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Laws, Attitudes and Public Policy

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Niklas Jakobsson
Oslo, Norway, May 2010

Summary of the thesis

The thesis consists of six self-contained papers.

Paper 1:
Do laws affect attitudes? An assessment of the Norwegian prostitution law using longitudinal data
The question of whether laws affect attitudes has inspired scholars across many disciplines, but empirical knowledge is sparse. Using longitudinal survey data from Norway and Sweden, collected before and after the implementation of a Norwegian law criminalizing the purchase of sexual services, we assess the short-run effects on attitudes using a difference-in-differences approach. In the general population, the law did not affect moral attitudes toward prostitution. However, in the Norwegian capital, where prostitution was more visible before the reform, the law made people more negative toward buying sex. This supports the claim that proximity and visibility are important factors for the internalization of legal norms.

Paper 2:
Gender and overconfidence: are girls really overconfident?
Previous research finds that people are overconfident and that men are more overconfident than women. Using a very precise confidence measure, this article shows, however, that whereas boys are overconfident, girls are actually underconfident regarding their mathematics performance. We conducted a survey where 14-year-old high school students were asked what grade they thought they would get in a mathematics test a week later. These results were then compared with their actual grade. Boys were overconfident about their grades, whereas girls were underconfident. Forthcoming in *Applied Economics Letters.*

Paper 3:
A field experiment of discrimination in the Norwegian housing market: sex, class, and ethnicity
We test for gender, class, and ethnical discrimination in the Norwegian rental housing market, using fake application letters. Females, individuals with high job status, and ethnical Norwegians are more likely to receive positive call-backs. For example, being an Arabic man, working in a warehouse is associated with a 25 percentage points lower probability of receiving a positive response when showing interest in an apartment as compared to an ethnically Norwegian female economist. We conclude that gender, class, and ethnic discrimination exist in the Norwegian rental housing market, and ethnic discrimination seems to be most prevalent.

Paper 4:
What explains attitudes toward prostitution?
We assess people's attitudes toward prostitution in Norway and Sweden, two countries that have made it illegal to buy sex. The laws were, however, put in place in different time-periods and embedded in different market structures and discourses. Compared to previous research, the present study is the first to use methods that can shed light on attitudes toward various aspects of prostitution while controlling for other factors. We find that men and sexual liberals are more positive toward prostitution, and that conservatives and those who support gender equality are more negative. Holding anti-immigration views is correlated with more positive attitudes toward buying, but not toward selling, sex. Norwegians are more positive than Swedes toward prostitution. It is also found that supporting gender equality has more

explanatory power in Sweden than in Norway, and it is argued that this may be due to the gender equality framing of the Swedish debate. Forthcoming in *Feminist Economics*.

Paper 5:
Why do you want lower taxes? Preferences regarding municipal income tax rates
The factors shaping people's preferences for municipal labor income tax rates in Sweden are assessed using survey data. The tax rate actually faced by the respondents has explanatory power for their attitudes toward the tax rate only when a few socio-demographic explanatory variables are included. When a richer set of variables are included, the association disappears. The hypothesis that this small or nonexistent effect of the actual tax rate is caused by a Tiebout bias finds no support, yet IV-estimations indicate that the actual municipal tax rate may be of importance for attitudes toward the tax rate.

Paper 6:
Intergovernmental grants and fiscal competition
This theoretical paper shows how a central government can induce a policy concerning a municipal matter through a package of a policy requirement and a grant. We find that, due to fiscal competition and the possibility for citizens to move between municipalities, the central government can make the municipalities adopt the policy requirement although the municipalities make a loss from doing so. We apply this model to a recent Swedish child-care fee reform and can explain why all Swedish municipalities implemented the maximum child-care fee although it had a negative impact on many municipalities' finances.

Paper I

Do laws affect attitudes?

An assessment of the Norwegian prostitution law using longitudinal data

Niklas Jakobsson and Andreas Kotsadam[*]

May, 2010

Abstract

The question of whether laws affect attitudes has inspired scholars across many disciplines, but empirical knowledge is sparse. Using longitudinal survey data from Norway and Sweden, collected before and after the implementation of a Norwegian law criminalizing the purchase of sexual services, we assess the short-run effects on attitudes using a difference-in-differences approach. In the general population, the law did not affect moral attitudes toward prostitution. However, in the Norwegian capital, where prostitution was more visible before the reform, the law made people more negative toward buying sex. This supports the claim that proximity and visibility are important factors for the internalization of legal norms.

Keywords: attitudes, norms, law, prostitution
JEL classification: K14, K40

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1. Introduction

In January 2009, buying sex became a criminal offense in Norway. One of the main aims of the law was to make people more negative toward buying sex (Holmström and Skilbrei 2008; Norwegian Ministry of Justice 2008; and Skilbrei 2008). In the present paper, we investigate whether it succeeded. That citizens internalize the values signaled by laws is a common argument (e.g., McAdams 2000; McAdams and Rasmusen 2007). There is, however, an explicitly acknowledged lack of studies on the causal relationship between laws and attitudes (e.g., Ellickson 2001; McAdams 2000).[1]

Norms as a means of explaining individual behavior has gained increasing focus in the economics literature (e.g., Akerlof 1980; Binmore and Samuelson 1994; Becker 1996), and the claim that people internalize societal norms and laws is widely accepted (Tyler 1990; McAdams and Rasmusen 2006; Cooter 2008). More recent contributions model the interactive process between attitudes and laws (e.g., Carbonara et al. 2008), while others try to identify the effect of institutions and policies on attitudes empirically (Alesina and Fuchs-Schündeln 2007; Fong et al. 2006; Soss and Schram 2007; and Svallfors 2009).

