowners have to pay moving costs k_m. However, in the unfortunate situation where depression hits their region, homeowners may commute to the other region for work. According to the model this leads to commuting cost of $k(c)$, where $k(.)$ is a convex increasing function and c is the total number of commuters choosing to use the road between the regions.

In the model r is the amount of renters and h is the amount of homeowners and there are only these two choices for all the individuals economy, which leads to $r + h = 1$. For simplicity, the two regions are similar and there are no intrinsic preferences between the two regions. The employment of the population is denoted by n, which leads to real output being $pf(n)$. Additionally, value of leisure is denoted by b and the number of movers from one region to another is denoted by m.

In the beginning, individuals will allocate themselves equally between the two regions and after the allocation the uncertain demand shock occurs. After the shock, the draw for the real selling price of the output from the range $[o, p2]$, its location, deciding the flourishing region as well as the area suffering from a depression are known. The homeowners and renters living in the flourishing region are fortunate and willingly work and live in the region where they live. However, the individuals in the depressed region are unfortunate and suffer from zero real selling price of the output. The renters of the depressed region can move to work in the flourishing region without a cost, which they certainly are willing to do, since the alternative to this is to commute which will incur costs. The group suffering most for the misfortune of their home region is homeowners of the depressed region. They have to choose between moving to the prosperous region for work and commuting daily there to work, both of which incur costs k_m and $k(c)$ respectively.

Since the wages in the economy adjust competitively, the initial reservation wage of all the renters (half living in the flourishing region and half moving into this region) and half of the home owners (that are living in the flourishing region) is b, the value of leisure. Remaining home owning individuals from the depressed region start to commute to the prosperous region. They are attracted by wages that are large enough to cover their initial reservation wage plus commuting costs $b + k(c)$, which is equal to the new reservation wage of this group. However, as the employment in the prosperous region grows, increased traffic congestion drives the commuting costs $k(c)$

linearly up to the point where commuting costs are equal with moving costs k_m. From there on, homeowners will move to the other region as they get wages that are just enough to cover the moving cost.

Oswald (1997) describes these three different phases of reservation wages as *slump, boom* and *strong boom* depending on the magnitude of the economic shock i.e. the level of the random draw of the real selling price from range $[o, p2]$. In a slump, the draw is moderate and the prosperous region attracts all the renters and half of the homeowners with reservation wage equal to b. These workers provide big enough labor force for the prosperous region and the economy does not need additional labor. In a boom, the draw of the real selling price is higher and thus marginal product of labor is higher, which drives wages to increase consequently leading more people to commute to prosperous region and the reservation wage increasing according to $b + k(c)$. In a strong boom, the random draw of the real output price is high and the large marginal product of labor attracts homeowners from the other region to move into the prosperous region to work with moving cost of k_m. The reservation wage thus becomes $b + k_m$ and high labor migration is needed to maintain the equilibrium.

2.1.2   Government's role

Now we'll consider government in this kind of economy. Its role is to try to maximize social welfare, which can be denoted by the sum of all individual utilities. In order to do this, it first chooses the number of homeowners, h and number of renters, r. After this it chooses the number of commuters, c, the level of employment n, the income of renters and homeowners, y^r and y^h and the number of individuals moving from the region suffering from a recession to the prosperous region. The formula the government seeks to maximize is defined as:

$$W = \int_0^{p2} (ru(y^r) + hu(y^h + i))g(p)dp$$

according to the following constraints:

$1 - n \geq 0$	(employment must be less than the population)
$c \geq 0$	(number of commuters cannot be negative)
$m \geq 0$	(number of movers cannot be negative)

$\int_0^{p2}(ry^r + hy^h)g(p)dp \geq \int_0^{p2}(pf(n) + (1-n)b -$
$k(c)c - k_m m)g(p)dp$

(expected real income has to be less than or equal to the expected real output)

$m + c \geq n - r - h/2$

(employment must be less than or equal to the movers, commuters, the renters and half of the homeowners altogether)

$h + r = 1$

(every individual belongs either to homeowners or to renters)

After optimization, the problem yields the following implications:

The expected utility of renters equals the expected utility of homeowners. They have the same marginal utility of income in every state of the model. In addition, the pride of homeownership, i, affects individuals in the same way as the value of leisure and drives up the reservation wages.

2.1.3 Different stages

Next, we will consider the model's stages in different economic situations described in the previous section. Firstly, if there is a strong boom, the real price of the output is high enough to make some homeowners to move after work. Oswald (1997) considers an interior optimum, where $c > 0$ and $m > 0$, i.e. there are some commuters and some movers in the economy.

Then we'll get

$$pf'(n) = k'(c)c + k(c) + b = k_m + b,$$

where the value of the marginal product of labor $pf'(n)$ is equal to commuting costs, externality cost created by commuting and the value of leisure. It is also equal to moving cost between the regions. The main implication of this is that because the production function $f(n)$ is concave, i.e $f'(n) < 0$ and $f''(n) > 0$, higher the moving costs k_m are, the higher the unemployment is. According to model, the more expensive it is to move home owning workers from one region to the other, the lower is the efficient employment in the economy.

After this, we will continue on describing the economy in an ordinary boom, where the real price of output is high enough to attract some of the individuals to commute between regions for work but

there is no migration. Similarly as in the example of strong boom we construct equality between marginal product of labor and costs:

$$pf'(n) = k'(c)c + k(c) + b$$

From the constraints given in the maximization problem, we'll get that, $c = n - r - h/2$, which results in

$$pf'(n) = k'\left(n - 1 + \frac{h}{2}\right)\left(n - 1 + \frac{h}{2}\right) + k\left(n - 1 + \frac{h}{2}\right) + b,$$

When differentiated implicitly it becomes:

$$\frac{\partial n}{\partial h} = \frac{1}{2}\frac{ck''(c) + 2k'(c)}{pf''(n) - ck''(c) - 2k'(c)}$$

which accurately summarizes the tradeoff between homes and jobs. Homeownership increases unemployment due to increases in the reservation wages of home owning individuals who after the random draw turn out to be in the suffering, depressed region.

2.1.4 Implications of the model

The key takeaway of the model is that in a situation where two areas face different economic shocks, the homeowners of the suffering area are the group that is the most unfortunate. Even though they benefit from the pride of homeownership, i, they have to commute or move to the other region which incurs costs to them and they have the worst labor market outcomes since the renters may move without a cost.

An easy way to show the implications of the search model is to extend Oswald's (1997) framework by a matching model of workers and jobs proposed by Coulson and Fisher (2002). Let's consider a situation where probability of employee-employer match occurring in the specific region is denoted by p_h, and the probability of workers over the same length of time losing their jobs is d. In this situation the steady state of the probability that a homeowner is unemployed is equal to $d/(d + p_h)$, which allows steady flows in and out of employment. In comparison to homeowners, renters can move after employment with no cost. If a renter loses his or her job, they can search over the specific region where they are accommodated as well as elsewhere. The probability of an employee-employer match for renters equals therefore $1 - (1 - p_h)(1 - p_e)$, p_e denoting the probability of acquiring a job elsewhere. Therefore, the steady state of probability of renter being

employed is $d/(d + p_h + p_e)$. This shows us the first implication of Oswald's theorem by which homeowners should have greater probability of being unemployed

Since the matching model assumes steady flows into and out of employment, the expected duration of unemployment can be calculated. Homeowners expected unemployment duration is $1/p_h$ whereas renters face expected unemployment duration of $1/(p_h + p_e)$, since they can search jobs cost-free also from outside the region. This shows us the second implication of Oswald's theorem by which homeowners should have longer spells of unemployment in comparison to renters.

Finally, in the bargaining framework of Coulson and Fisher the wages are determined by the bargaining powers of the company and the worker. Being highly dependent on the alternative choices that the parties have, bargaining power is lower for homeowners than renters since homeowners' second best choice is lower due to the longer expected unemployment period. This results in the third implication of Oswald's theorem by which homeowners should have lower wages in comparison to renters.

