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# Essays on public economics

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# Essays on public economics

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Aalto University  
School of Business  
Department of Economics

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## Abstract

This doctoral thesis is a collection of four essays in public economics that look at various public policies and their impacts on low-income and otherwise vulnerable individuals. The essays share the general aim of studying the effectiveness of public policies in achieving their stated goals. The first essay is single-authored by the candidate, and the latter three are collaborations with one or more co-authors.

In the first essay, I use a unique dataset compiled from Finnish registers and surveys to provide a comprehensive characterisation of the take-up behaviour of Finnish welfare benefits (housing allowance and social assistance) using descriptive methods. I provide various stylised facts on take-up and discuss how income dynamics matter for understanding take-up and benefit targeting.

The second essay focuses on the impact of information on benefit take-up. We study the information campaign in the context of the introduction of the guarantee pension program in Finland in 2011 and find that receiving a mailed information letter and application form significantly increased take-up compared to non-recipients.

In the the third essay, we analyse the impact of employers' disability insurance (DI) contributions on the incidence of disability pensions among their workers. Experience rating is used in DI in Finland in order to increase employers' incentives to prevent disabilities among their workers. We use detailed data and an empirical strategy that allows us to identify the causal effect of experience rating on disability inflow. Our analysis finds that the policy is not effective in reducing disabilities.

The fourth essay uses a theoretical framework to provide optimal tax and transfer rules for poverty reduction in developing countries. We modify the standard optimal tax framework by restricting tax instruments to be linear, which are more feasibly implemented in countries with a lower administrative capacity. We show that when we change from the standard objective of welfare maximisation to that of poverty minimisation, which better depicts the concrete objectives of such countries, the optimal tax and transfer rules are changed.



## Tiivistelmä

Tämä väitöskirja koostuu neljästä julkistaloustieteen alaan kuuluvasta esseestä, jotka käsittelevät erinäisiä politiikkainstrumentteja ja niiden vaikutuksia pienituloisiin ja muilla tavoin haavoittuviin yksilöihin. Esseiden tavoite on vastata kysymykseen, kuinka hyvin nämä politiikkainstrumentit saavuttavat niiden eksplisiittiset tavoitteet. Ensimmäinen essee on väittelijän yksin kirjoittama, muut kolme on kirjoitettu yhteistyössä eri kirjoittajien kanssa.

Ensimmäisessä esseessä luon laajan katsauksen suomalaisten viimesijaisen sosiaalietuuksien, asumistuen ja toimeentulotuen, alikäyttöön. Esseessä käytetään kuvailevia menetelmiä yhdessä ainutlaatuisen, eri rekisteriaineistoista kootun aineiston kanssa. Muodostan niiden avulla useita tyylliteltyjä faktoja alikäytöstä ja tutkin, miten kohderyhmän tulodynamiikka vaikuttaa alikäyttöön ja tukien kohdentumiseen.

Toinen essee käsittelee informaation vaikutusta tukien alikäyttöön. Tutkimme suomalaisen takuueläkkeen voimaantulon yhteydessä vuonna 2011 toteutettua informaatiokampanjaa. Tutkimus osoittaa, että informaatiokirjeen ja hakulomakkeen saaminen postissa vaikutti merkittävästi tuen hakemisalttiuteen.

Kolmannessa esseessä tutkimme työnantajien työkyvyttömyyseläkevakuutusmaksujen vaikutusta työntekijöiden työkyvyttömyyseläkkeiden yleisyyteen. Suomessa on käytössä maksuluokkamalli, jonka tulisi kasvattaa työnantajien kannustimia ehkäistä työntekijöidensä terveysongelmia ennalta. Käyttämämme empiirinen menetelmä sekä aineistomme tarkkuustaso mahdollistavat vakuutusmaksujen kausaalivaikutuksen tunnistamisen. Analyysimme perusteella maksuluokkamalli ei toimi tavoitellulla tavalla työkyvyttömyyseläkkeiden vähentämisessä.