Alesina and Fuchs-Schündeln (2007) investigate whether individual policy preferences are endogenous to political regimes and use post-war Germany to analyze the effects of communism on people's preferences regarding market capitalism and the role of the state in providing social services. Using the German Socioeconomic Panel, they find a large and statistically significant effect of former East Germans being more positive toward state intervention. Svallfors (2009) also investigates the role of institutions on the formation of values using the German natural experiment and, similarly, finds that mass publics are affected by institutional design. Soss and Schram (2007) investigate whether public opinion shifted as a result of welfare reform in the US in the 1990s. Using cross-sectional survey data, they find few opinion changes. They argue that the reforms did not affect mass opinion since they were distant to most people. Several studies try to assess the effect of smoke-free laws on attitudes (e.g., Heloma and Jakkola 2003; Tang et al. 2003; Gallus et al. 2006), but since most of them use cross-sectional data without control groups, they can not identify

[1] How laws affect behavior is studied to a larger extent (see, e.g., Donohue and Levitt (2001), Levine and Staiger (2004), Lott (2001), and Mocan (2006)).

causal effects. An important exception is Fong et al. (2006), who study the effects of an Irish smoke-free law on attitudes using longitudinal data with UK residents as control group. They find clear increases in support for total bans among smokers.

In the present study, we explore the effect of the Norwegian criminalization of buying sex on attitudes toward prostitution using longitudinal survey data from Norway and Sweden. These countries are very similar neighboring Scandinavian welfare states with similar languages and institutions (Esping-Andersen 1990; 1999). They are also similar in other respects. For example, the Global Gender Gap Report 2009 (Hausmann et al., 2009) ranks Norway and Sweden as the third and fourth most gender equal countries in the world, respectively. During the investigated period, Norway, but not Sweden, changed its legal framework surrounding prostitution. This allows us to evaluate the effects of the law using a difference-in-differences methodology, comparing changes in attitudes between the two countries. Apart from issues linked directly to prostitution, the data contains information on age, gender, income, cohabitation status, education, region of residence, and attitudes on issues linked to equality between the sexes, immigration, sexual liberalism, religious activities, and political views.

Our study has several advantages compared to previous studies. First of all, we use individual-level longitudinal data collected before and after the passing of a law, while Soss and Schram (2007) do not have longitudinal data and neither Svallfors (2009) nor Alesina and Fuchs-Schündeln (2007) have data on the East German population before reunification. We also have a control group, as opposed to Soss and Schram (2007), allowing us to compare the changes in attitudes among individuals in a country where there has been a change in the law (Norway) to the changes in attitudes among individuals in a similar country without such a change during the period (Sweden). These two factors in principle facilitate identification of causality. Compared to Alesina and Fuchs-Schündeln (2007) and Svallfors (2009), who study the effects of regimes on attitudes, we assess the effect of a specific law on attitudes. The results the present paper thereby have more practical relevance for policymakers interested in norm entrepreneurship. As opposed to Fong et al. (2006), who look at smokers' attitudes before and after the implementation of a smoke-free law, we study the effect of laws on attitudes in the general population and in groups that are more directly

affected by the law. This enables us to investigate the role of the context in which a reform is introduced.

When comparing changes in attitudes between the two countries, we find that criminalizing buying sex in Norway did not have large short-term effects on people's attitudes in general. More exactly, it did not affect moral attitudes toward buying and selling sex and it did not make Norwegians, as compared to Swedes, more likely to want buying sex to be illegal, although it did make them more likely to want selling sex to be illegal. The summary statistics reveal, however, that Norwegians think it should be illegal to sell sex to a lesser extent after the implementation of the law than before. Our results are thus driven by driven by Swedes having changed even more into thinking selling sex should not be illegal.

However, for respondents living in Oslo (the Norwegian capital), where the sex trade was clearly visible before the reform, there were clear effects on attitudes toward prostitution: People in Oslo now think that it should be illegal to buy sex to a larger extent than before the law. This supports the claim of proximity; that attitudes should be affected most for those most affected by a law. We also find that young people generally were more inclined than older people to change their views following a legal change. Finally, we find no support for the hypothesis that those who trust politicians more change their attitudes more in line with lawmakers' intentions when there is a legal change.

In order to generalize the results, a few caveats are necessary, especially since we might underestimate the effects of legal change on attitudes for several reasons. First of all, it is likely that laws affect attitudes more over longer time periods. It is therefore important to keep in mind that the results of this paper concern the short-run effects of laws on attitudes. Also, since we are unable to distinguish between any "direct effect" of the law and the effect attained via the media debate, a related issue is that the media discussion had started before the first wave of the survey was distributed. In addition, it was at this point clear that the law would be implemented. Both these factors are likely to underestimate the effects of the law reported in this paper.

The remainder of the paper is organized as follows. Section 2 presents our hypotheses, Section 3 describes the data and descriptive statistics, and Section 4 describes the empirical framework. Section 5 presents the results and Section 6 concludes the paper.

2. Hypotheses

As mentioned in the introduction, there is a large literature in different disciplines of social science stipulating theoretical effects of laws on attitudes. In this section, we will briefly describe the theoretical arguments in favor of a general effect and then move on to more specific hypotheses.