2.2 Further research with aggregate data

After Oswald's initial series of articles, a lot more research has been created around the Oswald theorem. Early on, the research focused on studying aggregate data which with some exceptions produced quite similar results to Oswald's findings. Although the overall relationship between homeownership and unemployment has prevailed, adding new covariates and using different data has lowered the magnitude of the relationship from the one observed by Oswald in some studies. The most relevant research using aggregate data is covered in this chapter.

Firstly, Oswald (1996) was criticized for not having control variables in his empiric analysis. Many institutional factors that could have assumed to have an effect on unemployment i.e. unemployment benefits or labor union density were not included in the empirical model. These factors are included by Nickell & Layard (1999) who find similar results as Oswald, however weaker in magnitude. They find the same positive relationship with panel data from 20 OECD countries during years 1989 – 1994. However, the elasticity of the relationship is 0.13, which means that regions with 10 % higher homeownership rates have on average 1.3 % higher unemployment rates.

Additionally, Green and Hendershott (2001) show that with aggregated data from United between years 1970 – 1990, there is a positive relationship between homeownership rates and unemployment. However, they find that the relationship holds only for middle aged people and

when the observations are weighted with the household population, the relationship becomes nonexistent. Their evidence of middle aged people suggests that regions with a 10 % higher homeownership level have 1.8 % higher rate of unemployment. Green and Hendershott (2001) propose three additional reasons why homeownership can affect the employment. Firstly, in an economic downturn regions are faced with decrease in housing prices making homes more illiquid assets. In a situation where such a shock that Oswald's model presents occurs to a specific region, liquidity might have very strong implications to the outcome of the region. In Oswald's search model, when the prosperous area has a strong boom which attracts some of the homeowners to move to the new area, it is expected that the cost of moving is a constant.

However, if applied to reality and if the cost of moving includes transaction fees for selling the apartment, it is not clear who the buyer would be in Oswald's model. Also given the structure of housing market, if a mass of individuals would sell their apartments at the same time, the cost of moving would most probably not be a constant since the liquidity of housing would change with increasing supply of housing in the suffering area. Zabel (2009) studies the effect of demand and supply shocks on housing market and mobility and concludes that it is easier for homeowners to sell their accommodation in a "hot" housing market where a lot of transactions occur and the prices are rising than in a more illiquid market where the prices have decreased and in the worst case, left homeowners with negative equity on their accommodation. In addition, Einiö, Kaustia and Puttonen (2008) show that decreasing prices in property markets may affect individuals' reluctance to move because of mental accounting and loss avoidance by using the original purchase price as a reference point when selling their home. Secondly, economic downturn might result in high interest rates, which may induce a lock-in situation for homeowners with below-market mortgages. Thirdly, transaction costs may decrease labor market mobility for homeowners as already hypothesized by Oswald (1996).

Contradictory to most of the literature researching aggregate data and finding results according to Oswald's theorem, García and Hernández (2004) find evidence that is almost exactly opposite of Oswald's findings with data from Spanish provinces, where both unemployment rates and homeownership rates are relatively high in European terms. Their evidence suggests that Spanish provinces with 10 %-points higher homeownership rate have approximately 2.2 %-points lower unemployment rate. Their model introduces also hysteresis into the model between homeownership and unemployment by including lagged variables of unemployment rate to covariates. The idea of hysteresis is that unemployment rate is dependent on past unemployment rates and follows an autoregressive process. Hysteresis was brought first to unemployment research by Blanchard and

Summers (1986) who argued structural differences in labor markets, especially labor unions may create the differences between unemployment rates across regions. Alternatively, a phenomenon described by their insider-outsider model can occur, in which there are specific amount of "insider" workers and "outsider" workers. Insider workers bargain with the company about the wages and their goal is to maintain their jobs and not insure the outside workers' jobs. If an adverse shock occurs in this situation resulting in increased unemployment, some insider workers will lose their jobs, and thus the amount of insider workers will be decreased. Furthermore, the insider workers will bargain for higher wages due to the lower number of workers and thus the shock will have permanent effect on unemployment.

To the extent of our knowledge there exists one published paper concerning the relationship between homeownership and unemployment in Finland with empirical aggregate data which is Pehkonen (1999). Pehkonen (1999) found results that were consistent with Oswald's by using data of Finnish unemployment and homeownership from 13 labor districts in Finland, with time period being 1990-1991. The effect of 10 % difference in homeownership rate between labor districts is a bit lower than the one found by Oswald and amounts to approximately 1 %-point difference in unemployment rate according to Pehkonen's study.

2.3   Further research with individual data

The research based on aggregate data and macroeconomic models gathered a substantial amount of critique which concluded that implications for individual behavior derived from analysis of aggregate data, i.e. a cross-sectional analysis of unemployment rates and homeownership rates in different regions might not be accurate and could suffer for example from aggregation bias. Many of the critics proposed individual data as an alternative empirical approach to continue from the research questions where, according to them, the use of aggregate data might have fallen short. According to Rouwendal & Nijkamp (2007) the use of individual data in researching of the relationship between housing tenure and unemployment first emerged in papers by Van den Berg and Gorter (1996) and Goss and Phillips (1997) while most of the other papers addressing the relationship still utilized aggregate data. Later on, the research of individual behavior to explain the relationship between housing and labor markets gained vast support and there now exists quite a lot studies addressing the question by individual data.

The following micro-level research provided vast additional evidence on the phenomenon as some of the evidence supported Oswald's findings. For example, Van Ommeren, Rietvield and Nijkamp (1999) found out that job and residential mobility increase along with commuting distance. According to the predictions of their search model, an increase of 10 kilometers in commuting distance reduces the expected stay in the current job and residence by two years. They also find out that the effect is stronger for homeowners. This basically supports Oswald's search model's assumption that workers evaluate the costs of commuting and moving and that homeowners are less mobile.

However in many cases the new evidence obtained by individual data frequently contradicted the implications of Oswald's (1997) search model. The research focused on individual behavior such as job search effort, job commitment and externalities and used micro-level data of individuals mostly gathered from databases of national surveys and similar. In this chapter, some of the papers using individual data contradicting the implications of Oswald's (1997) search model are covered.

2.3.1 Homeowners' lower probability of unemployment

Even though Coulson and Fisher (2002) found evidence contradicting all three implications of Oswald's hypothesis, their later study Coulson and Fisher (2009) tests again the relationship between labor market outcomes and housing tenure and find different results. By using US micro data and testing three models provided by earlier researchers and two models of their own modification, none of the models provided can explain all the assumptions of the Oswald's theorem. One of the main empirical findings is that homeowners seem to have lower probability of unemployment but nevertheless they seem to have lower wages. They also point out that even though homeownership may result in less favorable labor market outcomes for individuals it may have a positive effect on the viewpoint of whole economy by resulting e.g. in greater job creation and increased overall production.

Van Leuvensteijn and Koning (2004) constructed models for individual labor mobility and probability of being a homeowner that are simultaneously examined in their micro-econometric framework. With Dutch panel data of individual labor and housing statuses from 1989 – 1998 they found no evidence that homeowners change jobs less often than renters, contradictory to the assumptions of Oswald's search model. Additionally, they found that homeowners are less vulnerable to unemployment as their model predicts that homeowners have smaller probability of becoming unemployed.

Even though there would exist a lower level of mobility for homeowners in the labor market as Oswald (1996) argued, by researching micro data, homeowners seem to have better possibilities to become employed in comparison to renters. Rouwendal & Nijkamp (2007) suggest that there might be two possible explanations to this: homeowners may have stronger incentives to become employed because of a larger utility loss when unemployed or that they may have inherently better labor market position. They conclude that the effect of incentives driven by different utility losses is probably significant because most of the research trying to control the labor market position of homeowners, find that homeowners have still higher exit rates from unemployment. Additionally, Dohmen (2005) provides a formal model that predicts that high homeownership is linked to high unemployment through changes in the unemployed pool depending on the housing market. In other words, he argues that the characteristics of an unemployed person could change when there are changes in the housing market e.g. when homeownership increases.