Neljännessä esseessä käytämme teoriamallia tarkastellaksemme optimaalista verojen ja tulonsiirtojen rakennetta köyhyyden vähentämiseen kehittyvissä maissa. Muokkaamme tavallista optimiveromallia ottamaan huomioon kehittyvien maiden heikomman hallinnollisen kapasiteetin rajoittamalla veroinstrumentit lineaarisiksi. Tutkimus osoittaa, että veromallin tavoitefunktion vaihtaminen tyypillisestä hyvinvoinnin maksimoinnista kehitysmaiden tavoitteita paremmin kuvastavaan köyhyyden vähentämiseen vaikuttaa optimaalisiin vero- ja tulonsiirtosääntöihin.





## List of essays

This thesis consists of an introduction and the following four essays:

**Essay 1:** Take-up of welfare benefits: combining a static and dynamic perspective. *Unpublished manuscript.*

**Essay 2:** Does information increase the take-up of social benefits? Evidence from a new benefit program. *Joint with Tuomas Matikka. Unpublished manuscript. Available as VATT Working Paper 83/2016.*

**Essay 3:** Using a kinked policy rule to estimate the effect of experience rating on disability inflow. *Joint with Tomi Kyyrä. Unpublished manuscript. Parts of this research have been published in Finnish in report 07/2015 of the Finnish Centre for Pensions.*

**Essay 4:** Optimal taxation and public provision for poverty reduction. *Joint with Ravi Kanbur, Jukka Pirttilä and Matti Tuomala. Published in International Tax and Public Finance, Vol. 25 (1), pp 64–98. Open access publication, reprinted here under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>).*



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I also spent considerable time alongside my studies as a research assistant at the World Institute for Development Economics Research (UNU-WIDER). I would like to thank Finn Tarp and Tony Addison for the opportunity to get

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Another international visit that mattered significantly for my research career was my undergraduate exchange at Pontificia Universidad Católica de Chile in 2006. The course ‘Desarrollo Económico de America Latina’ by Felipe Larraín sparked my interest in development issues and academic research, which eventually led me to pursue a PhD degree. My interests have since moved from development towards public economics, which occurred largely due to the inspiring course ‘Public Economics I’ taught by Jukka Pirttilä and Matti Tuomala at our doctoral program.

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# Introduction

This doctoral thesis is a collection of four essays that look at various public policies and their impacts on low-income and otherwise vulnerable individuals. The first two essays study the take-up of income transfer programs targeted at low-income individuals. The third essay studies the impact of employers' insurance contributions on the prevalence of disability pensions among their workers. The fourth essay uses a theoretical framework to provide optimal tax and transfer rules for poverty reduction in developing countries. The essays share the general aim of studying the effectiveness of public policies in achieving their stated goals (e.g. income support, prevention of disabilities).

The essays contribute to the field of public economics. The theme of the third essay additionally overlaps with labour economics, and the fourth one with development economics. The first essay is single-authored by the candidate, and the latter three are collaborations with one or more co-authors.

## **1 The take-up of social benefits**

The public sectors of various countries offer an array of income transfer programs with various goals, such as providing income security in the face of adverse life events or reducing poverty and inequality in the society. When implementing such programs, policymakers must decide on several details: the target population, the application process, the level of the benefit, and so on. All these decisions matter for the program's impact, but in addition to the direct effect (for example, a narrow target group or low benefit level could result in a small aggregate impact) they may also have unintended effects through program participation. Formulating detailed and complex rules for social benefit programs can create high costs for the target group to learn about eligibility or to go through the application process. The literature studying benefit take-up typically considers information, transaction, and stigma costs (Currie, 2006), and recent research has additionally identified various psy-

chological costs in program participation (e.g. Bertrand, Mullainathan and Shafir, 2006; Bhargava and Manoli, 2015). The balance of application costs and the expected size of the monetary benefit can become negative for some individuals, resulting in non-take-up.