Why would laws affect attitudes? A common argument is that once institutions are in place, they create feedback effects, including normative feedback. Normative feedback effects are likely to arise when public policies provide citizens with a sense of what is desirable (Svallfors 2009). The enactment of laws is a means by which policymakers are able to signal "good" values, and this expressive function of law is argued to be most common in criminal law (McAdams 2000; McAdams and Rasmusen 2007). The values may be internalized by the citizens for a number of reasons. McAdams and Rasmusen (2007) argue that new laws may affect the incentives that underlie norms by changing perceptions of what incurs disapproval or by creating a new basis for shame[2]. According to Cooter (2008), people internalize values signaled by laws in order to increase their cooperation opportunities, especially in long-run projects. Also Posner (1998; 2000) argues that people internalize norms to signal that they are of "good type." McAdams (2000) argues that laws may change behavior by signaling underlying attitudes in society to individuals concerned with approval. In such cases, a law helps people update their prior beliefs by creating a focal point (Cooter 1998). However, the direction of the possible attitudinal change does not necessarily follow the signals sent out by the legislature. Social response theory highlights how the reaction to a law can either reinforce or undermine its effect (Carbonara et al. 2008). In the present paper, we first test the hypothesis that laws affect attitudes.

[2] How shame may affect criminal behavior is discussed by Kahn and Posner (1999).

Yet, laws may affect people differently depending on the context in which they are introduced. Soss and Schram (2007) discuss under which conditions laws and policies can be assumed to affect attitudes. A high degree of societal visibility and proximity (i.e., the degree to which individuals notice and become directly affected by the policy) makes attitudinal change more likely. The criminalization of buying sex in Norway was a highly visible reform in the sense that the media coverage was extensive (Jahnsen 2008). Thus, there was a higher likelihood that the reform would affect attitudes than if it had not been as visible. Turning to proximity, most Norwegians are not affected directly by the law. This implies that it should not affect people's attitudes as much as it would have had the law affected them more directly. People living in Oslo, however, were more proximate to prostitution and thereby to the effects of the law. To them, prostitution was a clearly visible phenomenon before the enactment of the law (Skilbrei 2001) but has since then become much less noticeable (Strøm 2009). Thus, we expect the change in attitudes to be larger in Oslo than in the rest of the country.

The effects of laws on attitudes seem to be linked to other factors as well. Trust in politicians is argued to be important for internalization of legal norms (McAdams 2000; Ellickson 2001; McAdams and Rasmusen 2007), which is also a common argument among scholars of legal philosophy (e.g., Cserne 2004) and political science (e.g., Peters 2005). As argued by Ellickson (2001), some people may feel that the government has better and more accurate information and may therefore internalize legal norms. These arguments imply that people who trust politicians should be more inclined than people who do not trust politicians to change their attitudes in accordance with legal changes.

The effects of laws on attitudes may also differ by age and across cohorts. Svallfors (2009) argues that people whose life course transition into adult life has already been fully accomplished should be more resistant to attitudinal change. Similarly, young people are expected to adapt quicker to new rules since they have fewer previous formative experiences that need to be reconsidered (Svallfors 2009). Thus, we expect the change in attitudes to be larger among younger persons. The hypotheses to be tested in this paper are summarized below:

- The criminalization of buying sex affects attitudes toward prostitution.

- The effect of the law is greater in the area where the effects of the reform were most proximate, i.e., in Oslo.
- People who trust politicians are more inclined to change their attitudes in accordance with a legal change.
- Younger persons are more inclined to change their attitudes in accordance with a legal change.

3. Data and descriptive statistics

We conducted a longitudinal Internet-based survey sent out by TNS Gallup (www.tns-gallup.se/summary.aspx) in August 2008 and August 2009 to a random sample of 2,500 Norwegians and 3,000 Swedes aged 15-65. By the end of the second survey period, 1,034 Norwegians (41.4 percent) and 1,317 Swedes (43.9 percent) had responded to both surveys. The response rate in the first wave was 68.6 percent in Norway and 60.5 percent in Sweden. The respondents had three weeks to answer the first wave of the survey, and they received two reminders. Those who accepted also taking part in the second wave of the survey (in August 2009) had three weeks to answer, and received four reminders.[3]

The survey included four main questions on people's attitudes toward prostitution. More exactly, the respondents were asked whether they felt that it is morally acceptable or morally unacceptable to buy sex and sell sex, respectively. They responded on a 0-10 scale, where 0 implied "morally acceptable" and 10 implied "morally unacceptable." The respondents were also asked whether they thought it should be illegal to buy sex and sell sex, respectively; here the possible answers were *yes* and *no*. In addition to these questions, we asked for the respondents' attitudes on issues linked to equality between the sexes, immigration, sexual liberalism, religious activities, political views, their knowledge about the law, and their trust in politicians. We also have information on the respondents' age, gender, income, cohabitation status, education, and region of residence, but only for the first wave. The choice of control variables follows Jakobsson and Kotsadam (2010a), who investigate what determines attitudes toward prostitution.

Descriptive statistics are presented in Table 1. Regarding the dependent variables (Selling wrong, Buying wrong, Illegal selling, and Illegal buying), we see that Swedes are significantly

[3] For more information on the data, see Jakobsson and Kotsadam (2010a and 2010b).

more negative toward prostitution. They think it is more morally wrong both to buy and to sell sex and they are more inclined than Norwegians to think that both buying and selling sex should be illegal. Looking at the statistically significant trends over time, we see that respondents in both countries showed less moral concern with respect to selling sex in the second than in the first survey, and Swedes felt that selling sex should be illegal to a lesser degree than one year earlier.

Table 1. Descriptive statistics.