Van Ommeren, Rietvield and Nijkamp (1999) found out that job and residential mobility increase along with commuting distance. According to the predictions of their search model, a 10 km increase in commuting distance reduces the expected stay in the current job and residence by 2 years. This basically supports Oswald's search model's assumption that workers evaluate the costs of commuting and moving. They also find out that the effect is stronger for homeowners.

2.3.2   Homeowners' shorter spans of unemployment

Goss and Phillips (1997), one of the first researchers to address the relationship by researching individual data, found out that homeownership seems to reduce the length of individuals' unemployment spells, which is directly contradictory to the implications of the search model introduced in Oswald (1997). The same relationship between existence of mortgage and length of unemployment spells was found by Henley (1998), Böheim and Taylor (2000) and Flatau et al. (2003). Due to its capital-intensiveness, homeownership requires credit for most of the households. Based on this, Goss and Phillips (1997) propose that this is due to homeowners' more intensive job search activity which is caused for example by fixed mortgage payments. They suggest that homeowners with large mortgages might have lower reservation wages than renters or owners with a smaller mortgage. They also discuss the possibility that if mortgage underwriting process pays attention to the same personal characteristics of individuals as the process that determines individual's employment status i.e. recruiting, it may create the relationship between housing and labor markets. According to them, this effect might become stronger if it becomes more difficult to get a mortgage the more one's employment history comprises unemployment spells.

Henley et al. (1994) argue that home equity may have an effect on the magnitude of search effort, since it provides a method to finance the job search and mobility. They find a negative relationship between job tenure length and home equity value. Henley et al (1994) were also one of the first researches to apply individual data and the first discover the relationship between housing equity and individual's job tenure that has been later on confirmed with other studies as well. They construct hazard functions for examining British data from General Household Survey of 1985 and conclude that housing equity has negative impact on employment spells and pension scheme membership has positive impact on the length of employment spells for male individuals. In addition to longer employment spells, Henley et al (1994) also provide evidence that homeowner's existing home equity increases her labor mobility and shortens unemployment spells by increasing job search effort. Home equity speeds up the job search of an unemployed homeowner by performing as a buffer for expenses in job search and by reducing future earnings risk.

By using micro data from Denmark, Munch et al. (2005) found evidence that supports Oswald's (1997) search model's assumption that homeownership decreases labor mobility. They found that homeowners are less likely to accept a job offer outside their local job market in comparison to renters. Nevertheless, according to their conclusions, renters have worse chances to find a job and homeowners have also shorter unemployment spells compared to renters when the endogeneity of homeownership is controlled for. According to Laamanen (2013), endogeneity of homeownership means the statistical error that may be created in the models because of the fact that in theory, regional homeownership depends on the supply and demand of housing. Consequently, regional demand of housing depends positively on the labor outcome of the locals. However, the analysis of Munch et al. (2005) does not confirm one of the assumptions in the search model by which homeowners should reduce their reservation wages for local jobs. Ultimately, they conclude that the net effect of homeownership on unemployment duration is negative, which generally contradicts the Oswald hypothesis.

Battu, Ma and Phimister (2008) take public renting into account and with their data of British Household Panel Surveys between years 1991 – 2003 obtain results that employed homeowners have lower probability of getting employment in distant labor markets in comparison to renters. The negative effect of homeownership appears to be larger for skilled manual and non-manual socioeconomic class in comparison to professional and managerial class. However, this may be due to individual preferences as homeowners may actively seek for employment closer to their accommodation. They also find out that unemployed public renters have smaller probability to acquire job from distant labor markets in comparison to private renters. However, there is no

evidence supporting Oswald's theorem that homeownership increases individual unemployment duration.

Head and Lloyd-Ellis (2012) find a positive statistical relationship between individual unemployment and housing tenure with US microeconomic data but the magnitude of the effect is weaker, namely less than 25 % of the one observed initially by Oswald (1996). By researching home owning individuals' job changing decision making they conclude that the illiquidity of the housing market has significant impact on homeowners' labor mobility when deciding on changing jobs or reacting to sudden unemployment. The same proposition was provided also by Green and Hendershott (2011), and is based on the fact that Oswald's search model assumes perfect capital markets with no changes in for instance liquidity of housing assets. According to Head and Lloyd-Ellis (2012), the illiquidity results in lower job acceptance rate for homeowners, which consequently may lead to a link between housing market and labor market. They provide a reason for the differences in their results between homeownership's effect on aggregate unemployment and individual unemployment. Since, the illiquidity of housing market is related to unemployment through the decisions that the unemployed make, if the share of unemployed increases, the effect of homeownership raises as well partly due to the fact that it is now related to the decisions of bigger share of the population.

2.3.3 Homeowners' higher wages

Coulson and Fisher (2002) provide empirical evidence that homeowners have higher wages than renters. However, in their later paper Coulson and Fisher (2009) test five theory models with US data and find out that the models predict lower income for homeowners. However, even though individual homeowners might have inferior labor market outcomes in their empirical results, they conclude that higher levels of homeownership might have a positive impact on the whole society and its productivity. According to their conclusions, the decreasing wages of homeowners in a situation where homeownership increases do not decrease the welfare in the economy since the companies and workers are merely splitting the rents that are a result of matching.

In addition to showing that homeowners have shorter unemployment spells, the evidence of Munch et al. (2005) points out that home owning Danish workers seem to have higher wages than renters, all this even though they are less mobile in the labor market. Their conclusion is that homeownership decreases propensity to move for job reasons but simultaneously increases probability of receiving a local job. Even though their study shows that homeowners are less mobile

in the labor market, its results are contradictory to the assumptions of Oswald's hypothesis by which homeowners should have longer unemployment spells and lower wages.

2.4   Interpretation of the differences in the evidence

As we have now seen, the research done using aggregate data and individual data have yielded quite different results concerning the origin of the relationship. Even though majority of both approaches cannot deny the existence of the relationship, the initial hypothesis including the search model (Oswald, 1997) have been frequently rejected by the research using individual data. In this chapter we go through possible explanations for the contradictory evidence that the research has provided.

Coulson and Fisher (2002), showing evidence of homeowners having lower probability of unemployment, shorter unemployment spans and higher wages, give five possible explanations for their results contradicting Oswald's theorem. Firstly, if renters are more mobile they will move to areas with more unemployment since these areas provide the best prospects of becoming employed. This will result in unemployment rates equalizing between regions and decreasing the differences of unemployment rates of the two groups, renters and homeowners. Secondly, the housing tenure of prospective employees is not usually known by the companies which results in pooling of homeowners and renters into same labor market, which in turn helps homeowners with lower bargaining power to acquire as high wages as renters. Third, if homeowners would have lower wages and higher unemployment, companies might be attracted to set up their operations in regions with high homeownership. This in turn, might drive wages up in these regions, even though the wages of renters would be higher than homeowners. Fourth, relocation costs of homeowners and renters might not be as different as Oswald's theorem suggests. According to Coulson and Fisher (2002), in reality relocation costs may comprise many subjective elements such as proximity and ties to friends, family and the region in general, which may smooth the costs of relocation to be quite equal between homeowners and renters. Finally, the fifth explanation the authors provide is the behavior of homeowners. Understanding the long investment horizon of their home purchase, homeowners might be individuals that perceive high certainty and low risk in terms of their employment and wage. This selection of individuals with most stable employment would create an endogenous effect on the relationship which according to the authors is the most plausible explanation for the contradictory evidence.

Similarly to Coulson and Fisher (2002), majority of the literature using individual data deals with individual's behavior i.e. individual's job search effort and job commitment and factors affecting them. The literature provides number of factors affecting individual behavior that should be taken

into account. Among others, these factors include mortgages, credit constraints, utility loss while not working, inherently different labor market positions, pension schemes, home equity, social networks, discrimination, liquidity and externalities.