It is indeed a wide-spread feature of means-tested social benefit programs that some proportion of the targeted individuals do not apply for the benefits they are entitled to. Currie's (2006) and OECD's (Hernanz, Malherbert and Pellizzari, 2004) overviews show that take-up rates across countries and programs can range from close to 100% to far below 50%. As suggested by Bhargava and Manoli (2015), the non-take-up of benefits should be viewed as a policy problem, which can be influenced by parameters chosen by the policy-makers. It needs to be recognised that the details of program implementation affect take-up costs and benefits, and consequently people's willingness and awareness to apply for benefits, which in turn affects the effectiveness of the program in reaching its goal.

The first two essays provide two different perspectives to the issue of non-take-up of social benefits. In the first essay, I characterise the take-up behaviour related to two benefits targeted at the poorest households in Finland: housing allowance and social assistance. The detailed and varied analysis allows me to characterise the overall importance of take-up costs for different kinds of households, relative to the benefit size, and the resulting impact on poverty alleviation. In the second essay, the focus is specifically on information and transaction costs. We use the introduction phase of the Finnish guarantee pension program and the related information campaign to illustrate how a simple information treatment impacted on the take-up rate of vulnerable individuals outside the labour force.

The first essay, studying housing allowance and social assistance, contributes to the literature on benefit take-up firstly by providing a comprehensive picture of welfare take-up in a static set-up, and secondly by taking income dynamics into account. Take-up literature typically studies the static context, but some researchers have suggested that the dynamics of the eligible households' circumstances could also matter for take-up behaviour (e.g. Blundell, Fry and Walker, 1988; Blank and Ruggles, 1996). Combining these two perspectives allows me to characterise take-up behaviour from various angles. I provide several stylised facts on take-up, and show that the benefits reach the main target population – households with long-term low incomes – whereas those experiencing short-term low income are more often left out due to non-

take-up. Previous research on these particular benefits has studied take-up in a more narrow static set-up, but not the income patterns over time (Bargain, Immervoll and Viitamäki, 2012; Lyytikäinen, 2008). The results help to form a comprehensive picture of take-up behaviour and the nature of take-up costs, complementing the findings of Blank and Ruggles (1996), one of few studies considering the dynamic aspect of take-up.

Households with more variable income might anticipate becoming ineligible in the near future, which reduces the expected size of the benefit. For a short-term need, then, the costs of take-up are more likely to remain higher than the expected benefit. Households with short expected eligibility could for example try to find other means to cope without claiming the benefit. This is consistent with the standard economic hypothesis that eligible households calculate expected benefits and weigh them against take-up costs.

For this study, I construct a unique dataset from various registers and surveys of Statistics Finland as well as the Finnish Defence Forces. An important feature of the data is that I link income information and other characteristics over a longer time period to each annual data set in order to follow the eligible population's behaviour and experiences over a longer time window than allowed by the static, annual, data. With these data, I use graphical and statistical descriptive methods to portray take-up behaviour. In order to estimate take-up rates, I use microsimulation methods to determine which households are eligible for the benefits. I also study how the various simulation choices affect the take-up estimates, thus contributing to the literature using microsimulation methods as well as illustrating the robustness of the results.

Although the findings are informative of take-up behaviour among the population studied, part of the target population cannot be analysed with existing data. Some groups excluded from the current analysis could potentially have a lower propensity to take up or behave differently in the dynamic set-up. As better data becomes available, it would be important to study the take-up of these groups in a dynamic setting as well.

Whereas the first essay provides a wide view to the take-up behaviour of Finnish welfare benefits, the second essay focuses specifically on information and transaction costs in take-up. The context of this essay is the introduction of an entirely new social benefit, the Finnish guarantee pension program in 2011, and the Social Insurance Institution's (SII) campaign to raise awareness of the program among the eligible population. While the campaign

consisted of various kinds of tools, its main component that we study was the directed mailing to part of the eligible population. The mailing consisted of a short information letter and a pre-populated application form together with a postage-paid return envelope, and was sent to those individuals the SII could most easily and reliably recognise as eligibles: the recipients of a full national pension. With our detailed data from the SII and Statistics Finland on all pensioners, we can identify the rest of the eligible pool and compare how the take-up behaviour of the recipients of the January 2011 mailing (treatment group) compares to those who did not receive this particular mailing (the control group). We provide both illustrative graphical and descriptive evidence, as well as causal regression estimates, of the impact of this mailing on take-up.