		Norway		Sweden	
Variable	**Explanation**	**Wave 1**	**Wave 2**	**Wave 1**	**Wave 2**
Selling wrong	Answer to the question "*In your opinion, is it morally acceptable or morally unacceptable to sell sex?"* ranging from 0 for *Totally morally acceptable* to 10 for *Totally morally unacceptable.*	6.269 (3.170)	6.117 (3.085)	6.728 (3.158)	6.540 (3.107)
Buying wrong	Answer to the question "*In your opinion, is it morally acceptable or morally unacceptable to buy sex?"* ranging from 0 for *Totally morally acceptable* to 10 for *Totally morally unacceptable.*	6.822 (3.132)	6.770 (3.088)	7.403 (2.986)	7.439 (2.903)
Illegal selling	= 1 if respondent thinks it should be illegal to sell sex	0.466 (0.499)	0.456 (0.498)	0.551 (0.498)	0.510 (0.500)
Illegal buying	= 1 if respondent thinks it should be illegal to buy sex	0.518 (0.500)	0.522 (0.500)	0.632 (0.482)	0.618 (0.486)
Male	= 1 if respondent is male	0.457 (0.498)		0.497 (0.500)	
Age	respondent age	37.525 (13.458)		42.403 (13.928)	
Capital	= 1 if respondent lives in the capital city	0.122 (0.327)		0.199 (0.400)	
Cohabit	= 1 if respondent is married or cohabiting	0.655 (0.476)		0.673 (0.4694)	
High education	= 1 if respondent has at least some university education	0.529 (0.499)		0.457 (0.498)	
Low education	= 1 if respondent only has elementary education or less	0.080 (0.272)		0.164 (0.370)	
High income	= 1 if respondent earns >45,000 SEK per month, or >600,000 NOK per year.	0.077 (0.267)		0.032 (0.177)	
Low income	= 1 if respondent earns <20,000 SEK per month, or <200,000 NOK per year.	0.245 (0.430)		0.385 (0.487)	
Religious	= 1 if respondent participates in religious activities at least once a month.	0.098 (0.297)	0.090 (0.286)	0.080 (0.271)	0.068 (0.251)
Trust	Answer to the question "*In general, do you trust politicians*?" ranging from 0 for *Not at all* to 10 for *Very much.*	4.322 (2.032)	4.652 (2.039)	4.579 (2.025)	4.972 (2.026)
Anti immigration	Answer to the question "*Do you think that there are too many foreigners in Norway/Sweden?"* ranging from 0 for *No, not at all* to 10 for *Yes, for sure.*	3.610 (2.755)	3.277 (2.728)	4.544 (2.852)	4.426 (2.835)
Public sector	Answer to the question "*How large should the public sector be?"* ranging from 0 for *Much smaller than today* to 10 for *Much larger than today.*	4.730 (1.775)	4.775 (1.675)	5.244 (1.769)	5.347 (1.746)
Gender equality	Answer to the question "*Do you think that gender equality is an important issue?"* ranging from 0 for *No, not at all* to 10 for *Yes, for sure.*	8.368 (2.138)	8.617 (1.983)	8.879 (1.905)	8.926 (1.848)
Co-responsible if abused	Answer to the question "*Do you think women who dress challengingly are co-responsible if they become sexually abused?*" ranging from 0 for *No, not at all* to 10 for *Yes, for sure.*	2.050 (2.753)	2.173 (2.843)	1.764 (2.679)	1.757 (2.678)
Sexual liberal	Answer to the question "*Do you think it is okay to have sex with unknown people?*" ranging from 0 for *No, not at all* to 10 for *Yes, for sure.*	4.838 (3.445)	5.000 (3.413)	5.975 (3.559)	6.044 (3.492)
Know 1	= 1 if Swedish respondent answers yes "*To your knowledge, is it illegal to buy sex?*", and no to "*To your knowledge, is it illegal to sell sex?*" in the first wave of the survey. Or if Norwegian respondent answers no to "*To your knowledge, is it illegal to buy sex?*" and no to "*To your knowledge, is it illegal to sell sex?*" in the first wave of the survey	0.428 (0.495)		0.624 (0.485)	
Know 2	= 1 if respondent answers yes to "*To your knowledge, is it illegal to buy sex?*" and no to "*To your knowledge, is it illegal to sell sex?*" in the second wave of the survey.		0.588 (0.492)		0.671 (0.470)

Mean values presented; standard deviation in parentheses.

To assess the representativeness of our sample, we compare the descriptive statistics of the respondents to national statistics. In Sweden, 50.8 percent of the population are men, which corresponds well with our Swedish sample where 49.7 percent are men. However, only 45.7 percent of the Norwegian respondents are men, while the share of all Norwegians is 50.9 percent. The mean ages among 15-65 year olds are 40.1 in Sweden and 39.7 in Norway, while in our samples the mean ages are 43.4 and 38.5 years, respectively (Statistics Sweden 2008a; Statistics Norway 2008). What is more problematic is the representativeness of our sample with respect to education: While the share of Swedes aged 16-65 who have higher education is 31.8 percent, the share in our sample is 45.3 percent (Statistics Sweden 2008b). For Norway, the percentages differ even more: 27.0 percent of all Norwegians aged 16-66 have higher education, while the corresponding figure in our sample is 56.7 percent (Statistics Norway 2008). Furthermore, the bias toward including highly educated people is linked to non-random attrition, especially in Norway. In the first wave, 43.4 percent of the Swedes and 48.8 percent of the Norwegians had university education. We conclude that our sample is fairly representative regarding gender and age while in terms of education it is biased toward including highly educated people, and there are serious concerns regarding non-random attrition. While this should be considered when comparing raw correlations and mean values, the problem is somewhat alleviated in the regression analyses by explicitly controlling for education and other confounding factors. Furthermore, even though initial attitudes in our sample may not be representative for the whole population, the change in attitudes may be representative, and we can in fact test whether education affects attitude change.