One of the explanations provided by Goss and Phillips (1997) is that homeownership may increase one's commitment and involvement in the community. Due to the commitment of the homeownership community, there might be a more intensive network of information, which could lead to homeowners' enhanced possibility of coming across viable job opportunities. Investing in a high-cost, illiquid asset as piece of real estate or an apartment can be seen as such commitment to the community and an intention to join the information network by becoming more involved. The increased information lowers homeowners' search effort needed to gain a job offer and become employed again.

Another possible explanation for differences in employment and unemployment spells between homeowners and renters provided by Goss and Phillips (1997) is discrimination. The differences in job search effort needed to become employed may differ between owners and renters due to discrimination if the discrimination is based on individual characteristics that are similar to the characteristics of discrimination in housing market. If there is a common denominator between the characteristics of individuals to whom the jobs are not usually offered and the individuals who accommodate in rental apartments, discrimination may be the reason for the relationship between housing tenure and unemployment. Based on their empirical analysis, other papers such as Dohmen (2005) and Head and Lloyd-Ellis (2011) have also noticed that homeowners tend to be high skilled workers and larger human capital than renters. In addition, Green and Hendershott (2001) found that when controlling for the individuals of the household, homeownership seems to restrict mobility of the partner to the head of the household. They argue that these might be signs of possible inherent characteristics that differentiate homeowners from renters. Discrimination may also limit individual's geographical mobility and thus limit employment possibilities. Unfortunately, the effect of discrimination of this kind of characteristics has been hard to research empirically in the past and unambiguous evidence of its effect has not been available for researchers.

2.5   Externalities as a possible source for the relationship

One of the most recent micro-level studies is paper by Laamanen (2013) which fortunately for this paper, analyses unique Finnish labor and housing data. Laamanen researched the effect of deregulation of renting apartments in the beginning of 1990s, which was initially started in the

Northern and Central Finland. This created a natural situation for research between northern and southern parts of Finland with two different accommodation markets that allowed finding a causality between homeownership and unemployment. The results of the research were according to Oswald's theorem: the regulation of rental apartments, which kept homeownership high, increased unemployment in the southern parts of Finland. The natural situation of deregulation made it possible to uniquely research causality between regional homeownership and unemployment. Laamanen (2013) finds that the deregulation had a decreasing effect on homeownership which consequently and causally had a positive effect on unemployment. Another very recent paper (Blanchflower and Oswald, 2013) on the relationship between housing tenure and unemployment end up with very similar findings as Laamanen (2013). By using lagged variables for homeownership rates, they find positive relationship between changes in current unemployment rates and past homeownership rates up to five years.

Both of the most recent papers addressing the relationship, Blanchflower and Oswald (2013) and Laamanen (2013) bring up the possibility that housing market produces some kind of externalities that result in higher aggregate unemployment even though homeowners' labor market outcomes might be superior in comparison to renters. Based on Serafinelli (2012), Blanchflower and Oswald (2013) conclude that there is a possibility that any housing market structure that leads to immobility could produce negative externalities on workers and firms. They also acknowledge that there are several ways how this kind of externality could happen and they provide a couple of their suggestions and conclude that all the possibilities have not been fully researched empirically. The examples of externalities that Blanchflower and Oswald (2013) and Laamanen (2013) point out are:

1) Increased commuting may create traffic congestion which decreases the attractiveness of working for great amount of people

2) Because unwanted development may decrease home values or for NIMBY (not in my back yard) or other reasons, regions with high homeownership may discourage creation of new business startups through for example exclusionary zoning, which could lead to increased unemployment

3) If properties and apartments are bought with debt, the high debt expenses resulting from a large borrowed capital may decrease households' consumption which can create an externality to the labor market through decreasing demand

3 Model

This chapter presents the models used for the empirical part of this paper. Choices of all the variables for the empirical models are argued and the reasons behind the choices are presented.

The empirical model of this paper follows closely Oswald and Blanchflower (2013) and remains from trying to explain explicit factors defining the steady state unemployment. A region's unemployment rate is thought of as an autoregressive relationship that has a steady state solution and that the unemployment rate is dependent on its past values. Since the unemployment can be thought as stock variable rather than a flow variable, the independent variable, regional unemployment rate, is assumed to be very dependent on the previous value of regional unemployment. According to this assumption, we define the empirical pooled cross-sectional model of the following form which resembles quite a lot the one presented in Oswald and Blanchflower (2013):

$$U_t = f(U_{t-1}, LMC, HMC, DEC, RD, YD, homeownership\ rate)\ ,$$

where U_t denotes current unemployment rate and U_{t-1} the unemployment rate in the previous year. LMC denotes labor market characteristics, HMC housing market characteristics, DEC demographic and educational characteristics, RC regional dummies, YD year dummies and lastly we include regional homeownership rate, the factor of our interest, into the equation. However, in comparison to Oswald and Blanchflower (2013) who used the Current Population Survey of US, the model in this paper has significantly less covariates, which may affect the credibility of the results in a decreasing manner.

In our model, labor market characteristics in our model comprise number of individuals commuting to other municipalities categorized to four different levels of education: grammar school, high school, undergraduate and graduate-postgraduate and yearly revenue generated per worker.

Housing market characteristics in our model consist of proportion of regional housing in detached houses, and regional aggregate mortgage debt stock. The regional housing in detached houses is controlled for because of the suggestion that majority of detached housing in Finland is owner-occupied real estate whereas other housing types such as blocks of flats and row houses are more likely to be owned in the form of stocks in apartment housing companies and more often rented. The regional proportion of detached houses has thus an obvious effect on the homeownership rate and should be included in the model. The aggregate mortgage stock is included in the model since

the literature review revealed that mortgages are found to play a role in the relationship on individual level.

Other demographic variables that are controlled for are net migration in the municipalities and proportion of students. In addition to the variables described earlier, dummies for the 19 provinces of Finland and dummies for years 2005 – 2012 are included in the model.

4   Empirical Analysis

In this chapter, the data used in the empirical research of this paper is described. Descriptive tables of the data are provided before going through the contents of the dataset in more detail. The main statistical analysis, the regression tables and the results of the analysis are provided in the end of the chapter.

4.1   Source

The data for the empirical research has been collected from Statistics Finland. The data consists of municipal-specific yearly information for the period 2005 – 2012 about:

- Housing market factors
    - Homeownership rate
    - Number of detached houses
    - Amount of housing debt stock
- Labor market factors
    - Unemployment rate
    - Revenue generated per worker
    - Number of individuals with grammar school education commuting to other municipalities for work
    - Number of individuals with high school education commuting to other municipalities for work
    - Number of individuals with undergraduate education commuting to other municipalities for work
    - Number of individuals with graduate or postgraduate education commuting to other municipalities for work
- Demographic factors
    - Net migration between municipalities
    - Number of students

The regional division used in the analysis is according to the municipality division in 2014 with 320 municipalities across Finland. Some of the data was not categorized by the municipality division of 2014 and thus was constructed afterwards by combining some of the municipalities that had merged in accordance to the newest municipality division.

For descriptive statistics the minimum, average and maximum of the variables used in the empirical model for year 2011 are represented in the table below:

Year 2011, 310 Observations

	Min	Average	Max
Homeownership rate	0,479	0,761	0,919
Number of detached houses	45	3 249	30 013
Amount of housing debt	520 861	239 265 128	9 171 448 304
Unemployment rate	0,010	0,102	0,229
Revenue generated by worker	30 800	159 737	370 000
Commuting GS_1	3	303	9 416
Commuting HS_2	12	1 036	24 011
Commuting UG_3	8	711	18 008
Commuting G_4	1	379	19 263
Net migration between municipalities	-435	1	1 643
Number of students	2	1 309	45 333

[1] Commuting GS represents the amount of individuals with grammar school education commuting to other municipalities for work

[2] Commuting HS represents the amount of individuals with high school education commuting to other municipalities for work

[3] Commuting UG represents the amount of individuals with undergraduate degree commuting to other municipalities for work

[4] Commuting G represents the amount of individuals with graduate or postgraduate degree commuting to other municipalities for work

4.2   Housing market factors

The housing data has been collected mainly from the Finnish Population Information System and tax registers that include the housing type and its tenure by population and households. The data used in this paper uses households as units. The data reflects the housing situation in the last day of the respective year.