The overall take-up rate of the guarantee pension was very high: 93% of all eligible pensioners had applied for it by the end of 2011. Nevertheless, we find that the take-up rate as well as the speed of take-up of the January mailing recipients and non-recipients differed significantly. Using our main regression specification, we estimate the impact of the letter to be 33 percentage points, causing the treatment group take-up rate to be more than 50% larger than that of the control group. Our data set also contains several variables that inform on the health status of the target individuals, which allows us to study the impact of this kind of a simple information treatment on individuals with varying health status. We find that pensioners with medical expenses for severe or long-term illnesses do not react differently from those without such medication, suggesting that deteriorated health itself does not reduce the take-up effect of the mailing. Furthermore, severely ill pensioners who are less likely to manage their financial issues by themselves, respond even more strongly to the letter.

The essay's contribution to the literature lies especially in that we study individuals outside the labor force, namely the low-income elderly and disability pensioners. Earlier literature on take-up, and the literature on information provision, have mostly analysed groups with a tighter connection to the labour market or education (e.g. Bettinger, Long, Oreopoulos and Sanbonmatsu 2012; Bhargava and Manoli 2015; Liebman and Luttmer 2015). However, knowledge of how this kind of inexpensive and simple information provision affects take-up among non-working individuals – many with poorer health – is very relevant for practical policy making, as many social benefit programs target benefits to such vulnerable individuals.

## 2 Incentivising employers to reduce disability pension incidence

Whereas the previous two essays looked at income transfer programs that are targeted to individuals with low incomes, the third one looks at a program that provides income security in the face of a disability that prevents the individual from working full-time or at all. Instead of studying the take-up behaviour regarding disability pensions, the essay takes a different perspective on the efficiency of disability policies: how well does the current policy encourage the proactive prevention of such pensions. In many countries, disability benefit costs have been rising over recent years, which creates a burden on public budgets and pension systems. Work-disabling conditions are also a personal tragedy to those who encounter them. This has prompted governments to search for ways to curb the growth of expenses (OECD, 2010). Regarding this health-based benefit, one channel is to try to improve the health of workers so that disability benefits are needed less often. In this endeavour, in addition to the workers themselves, employers can potentially play a role as well. For example, they can take care of the working conditions of their workers, provide part-time work to suit workers' health needs, and so on.

However, since it is costly for the employers, they may invest too little in such disability-preventing measures from the society's point of view. In Finland and the Netherlands, experience rating of disability insurance (DI) premiums is used to increase employers' incentives for such investment. In experience rating systems, the employer's insurance premium reacts to the prevalence of disability benefit claims among its workforce: employers with a high disability risk face higher insurance costs whereas employers with a low disability risk pay lower insurance premiums. This system should ideally cause employers' incentives to be aligned closer to those of the society's, encouraging them to invest more in measures that reduce disabilities. In this essay, we estimate what effect the experience rating system in DI has on the incidence of sickness and disability in Finland.

To study the effect of experience rating, we take advantage of an institutional feature that allows us to identify its impact from other confounding effects. In Finland, a firm's degree of experience rating depends on its size: the smallest firms are not subject to experience rating at all, whereas the largest firms are fully experience-rated. For firms in between, the degree of experience rating increases from 0 to 1 with the firm's size. These discontinu-

ities (“kinks”) in the experience rating rule at the threshold values for small and large firms allow us to use a regression kink design (Nielsen, Sørensen and Taber, 2010; Card, Lee, Pei and Weber, 2015) to identify a causal effect from experience rating. We also benefit from the availability of detailed register data from the Finnish Centre for Pensions and Statistics Finland that cover all private-sector firms and their employees over the period 2007–2013, as well as worker sick leave periods and disability pensions, together with their medical diagnoses.