4. Empirical framework

Since we have individual level panel data from both Norway (where the law changed during the period) and Sweden (where there was no legal change), we are able to apply a difference-in-differences method. The average difference over time in the control group is subtracted from the average difference over time in the treatment group. However, since the assignment of subjects to the two groups was not randomized, further assumptions must be made in order to establish causality.

Norway and Sweden are very similar neighboring Scandinavian welfare states with similar languages and institutions (Esping-Andersen 1990; 1999). They are also similar in other respects. For example, the Global Gender Gap Report 2009 (Hausmann et al., 2009) ranks Norway and Sweden as the third and fourth most gender equal country in the world, respectively. Since the countries are very similar, a reasonable assumption is that attitudes in the countries evolve in a similar way. Therefore, we make the identifying assumption that, conditional on the observed individual characteristics, the change in average attitudes of Norwegians (who did experience a legal change during the investigated period) would have been the same without the new law as the change in average attitudes during the same period in Sweden (where no such new law was implemented). Under this identifying assumption, we can evaluate the causal impact of the reform. However, if the change in attitudes would have been different in the two countries in the absence of the Norwegian criminalization, the identifying assumption is problematic. Since we do not have more than one wave of data from before the implementation of the law, we cannot test this assumption, so care should be taken when making inferences. The identifying assumption is further problematized in the concluding discussion.

We estimate the following specification:

$$Y_{i1} - Y_{i0} = \beta_0 + \beta_1 N_i + \beta_2 \mathbf{Z}_{i0} + \beta_3 (\mathbf{X}_{i1} - \mathbf{X}_{i0}) + \varepsilon_i , \quad (1)$$

where Y_{it} is the moral attitude toward buying/selling sex (ranging from 0 for "morally acceptable" to 10 for "morally unacceptable") or attitude toward criminalization (taking the value one if the respondent thinks buying/selling sex should be illegal) for individual *i* in period *t*. The estimations are carried out using ordinary least squares (OLS).[4] N_i is our explanatory variable of main interest; it is a Norway indicator that takes the value one if individual *i* lives in Norway. $\mathbf{Z}_{i0}$ is a vector consisting of age, gender, income, cohabitation status, education, and region of residence for individual *i* observed in the first period only. $\mathbf{X}_{it}$ is a vector of observed individual characteristics for individual *i* in period *t* (religious,

[4] Ordered logit regressions yield very similar results as the OLS estimates (available upon request).

trust, anti immigration, public sector, gender equality, co-responsible if abused, and sexual liberal, described in Table 1). Since these variables are observed at both time periods, they enter as differences. ε_i is the random error term, which is assumed to be uncorrelated with N conditional on the other variables. Variables entering as differences may also be affected by the law, since they are recorded in the second period as well, and may hence be endogenous, and we therefore present results including only $\mathbf{Z}_{i0}$ as well. The vector $\mathbf{Z}_{i0}$, is only recorded for the first period and included to control for potential time varying effects from these variables. As hypothesized, the change may be larger among younger people or by people living in the capital. This may also be true for gender, income, cohabitation status and education. For example, respondents with higher education may be affected differently than respondents without. We also run specifications including only the first wave of all control variables (that is, controlling for $\mathbf{Z}_{i0}$ and $\mathbf{X}_{i0}$) and specifications including only those variables for which we have data in both years as differences (that is, only $\mathbf{X}_{i1}$-$\mathbf{X}_{i0}$). The results (available upon request) do not alter the conclusions.

5. Results

In this section, we present results regarding change in moral attitudes in the general populations (5.1) and toward the legal setting (5.2). In Section 5.3, we present the results regarding attitude change in Oslo as well as for different age groups. In Section 5.4, we problematize and discuss the results more broadly.

5.1 Moral attitudes toward prostitution

We start by looking at the difference in moral attitudes toward buying sex. The coefficients of OLS regressions are presented in Panel A in Table 2.[5] Our main variable of interest is the coefficient for the Norway dummy, which is our difference-in-differences (dd) estimate as described above. In the first column, we only control for gender, age, education, living in the capital region, and civil status ($\mathbf{Z}_{i0}$). We see that the dd estimate (*Norway*) is insignificant. In Column 2, we also include the other attitude variables as controls. These are also variables for which we have data for both years, so they enter as first differences $(\mathbf{X}_{i1} - \mathbf{X}_{i0})$. Also here we see that the dd estimate is insignificant. Moving to the results on moral attitudes

[5] The full regression tables are presented in Appendix.

toward selling sex, the results in Panel B (Table 2) show that the dd estimates are not statistically significant for either specification (1 or 2). This indicates that the law did not affect moral attitudes toward selling sex in Norway in the general population.