By utilizing the map interface of Statistics Finland, we can get geographical representation of homeownership and its variation between the municipalities of Finland for 2010. In the picture below, homeownership rates are depicted on the map of Finland. Color scale is divided in four categories and shown in the legend on the right hand side of the map.
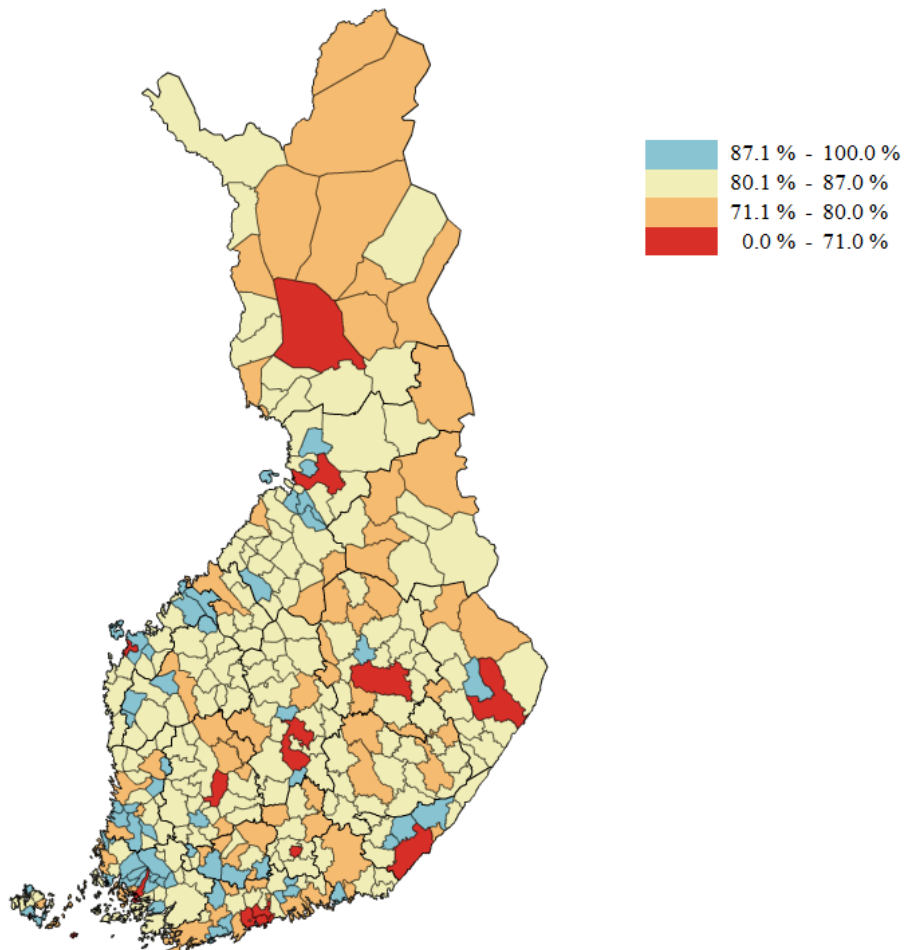
Picture 1   Homeownership rates of Finnish municipalities in 2010.

As we can see from the picture, most of the municipalities have high homeownership rates of over 70 %. Only bigger cities with universities, such as Helsinki, Turku, Tampere, Jyväskylä, Kuopio, Joensuu, Lahti, Vaasa, Oulu and Rovaniemi seem to belong in the two lowest categories of homeownership rates.

To be counted as an apartment in the data, the requirements for the housing unit is that it has to be in year-round use, the floor area has to be at least 7 square meters and the unit has to include kitchen facilities. Thus the data does not include for example dormitories or institutions as housing units. Households comprise all the people living in one housing unit. People living abroad, permanently in institutions, without an apartment or unknown residences are thus not included in the household population.

The tenure is determined by the ownership of the housing unit. If the occupant owns the shares that authorize the use of the occupied apartment in an apartment housing company or owns the property, the household is counted as homeowners. The rest of the households are categorized as renters or other tenures. Obviously, if the household has a rental agreement of the apartment, the household is categorized as renters. The renter households are further sub-categorized as state-subsidized renters, regular renters and other renters. State-subsidized rental apartments have rent ceilings and are financed through state-subsidized loans. Other tenures include right of residence –apartments and other, uncategorized tenures.

Number of houses and detached houses are collected by the Finnish building control officials. The number of houses and detached houses are based on the figure on the last day of year 2013. Unfortunately, yearly numbers for the whole time period were not available and thus these figures are the same for all of the years.

The data about housing debt contains information about the total amount of housing debt in a municipality and total number of households that have housing debt. The dataset is collected solely from the Finnish tax register, since the tax authorities are provided with information of all individual debts and interests yearly from all financial creditors and other credit companies. Thus the data includes information about all taxpaying individuals in Finland.

In the housing debt data, household consists of all the people living permanently together in a housing unit. Housing debt consists of debt taken by a taxpayer in the purpose of purchasing an apartment or house for permanent living or renovating this kind of an apartment. As in housing

data, individuals living permanently in institutions and dormitories are not included in this data either and their mortgages are not added into the housing debt described in this chapter.

4.3   Labor market factors

The data about employment of both genders has been collected from approximately 40 sources by Statistics Finland. The sources include for example the Finnish state pension scheme, which includes employment information of all Finnish people between ages 18 and 68 from 2005 on, Finnish Population Information System, which contains accommodation information of all people living in Finland, registers for companies operating in each municipality, and tax registers including all Finnish taxpayers.

Information about individuals' employment has been collected by deriving people in the workforce by deducting students, pensioners, people in the military service and 0 – 14 year-olds and other people outside from the workforce because of an illness or similar from the total population. Then the workforce is divided to employed and unemployed which is determined by their employment status on the last week of the respective year. The total workforce includes all the 15 – 74 year old individuals who were either employed or unemployed during the last week of the respective year. Unemployment rates are then calculated by dividing the amount of unemployed individuals by the total workforce.

From the map interface of Statistics Finland, a geographical representation of unemployment rates in all the municipalities of Finland for 2010 can be obtained. In the picture below unemployment rates for municipalities are depicted on the map of Finland. Color scale is divided in six categories and shown in the legend on the right hand side of the map.
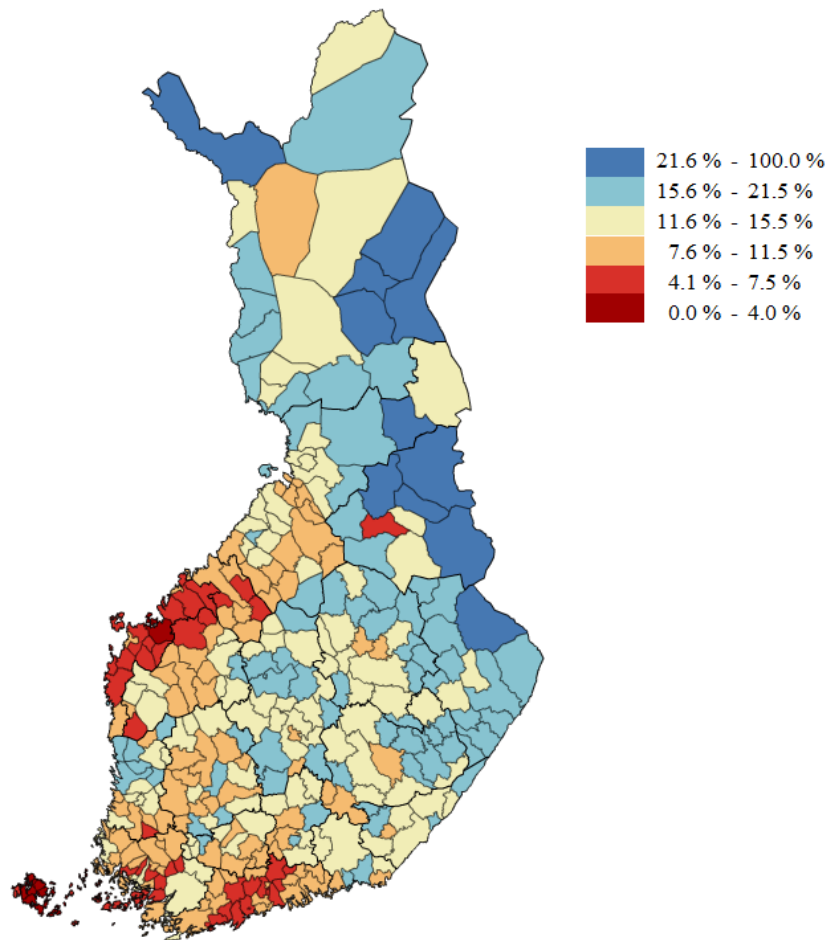
Picture 2   Unemployment rates in Finnish municipalities 2010