Due to the rareness of experience rating in disability insurance across countries, there is not much previous research on its efficiency in this context, and the existing evidence is inconclusive (Koning, 2009; van Sonsbeek and Gradus, 2013; Kyyrä and Tuomala, 2013; de Groot and Koning, 2016). The Finnish institutional set-up, and our detailed data, allow us to contribute to understanding better the efficiency of incentives provided by experience rating in the context of DI.

Our analysis suggests that experience rating does not help to reduce sick leaves or disability benefit claims. Different sized firms have differential incentives to prevent sickness and disability incidence, but we find no differences in incidence rates between them. Using the regression kink analysis, we find no evidence of the degree of experience rating having an impact on the incidence of sick leave or disabilities. Our data also allow us to disaggregate the inflows to different types of disability benefits, and also by medical condition, but the results do not vary along these dimensions, either.

Thus, our analysis casts doubt on the efficiency of experience rating in DI as a way to reduce disabilities. A possible explanation is that the current design of the Finnish experience rating scheme is too complex for employers to properly grasp the impact of disability incidence on their insurance premiums, thus hindering their incentives to act proactively.

### **3 Optimal tax and transfer policies for poverty reduction**

The first three essays study individual public programs and their effectiveness in reaching their goals. It is also important to consider the public sector as a whole, incorporating taxes, transfers and other tools together in the analysis. This is naturally very difficult to do empirically, but can be done in a comprehensive manner using a theoretical framework. This exercise is

relevant for developed economies as well, but in the fourth essay we take the viewpoint of a developing country, where policymakers are often focused on poverty alleviation but the administrative capacity of the public sector can be more limited, and modify the framework accordingly.

The optimal taxation literature (in the tradition of Mirrlees (1971)) assumes that the public sector is capable of implementing complex instruments such as non-linear income taxes. Many of the results of this literature are therefore not directly useful for policy recommendations in developing countries. We therefore study linear instead of nonlinear income taxes in our model and also consider the administrative requirements that different instruments impose on the public sector. For example, linear income taxation can be implemented by combining a proportional income tax and a lump-sum transfer. Such taxes can be withheld at source, which is administratively easier than to realise a fully non-linear income tax schedule requiring the accounting of all incomes over the course of the year from all sources. We study all of the most relevant redistributive instruments from this perspective: income taxation, income transfers, taxes and subsidies on commodities, and public provision of public and private goods.

Another motivation for the focus on the developing country context is that in such countries there is often an explicitly expressed goal to reduce poverty and to distribute the fruits of economic growth more evenly, by the countries' governments themselves as well as the wider development community. In fact, one of the Sustainable Development Goals (SDGs) formulated by United Nations in 2015 is simply "End poverty in all of its forms everywhere". However, standard optimal tax analyses typically assume that the government is instead interested in well-being, modeled as the maximisation of a social welfare function which aggregates individual utilities in the society. We study how the optimal tax rules are affected when the goal of poverty reduction is explicit in the model.

We find that, compared to the welfare-maximising optimal linear income tax, the poverty-minimising optimal tax formula includes additional pressure towards lowering the marginal tax rate in order to boost earnings to reduce income poverty. Our numerical simulations however show that this mechanism is offset by the redistributive concerns, as the optimal tax rates are higher under the poverty minimisation objective than under welfare maximisation. We observe a more drastic result when studying commodity taxation: setting poverty minimisation as the government's objective changes completely the

conditions under which uniform commodity taxation is optimal, as set out by Deaton (1979). Under poverty minimisation, uniform commodity taxation is unlikely to be ever optimal. In practice, however, the administrative difficulties of differentiated commodity taxes should also be taken into account.

The findings complement earlier studies on optimal linear taxation (e.g. Tuomala, 1985; Piketty and Saez, 2013) and on non-welfaristic objectives (e.g. Kanbur, Keen and Tuomala, 1994; Pirttilä and Tuomala, 2004). The analysis also illustrates how the theoretical framework can be modified to bring out conclusions that are relevant to the policy context at hand.

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