Table 2. Effect of law on attitudes

	(1) Base	(2) Full	(3) Trust	(4) Know 2	(5) Know 2+Trust
Panel A. Difference in moral attitudes toward buying sex.					
Norway	0.088	0.116	0.264	0.023	0.156
	(0.119)	(0.120)	(0.186)	(0.143)	(0.228)
$\mathbf{Z_{i0}}$	YES	YES	YES	YES	YES
$\mathbf{X_{i1}}$-$\mathbf{X_{i0}}$	NO	YES	YES	YES	YES
Observations	2104	2067	862	1323	598
Panel B. Difference in moral attitudes toward selling sex.					
Norway	0.098	0.136	0.273	0.142	0.097
	(0.125)	(0.126)	(0.193)	(0.151)	(0.229)
$\mathbf{Z_{i0}}$	YES	YES	YES	YES	YES
$\mathbf{X_{i1}}$-$\mathbf{X_{i0}}$	NO	YES	YES	YES	YES
Observations	2098	2062	860	1318	597
Panel C. Difference in attitudes toward criminalization of buying sex.					
Norway	0.014	0.016	0.098***	0.023	0.061
	(0.020)	(0.021)	(0.032)	(0.025)	(0.040)
$\mathbf{Z_{i0}}$	YES	YES	YES	YES	YES
$\mathbf{X_{i1}}$-$\mathbf{X_{i0}}$	NO	YES	YES	YES	YES
Observations	2103	2063	859	1319	596
Panel D. Difference in attitudes toward criminalization of selling sex.					
Norway	0.037*	0.037*	0.100***	0.063**	0.062
	(0.021)	(0.022)	(0.035)	(0.027)	(0.042)
$\mathbf{Z_{i0}}$	YES	YES	YES	YES	YES
$\mathbf{X_{i1}}$-$\mathbf{X_{i0}}$	NO	YES	YES	YES	YES
Observations	2087	2048	852	1310	591

Notes: This table reports the effect of the law on attitudes. Panels A-D present the four different dependent variables. Regressions are conducted using OLS. Controls in all regressions include age, gender, income, cohabitation status, education, and region of residence for individual *i* observed in the first period (Z_{i0}). Columns 2-5 also include ΔTrust, ΔReligious, ΔPublic sector, ΔGender equality, ΔCo-responsible, ΔAnti immigration and ΔSexual liberal as controls (X_{i1}-X_{i0}). In Column 3, the sample is restricted to those who trust politicians. Column 4 includes those who know what the law says. In Column 5, the sample is restricted to those who both trust politicians and know the law. In Columns 3 and 5, ΔTrust is not included since the sample is restricted with respect to trust. Standard errors in parentheses. Full tables are presented in Appendix.
* significant at 10%; ** significant at 5%; *** significant at 1%.

To test the hypothesis that people who trust politicians are more inclined to change their opinions in line with the signals sent out by the law, we restrict the sample to those who

trust politicians i.e., those who answered 6 or above on a 1-10 scale to the question, "In general, do you trust politicians?" in the second survey (Column 3).[6] Since the dd estimate is still insignificant for this group (both in Panels A and B), the hypothesis can not be confirmed. In Column 4, we restrict the sample to those who actually knew about the law (i.e., those who answered the question, "To your knowledge, is it illegal to buy/sell sex?" correctly in the second period[7]), and in the last column, we include those who both knew about the law and claimed to trust politicians. The dd estimate is insignificant for these two specifications as well, and we conclude that we find no evidence that the law changed Norwegians' moral attitudes toward buying or selling sex.

5.2 Attitudes toward the law

We then proceed to investigate the changes in attitudes toward criminalization of buying sex; the results of the OLS regressions are shown in Panel C (Table 2). As in the case of moral attitudes, we see that our dd estimate is insignificant in the full sample. Yet the dd estimate in Column 3 indicates support for the hypothesis that those who claimed to trust politicians were more inclined to change their attitudes. However, once we condition on actually knowing the law, which should be a necessary condition for this mechanism, there is no effect. We therefore conclude that we find no evidence that the law changed Norwegians' attitudes toward criminalization of buying sex.

The picture changes when looking at the results on changes in attitudes toward criminalization of selling sex, which are presented in Panel D (Table 2). We note that the dd estimate is statistically significant for all specifications, except for the one in Column 5. Living in Norway increases the probability of having changed into wanting selling sex to be illegal and decreases the probability of having changed into wanting it to be legal. The higher marginal effects are found in the subsample with people who trust politicians to a greater extent. While this seems to suggest some support of the hypothesis that trust in politicians is important, one should keep in mind that the direction is the opposite of what was intended (the lawmakers wished for more negative attitudes toward buying sex but explicitly not

[6] We also conducted the same analysis with the trust question from the first wave of the survey, and the results were very similar.

[7] We only require a correct answer in the second wave since people may have updated their beliefs as an effect of the law (but the results do not change if we require a correct answer also before the criminalization).

toward selling). Furthermore, restricting the sample to those who actually know the law and trust politicians removes the significance of the effect. Thus, there is no support for the claim that trust in politicians affects attitudes in the intended way. Also, when using the responses to the trust question from the first wave, the marginal effects are larger for the subgroup trusting politicians, but the effect becomes insignificant when conditional on knowing the law.

That the legal change seems to have affected attitudes toward criminalization of selling sex but not toward criminalization of buying sex may come as a surprise since the law focuses only on buying sex. As suggested by social response theory, a legal change can lead to attitude changes contrary to the expectations of lawmakers (e.g., Carbonara et al. 2008). Whether our results should be interpreted in such a way is not clear since the attitudes toward buying sex did not change into being more negative. However, as put forth in the Norwegian debate (especially by Pro Sentret,[8] whose position is that the stigmatization of sellers will increase as a result of the recently implemented law), a law that criminalizes buyers is likely to affect attitudes toward selling as well, since it puts focus on the issue and signals that there is a problem. Another interpretation is that the law led to opposition in the sense that people now think that both parties of the transaction should be liable, which is contrary to the lawmakers' view. That is, people prefer symmetry where both buying and selling sex should be treated in the same way by the law.