The picture depicts the unemployment situation in 2010 for every Finnish municipality. It can be seen that in the Northern and Eastern Finland unemployment rates are consistently higher than in the Western and Southern parts. At first glance the municipalities with lower homeownership rates depicted in the previous picture do not seem to be strongly related to high unemployment rates geographically in the map. This however, may be because of chosen intervals for the categories of unemployment and homeownership rates shown in the maps.

The empirical data used in this thesis also comprises data about revenue generated per worker in a municipality as a good indicator of the municipality specific economy that has been collected mainly from registers of tax authorities and Finnish Patent and Registration Office by Statistics Finland. The dataset includes all companies in all sectors within a municipality that have operated more than six months and have employed more than one half of a worker and whose yearly revenue has exceeded a statistical level of approximately 10 000 €. The dataset is collected by Statistics

Finland and was available in two datasets for the time period of the empirical research of this thesis (2002 – 2007) and due to discrepancies found between the years 2006 and 2007 while merging the 1993 – 2006 and 2007 – 2012 datasets, 10 small municipalities were excluded from the final dataset.

The commuting data has been collected by Statistics Finland by combining approximately 40 sources such as the Finnish state pension scheme and the Finnish Population Information System. The data contains information about 18 – 64 year old people commuting to other municipalities to work and people working in the same municipality where they live in.

The data about commuting to work can be divided in more detail to four education levels of the individuals. By dividing the data to these four categories the analysis aims to control differences in labor mobility caused by differences in amount of human capital.

The levels are:

- No education after the mandatory grammar school,
- Middle level education (high school or vocational school graduate)
- Undergraduate degree
- Graduate or postgraduate degree

4.4   Demographic factors

Migration data has been collected mainly from the Finnish Population Information System that is maintained by Finnish Population Register Centre. The data is created from the notifications of address changes during the respective year. It contains only the migration categorized as 'permanent change of address'. Thus temporary migration is not included in the data. However, it is noteworthy that the decision between categorizing the migration as temporary and permanent is done by the individual sending the notification. The data is categorized for the total amount as well as both genders.

The unit of the data is change of address, not individual, which makes creates some difficulty in using the data. The individual giving the notification can add people moving with him or her to the notification which results in smaller number of address changes than the people moving. Also the gender division becomes difficult since it depends only on who sends the notification. In addition, to capture the inter-municipal migration, the data is set to contain only migration between two municipalities of Finland and no migration between Finland and other countries.

The material contains also information about the amount of students living in the municipality. An individual is counted as a student when she is at least 15 years old, her main occupation is studying in an educative organization and she does not work nor is unemployed. This information has been collected from the student register that is maintained by Statistics Finland and the student aid registers of the Finnish Social Insurance Institution.

4.5   Empirical findings

In this section, the findings of this paper's empirical work are presented. First we present the overall findings and compare them with the assumptions that we have made in the beginning of this paper. Secondly, we evaluate the significance and plausibility of the findings.

We estimate a pooled cross-sectional OLS regression to study Oswald's thesis in Finnish municipalities using data from 2005 – 2012 having the current unemployment rate as the dependent variable. I follow in the footsteps of Oswald and Blanchflower (2013) by assuming that because unemployment is rather a stock variable than a flow variable, the development of regional unemployment rates follows an autoregressive process that is dependent on the previous values of unemployment rates. Therefore the lagged variable of homeownership is included as an independent variable in each of the models. Four models are estimated by first including the current homeownership and then each of the lagged homeownership rates ranging from the previous year to the year three years before. Lastly, fifth model is estimated by including all of the lagged homeownership rates in the same model. All of the models are presented in Table 1 and also included in the appendix.

Similarly to existing evidence, my results indicate a statistically significant positive relationship between unemployment rates and lagged homeownership rates. The results are consistent with Oswald and Blanchflower (2013) who find similar results in the US states and also another macro-level empirical work researching Oswald's theorem with earlier Finnish data, Pehkonen (1999).

Similarly to the conclusions of Oswald and Blancfhlower (2013), according to the results we can draw the following implications:

- Unemployment is higher in municipalities that had higher homeownership rates in the past.
- The long run homeownership rate elasticity of unemployment rate, obtained by assuming that the model is first order difference equation, ranges from 0.9 – 1.6.

- Unemployment is highly autoregressive, which results in long run results of unemployment being significantly larger than short run results.

However, contradictory to the results of Oswald and Blanchflower, the effect of lagged homeownership rate does not increase when we move longer to the past and the current unemployment is statistically significantly dependent on the current homeownership rate as we can see in the column (1) of Table 1. This may be due to the autocorrelation between homeownership rates which causes the unemployment to be affected by trends that have affected past homeownership rates as well as the current homeownership rate.

If the model is thought of as a first order difference equation, we can similarly to Blanchflower and Oswald (2013) calculate the long run homeownership elasticity of unemployment rate by dividing the beta coefficient of lagged homeownership rate in in the previous year by ($1 -$ beta coefficient of lagged unemployment rate in the previous year). The long run homeownership elasticity of unemployment is thus approximately 1.0, which means that with homeownership rate increase of one percent, the result in unemployment rate is increase of one percent in the long run as well. Based on the models presented in the columns (2), (3) and (4) of Table 1, the long run elasticity between unemployment and the current homeownership rate, homeownership rate two years earlier and homeownership rate three years earlier are approximately 1.6, 1.1 and 0.9, respectively. For the fifth model presented in the column (5) of Table 1, the elasticity is obtained by dividing the sum of beta coefficients of lagged homeownership rates by by ($1 -$ beta coefficient of lagged unemployment rate in the previous year) which gives long run elasticity equal to approximately 1.3. These figures are very similar to the ones obtained by Blanchflower and Oswald (2013) and the magnitude of the elasticity is very significant and represents a quite grave result of the relationship between homeownership and unemployment in Finnish municipalities.