The summary statistics reveal, however, that the effect described above is driven by Swedes having changed more into thinking selling sex should not be illegal and Norwegians in fact thinking it should be illegal to a lesser extent after the implementation of the law than before. Given our identifying assumption, the effects of the law are, however, that Norwegians became more likely to think it should be illegal to sell sex than they would have been in the absence of legal change (where they would have changed even more). Since we are not able to test this assumption, care should be taken when interpreting this result. If the identifying assumption does not hold, this conclusion is not correct.

[8] Pro Sentret is a non-governmental organization that represents prostitutes and provides information on prostitution.

5.3 Attitudes among different age groups and in Oslo

To test the hypothesis of younger people being more prone to change their attitudes as a consequence of the law, we interact the Norway indicator variable with the vector $\mathbf{Z}_{i0}$. The results are presented in Table 3 below.

Table 3. Regressions with interaction terms.

	(1) Buying wrong	(2) Selling wrong	(3) Illegal buying	(4) Illegal selling
Norway	0.440	0.816	0.094	0.048
	(0.496)	(0.521)	(0.084)	(0.089)
Age	0.025***	0.012*	0.003**	0.003**
	(0.006)	(0.007)	(0.001)	(0.001)
Age*Norway	-0.017*	-0.015	-0.004**	-0.002
	(0.010)	(0.010)	(0.002)	(0.002)
$\mathbf{Z_{i0}}$	YES	YES	YES	YES
$\mathbf{Z_{i0}}$*Norway	YES	YES	YES	YES
Observations	2104	2098	2103	2087

Notes: This table reports the effect of the law on attitudes. Regressions are conducted using OLS. Controls in all regressions include age, gender, income, cohabitation status, education, and region of residence for individual *i* observed in the first period (Z_{i0}), as well as these variables interacted with Norway. Standard errors in parentheses. Full tables are presented in Appendix.
* significant at 10%; ** significant at 5%; *** significant at 1%.

We see that for all variables, the coefficient of age is positive, hence, the change in opinion in favor of criminalization increases with age. The Norway indicator variable interacted with age is negative and statistically significant for the two specifications regarding buying sex.[9] This means that older Norwegians changed less toward thinking that buying sex is immoral and also changed less toward thinking that buying sex should be illegal. Analysis with cohort dummies (available upon request) further confirms that younger Norwegians changed their attitudes more than older Norwegians as an effect of the law. We thereby confirm the hypothesis that younger people are more prone to adapt their attitudes in response to legal changes and we also note that the direction of change follows the lawmakers' intentions. This supports claims from institutional and socialization theory (e.g., Svallfors 2009) that those with fewer previous formative experiences in need of reconsideration are more prone to internalize legal norms.

[9] As a sensitivity analysis we also included $\mathbf{X_{i1}}$-$\mathbf{X_{i0}}$ and interacted it with the Norway indicator variable. The results are very similar although the coefficient for believing that buying sex is wrong moves from being significant at the 10 % level to being significant at the 13 % level.

We also note that education level does not seem to affect the changes in attitudes, which is important considering our biased sample.

Finally, in order to test the hypothesis of proximity suggested by Soss and Schram (2007), according to which there should be a greater effect in Oslo than in the rest of Norway, we restrict the treatment group to include only people living in Oslo. The comparison group is still the Swedish sample. This is again done to establish an effect of the law as opposed to describing a correlation arising from a general trend. Table 4 presents the results. Interestingly, we see that people in Oslo changed their attitudes toward thinking that buying sex is more immoral and also toward wanting buying sex to be illegal. They do not think that selling sex is more immoral or that it should be illegal to a greater extent than they did before. The marginal effect of living in Oslo implies an 8.2 percentage point higher probability of having changed opinion from wanting buying sex to be legal to wanting it to be illegal, and Oslo residents are also 5.3 percentage points less likely to have changed into thinking buying sex should be legal.[10]

Table 4. Difference in attitudes toward prostitution in the Norwegian capital as compared to Sweden.

	(1) Buying wrong	(2) Selling wrong	(3) Illegal buying	(4) Illegal selling
Oslo	0.509*	0.289	0.134**	0.041
	(0.288)	(0.322)	(0.054)	(0.058)
$\mathbf{Z_{i0}}$	YES	YES	YES	YES
$\mathbf{X_{i1}}$-$\mathbf{X_{i0}}$	YES	YES	YES	YES
Observations	1281	1277	1280	1270

Notes: This table reports the effect of the law on attitudes in the Norwegian capital as compared to Sweden. Regressions are conducted using OLS. Controls in all regressions include age, gender, income, cohabitation status, education, and region of residence for individual *i* observed in the first period (Z_{i0}), as well as ΔTrust, ΔReligious, ΔPublic sector, ΔGender equality, ΔCo-responsible, ΔAnti immigration, and ΔSexual liberal (X_{i1}-X_{i0}). Standard errors in parentheses. Full tables are presented in Appendix.
* significant at 10%; ** significant at 5%; *** significant at 1%.