	(1) 2006 - 2012		(2) 2007 - 2012		(3) 2008 - 2012		(4) 2009 - 2012		(5) 2009 - 2012	
Constant	-1.41100**	(0.45014)	-0.92284**	(0.44269)	-1.45210***	(0.49568)	-1.36052***	(0.56509)	-1.74893***	(0.52657)
Log unemployment rate $_{t-1}$	0.81597***	(0.01461)	0.81476***	(0.01464)	0.79536***	(0.01636)	0.75922***	(0.01865)	0.75001***	(0.01868)
Log homeownership rate	0.28865***	(0.09086)							2.23708***	(0.50467)
Log homeownership rate $_{t-1}$			0.18701**	(0.08965)					-0.89847	(0.62297)
Log homeownership rate $_{t-2}$					0.22621**	(0.10124)			0.40753	(0.50884)
Log homeownership rate $_{t-3}$							-0.22490*	(0.11570)	-1.36970***	(0.38151)
Housing market factors										
Log proportion of housing in detached houses	-0.16207***	(0.03074)	-0.13220***	(0.03004)	-0.15167***	(0.03379)	-0.16396***	(0.03932)	-0.21940***	(0.04052)
Log aggregate mortgage debt	0.02349**	(0.00930)	-0.02055	(0.00933)	0.02203**	(0.01061)	0.02356*	(0.01219)	-0.14117	(0.11152)
Demographic factors										
Net migration	-0.00004	(0.00002)	-0.00004	(0.00002)	-0.00003	(0.00002)	-0.00006*	(0.00003)	-0.00005*	(0.00003)
Log proportion of students	-0.06159***	(0.02182)	-0.06138***	(0.02187)	-0.05927	(0.24728)	-0.08854***	(0.02842)	-0.08258***	(0.02958)
Labor market factors										
Log commuting GS$_1$	-0.01595	(0.01763)	-0.01400	(0.01764)	-0.22432	(0.19973)	-0.00857	(0.02266)	-0.00630	(0.02228)
Log commuting HS$_2$	0.01493	(0.02336)	0.01518	(0.02342)	0.02290	(0.02651)	0.02781	(0.03025)	0.04812	(0.02951)
Log commuting UG$_3$	-0.01597	(0.01990)	-0.01265	(0.01990)	-0.00910	(0.02255)	-0.02293	(0.02631)	-0.03249	(0.02631)
Log commuting G$_4$	-0.02785***	(0.01046)	-0.02799***	(0.01048)	-0.03667***	(0.12258)	-0.03714**	(0.01438)	-0.02389**	(0.01363)
Log revenue per worker	0.01568	(0.00987)	0.01498**	(0.00989)	0.02109*	(0.01109)	0.01434	(0.01299)	0.02295*	(0.01276)
Year dummies	5		5		4		3		3	
Province dummies	18		18		18		18		18	
R^2	0.9163		0.9160		0.9097		0.8948		0.8977	
Number of observations	1746		1746		1460		1168		1168	

Standard errors are reported in parentheses. *, **, *** indicates significance at the 90 %, 95 % and 99 % level respectively

[1] Commuting GS represents the amount of individuals with grammar school education commuting to other municipalities for work
[2] Commuting HS represents the amount of individuals with high school education commuting to other municipalities for work
[3] Commuting UG represents the amount of individuals with undergraduate degree commuting to other municipalities for work
[4] Commuting G represents the amount of individuals with graduate or postgraduate degree commuting to other municipalities for work

Table 1: Unemployment equations estimated by pooled cross section OLS regressions

In the model, housing market characteristics such as the proportion of regional housing in detached houses, and regional aggregate mortgage debt stock are controlled for. The proportion of housing in detached houses has negative sign and is statistically significant in each of the models in Table 1. Aggregate mortgage has positive effect on the unemployment and is statistically significant in three of the models, presented in columns (1), (3) and (5).

The labor market factors in the model include individuals commuting to other municipalities categorized to four different levels of education: grammar school, high school, undergraduate and graduate-postgraduate and yearly revenue generated per worker are controlled for. The number of individuals commuting to work in other municipalities is only statistically significant for individuals with graduate or postgraduate education. However, the relationship between unemployment and graduate or postgraduate individuals commuting to other municipalities for work is negative which seems counterintuitive at the first glance. This may however be due to some areas attracting a lot of highly educated individuals of whom some part may then commute to other municipalities. The negative relationship holds for all of the models.

Of other demographic variables in the models, the proportion of students is negative and statistically significant in all but one of the models. This may be interpreted as a signal of university

cities attracting business and employment and thus having lower unemployment in general. In addition net migration is controlled for but it obtains statistical significance only in two of the models. The effect of net migration is negative, which is possibly a sign of booming regional markets attracting individuals to migrate after new jobs similarly as Oswald's (1997) model and later Zabel (2009) describes.

In order to test the robustness of the model, the model with log homeownership rate in $t = -1$ as an independent variable is run individually for four different geographical areas of Finland obtained by aggregating the municipalities to Eastern, Northern, Western and Southern Finland. The geographical robustness test indicates that the positive relationship between homeownership rate and unemployment rate does not hold for all of the areas of Finland. The relationship becomes statistically significant for Northern Finland presented in the column (4) of Table 2 in the appendix, where the population density is low and the homeownership rates are relatively high, and for Southern Finland, presented in the column (1) of Table 2, where the population density is higher and there are multiple municipalities where the homeownership rates represent the lowest in the sample. However for Eastern and Western Finland presented in the columns (2) and (3) of Table 2 respectively, the lagged variable of homeownership rate does not obtain statistical significance, which indicates that the pattern is not exactly as robust as would be desirable. As a side note, the long run homeownership rate elasticity of unemployment becomes especially high and worrying when studying solely Northern Finland, totaling to 3.3, which would mean that one percent increase in homeownership rate would result in 3.3 percent increase in employment. In Northern Finland the growing homeownership can be seen as the most prominent problem in terms of its effect on the unemployment. The result table of the geographical robustness check is included in the appendix.

5 Conclusions

In this chapter, we present the conclusions of this paper. We derive conclusions from the empirical research of relationship between unemployment and homeownership in Finnish municipalities and review them in comparison to results from existing research. Purpose of this chapter is also to shed light to the research questions and provide further research possibilities concerning the relationship.

Based on the empirical analysis of this thesis, the long run homeownership rate elasticity of unemployment in Finnish municipalities, ranging from 0.9 to 1.6 indicates that there exists a positive and a significant relationship between homeownership and unemployment in Finland. The results quite clearly support the existing results of the relationship between homeownership and unemployment obtained by Blanchflower and Oswald (2013). They are also in line with the earlier results obtained by using Finnish data by Pehkonen (1999) and Laamanen (2013). The long run effect of high homeownership rates based on the empirical model seems to be quite substantial and should be in the attention of policy makers who decide upon policies affecting housing markets in Finland.

As shown in the literature review part of this thesis, the exact cause for the existence of this relationship is not known but a couple of enlightened guesses and suggestions for the origin of the relationship do exist. The latest explanation that two of the latest papers addressing the relationship point towards is the role of externalities. Possible externalities that have been suggested to possibly have a role in the relationship include exclusionary zoning and decreased consumption due to mortgage payments. Despite being on the macro level, the aggregate mortgage debt stock of the municipalities is controlled for and found to have a statistical significance in almost four out of five models. The relationship between aggregate housing debt and unemployment is positive according to analysis which supports the suggestion, firstly introduced by Laamanen (2013) that increased mortgage payments might result in a decrease in a household's consumption. This would lead to the regional housing market affecting the labor market through consumption in different proportions depending on the region's homeownership rate.

However, there are a couple of shortfalls and problems with the empirical analysis of this paper, mainly due to inadequacies related to the data used. Main shortfall of the analysis in this paper is the use of aggregate data. As it was shown in the literature review part of this thesis, the chosen type of data will dictate the extent of the conclusions concerning individual behavior that can be drawn from the analysis. For the macro-level data, the amount of conclusions is smaller and thus it would be recommended to use micro data to be able to capture the factors affecting the relationship

more accurately. Also as we have seen during the geographical robust check of the model, the positive relationship between homeownership and unemployment was not found for Eastern and Western Finland, which may first and foremost indicate inadequate amount of data.

During the time period chosen for the empirical research 2005 – 2012, there were a lot of fluctuations in the economies around the world due to the subprime mortgage crisis of 2007 – 2009 in the US followed by the Eurozone crisis from 2009. These fluctuations have obviously affected the Finnish economy as well and therefore probably have affected exogenously the employment data used in this empirical research. The countermeasures taken by ECB to lower interest rates may have in the other hand impacted the Finnish households' debt and consequently propensity to obtain owned apartments and houses.

Secondly, the possibility of omitted variable bias is an obvious problem since employment in a region is affected also by various other factors than the variables associated with regional labor market, housing market and demography that were used in the analysis of this thesis. We tried to include quite many other covariates describing municipal-specific housing and labor markets as well as demography to overcome this problem but only some of the variables gained statistical significance. This might have been due to the short time period and quite scarce amount of data.

There is also lots of simultaneity affecting the models. As Oswald (1996) has also pointed out, high unemployment may discourage home purchasing and homeownership may affect unemployment in some ways simultaneously, which would create a need for an instrument of regional homeownership rates. One possibility that has not been fully utilized in the existing research, is introducing of a mortgage innovation as an instrument for changes in homeownership. In the case of Finland, statistics of ASP-account, a savings account targeted especially for young people and specialized for purchasing of first own home, are not available but if harnessed, might provide a good instrument of changes in regional homeownership rates.

Despite the shortfalls and problems with the empirical model the results of this thesis can be seen as a quite clear indication of the positive relationship. The direct effect of housing tenure on the whole economy is complex and detailed recommendations of optimal homeownership rate or similar is close to impossible to give. Therefore future research on the topic should be encouraged. Excellent future research topics would include more detailed research on the externalities suggested to affect the relationship i.e. externalities related to zoning and consumption. The data for this kind of research might be more difficult to obtain and empirical research might require innovative instrumental variables but the results might reward the research on the subject very greatly.

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7   Appendix

Table 1: Unemployment equations – estimated by pooled cross-sectional OLS regression. The dependent variable is the log of the current unemployment rate.

	(1) 2006 - 2012		(2) 2007 - 2012		(3) 2008 - 2012		(4) 2009 - 2012		(5) 2009 - 2012	
Constant	-1.41100**	(0.45014)	-0.92284**	(0.44269)	-1.45210***	(0.49568)	-1.36052***	(0.56509)	-1.74893***	(0.52657)
Log unemployment rate $_{t-1}$	0.81597***	(0.01461)	0.81476***	(0.01464)	0.79536***	(0.01636)	0.75922***	(0.01865)	0.75001***	(0.01868)
Log homeownership rate	0.28865***	(0.09086)							2.23708***	(0.50467)
Log homeownership rate $_{t-1}$			0.18701**	(0.08965)					-0.89847	(0.62297)
Log homeownership rate $_{t-2}$					0.22621**	(0.10124)			0.40753	(0.50884)
Log homeownership rate $_{t-3}$							-0.22490*	(0.11570)	-1.36970***	(0.38151)
Housing market factors										
Log proportion of housing in detached houses	-0.16207***	(0.03074)	-0.13220***	(0.03004)	-0.15167***	(0.03379)	-0.16396***	(0.03932)	-0.21940***	(0.04052)
Log aggregate mortgage debt	0.02349**	(0.00930)	-0.02055	(0.00933)	0.02203**	(0.01061)	0.02356*	(0.01219)	-0.14117	(0.11152)
Demographic factors										
Net migration	-0.00004	(0.00002)	-0.00004	(0.00002)	-0.00003	(0.00002)	-0.00006*	(0.00003)	-0.00005*	(0.00003)
Log proportion of students	-0.06159***	(0.02182)	-0.06138***	(0.02187)	-0.05927	(0.24728)	-0.08854***	(0.02842)	-0.08258***	(0.02958)
Labor market factors										
Log commuting GS_1	-0.01595	(0.01763)	-0.01400	(0.01764)	-0.22432	(0.19973)	-0.00857	(0.02266)	-0.00630	(0.02228)
Log commuting HS_2	0.01493	(0.02336)	0.01518	(0.02342)	0.02290	(0.02651)	0.02781	(0.03025)	0.04812	(0.02951)
Log commuting UG_3	-0.01597	(0.01990)	-0.01265	(0.01990)	-0.00910	(0.02255)	-0.02293	(0.02631)	-0.03249	(0.02631)
Log commuting G_4	-0.02785***	(0.01046)	-0.02799***	(0.01048)	-0.03667***	(0.12258)	-0.03714**	(0.01438)	-0.02389**	(0.01363)
Log revenue per worker	0.01568	(0.00987)	0.01498**	(0.00989)	0.02109*	(0.01109)	0.01434	(0.01299)	0.02295*	(0.01276)
Year dummies	5		5		4		3		3	
Province dummies	18		18		18		18		18	
R^2	0.9163		0.9160		0.9097		0.8948		0.8977	
Number of observations	1746		1746		1460		1168		1168	

Standard errors are reported in parentheses. *, **, *** indicates significance at the 90
%, 95 % and 99 % level respectively

[1] Commuting GS represents the amount of individuals with grammar school education commuting to other municipalities for work
[2] Commuting HS represents the amount of individuals with high school education commuting to other municipalities for work
[3] Commuting UG represents the amount of individuals with undergraduate degree commuting to other municipalities for work
[4] Commuting G represents the amount of individuals with graduate or postgraduate degree commuting to other municipalities for work

Table 2: Geographical robustness check between Northern, Southern, Eastern and Western Finland. The dependent variable is the log of the current unemployment.

	(1) Southern Finland		(2) Eastern Finland		(3) Western Finland		(4) Northern Finland	
Constant	-2.26296***	(0.83049)	1.71783	(1.04426)	0.18976	(0.82294)	-1.87969**	(0.91691)
Log unemployment rate $_{t-1}$	0.69258***	(0.03082)	0.75725***	(0.04122)	0.82517***	(0.02492)	0.87278***	(0.02986)
Log homeownership rate $_{t-1}$	0.33633**	(0.16376)	-0.20089	(0.22228)	-0.03500	(0.16395)	0.42317**	(0.18744)
Housing market factors								
Log proportion of housing in detached houses	-0.18492***	(0.04888)	-0.08468	(0.08640)	-0.08797	(0.05861)	-0.21881***	(0.08280)
Log aggregate mortgage debt	0.07540***	(0.01647)	0.00180	(0.02455)	0.00412	(0.02000)	0.01168	(0.02127)
Demographic factors								
Net migration	-0.00006*	(0.00003)	-0.00017**	(0.00007)	-0.00002	(0.00005)	0.00001	(0.00001)
Log proportion of students	-0.16865***	(0.04883)	-0.03732	(0.05651)	-0.02763	(0.03785)	-0.06707	(0.04741)
Labor market factors								
Log commuting GS$_1$	-0.01394	(0.04451)	-0.10174***	(0.04033)	-0.02131	(0.03288)	-0.00716	(0.03207)
Log commuting HS$_2$	0.00313	(0.05415)	0.03267	(0.04449)	0.00333	(0.04287)	0.01791	(0.04458)
Log commuting UG$_3$	0.00439	(0.05003)	0.02705	(0.03577)	-0.00465	(0.03554)	-0.02249	(0.03698)
Log commuting G$_4$	-0.08215***	(0.02384)	-0.00795	(0.02123)	-0.00867	(0.01767)	-0.02145	(0.02287)
Log revenue per worker	0.02438	(0.01571)	-0.04934*	(0.02744)	-0.03215*	(0.01882)	-0.00452	(0.02278)
Year dummies	5		5		5		5	
Province dummies	6		2		5		2	
R^2	0.9274		0.8371		0.8887		0.8652	
Number of observations	536		270		598		342	

Standard errors are reported in parentheses. *, **, *** indicates significance at the 90 %, 95 % and 99 % level respectively

[1] Commuting GS represents the amount of individuals with grammar school education commuting to other municipalities for work

[2] Commuting HS represents the amount of individuals with high school education commuting to other municipalities for work

[3] Commuting UG represents the amount of individuals with undergraduate degree commuting to other municipalities for work

[4] Commuting G represents the amount of individuals with graduate or postgraduate degree commuting to other municipalities for work