It should also be noted that these changes are driven by Oslo residents thinking that buying sex is more immoral and that it should be illegal, e.g., 51.6 percent of the people living in Oslo thought it should be illegal prior to the law while 58.7 thought so in the second survey. When using only the Swedish capital (Stockholm) as control group, the statistical significance

[10] These effects are calculated using ordered probit regressions (results available upon request).

of the effect on moral attitudes toward buying sex disappears. This effect is only significant at the 10 percent level when comparing to the whole of Sweden, and we lose around three-quarters of the sample size by only including Stockholm. Regarding the other dependent variables (Selling wrong, Illegal selling, and Illegal buying), the results are similar to before (all results are available upon request).

Having established that there is indeed an effect in Oslo, we also compare the changes in attitudes in Oslo to the changes in the rest of Norway. This has the advantage of isolating the proximity aspect since Oslo residents were more affected by the legal change. These results (in Table 5) indicate that the changes were larger in Oslo than in the rest of Norway regarding buying sex. That is, Oslo residents changed into wanting buying sex to be criminalized (p=0.06) and there is some support for thinking that buying sex is more morally wrong (p=0.14). Taken together, the cross-country dd estimates and the within-Norway estimates support the hypothesis that proximity affects attitudinal change.

Table 5. Difference in attitudes toward prostitution in the Norwegian capital as compared to the rest of Norway.

	(1) Buying wrong	(2) Selling wrong	(3) Illegal buying	(4) Illegal selling
Oslo	0.468	0.269	0.088*	0.019
	(0.315)	(0.301)	(0.047)	(0.049)
$\mathbf{Z_{i0}}$	YES	YES	YES	YES
$\mathbf{X_{i1}}$-$\mathbf{X_{i0}}$	YES	YES	YES	YES
Observations	888	887	885	879

Notes: This table reports the effect of the law on attitudes in the Norwegian capital as compared to the rest of Norway. Regressions are conducted using OLS. Controls in all regressions include age, gender, income, cohabitation status, education, and region of residence for individual *i* observed in the first period (Z_{i0}), as well as ΔTrust, ΔReligious, ΔPublic sector, ΔGender equality, ΔCo-responsible, ΔAnti immigration, and ΔSexual liberal (X_{i1}-X_{i0}). Standard errors in parentheses. Full tables are presented in Appendix.
* significant at 10%; ** significant at 5%; *** significant at 1%.

5.4 Discussion

In sum, the law did not affect moral attitudes toward prostitution in the general Norwegian population. However, in the Norwegian capital, where prostitution was more visible before the reform, the law actually made people more negative toward buying sex. We also find that younger people changed their attitudes more, and in the direction of the lawmakers' intentions, than older people as a result of the law. The hypothesis that people who trust

politicians change attitudes more in the intended direction when a law is enacted is not supported. One possible reason for this is that they already before the implementation of the law supported the view put forward by the politicians.

In order to generalize the results, a few caveats are necessary, especially since we might underestimate the effects of legal change on attitudes for several reasons. First of all, it is likely that laws affect attitudes more over time periods that are longer than eight months, and there is indicative evidence that the enactment of the same law changed attitudes in Sweden to a considerable degree (Jakobsson and Kotsadam 2010a). As Ellickson (2001) argues, there may be lags in the effects on attitudes due to cognitive biases toward status quo derived from loss aversion or due to a difficulty of displacing already internalized norms. A related mechanism through which laws may have long-run effects is the replacement of cohorts as suggested by Svallfors (2009), and our results of more change among younger people indicate that this is likely. It is therefore important to keep in mind that the results of the present paper concern the short-run effects of laws on attitudes only, and that we cannot say anything about long-run effects.

Since we are unable to distinguish between any "direct effect" of the law and the effect attained via the media debate, a related issue is that the media discussion had started before the first wave of the survey was distributed (see, e.g., Jahnsen 2008). In addition, it was at this point clear that the law would be implemented. Both these factors are likely to underestimate the effects of the law reported in this paper. However, the debate was more widespread during the final months before implementation (and hence after the first survey was sent out), and we can see that the level of knowledge about the law was lower when respondents answered the survey the first time (43 percent of the Norwegian respondents knew the legal framework in the first survey while 59 percent did in the second). It is therefore likely that people updated their knowledge between the two surveys.

These caveats are also important for our identifying assumption that the change in average attitudes among individuals living in Norway would have, without the law, been the same as the change among individuals living in Sweden. Since the media debate started and information about the reform became available before we sent out the first survey, the

possible process of attitudinal change had probably already started. As we show, however, knowledge was updated and media coverage became intense after the respondents had answered the first survey, probably implying a possible underestimation of the magnitude of the causal effect; yet it does not imply that the effects we find are not causal. The problem of lags in response to legal change is also problematic since if there are long lags with considerable effects, Swedes may constitute an inappropriate control group as a similar law was enacted in Sweden ten years earlier. In the worst case scenario (for our assumption) of still persisting effects of the Swedish law on the rate of change in attitudes among Swedes, our results are still important for comparing the difference between short-term and long-term effects. Both of these limitations of the identifying assumption could have been resolved by collecting more waves of data further back in time, which is a path we recommend future researchers to take (although it is difficult to gather detailed information on attitudes toward a relevant law that nobody knows will be implemented). Compared to existing literature, however, this paper amplifies the available knowledge in the area.

6. Conclusion

Using longitudinal data, we investigate the attitudinal effects of the criminalization of buying sex in Norway (1 January 2009), which had as one of its key aims to make people more negative toward buying sex. We conducted surveys in Norway and Sweden where we asked for people's opinions about prostitution during the fall of 2008 and the fall of 2009, i.e., before and after the criminalization of buying sex in Norway, and evaluated the effects in a difference-in-differences estimation with Swedish respondents as control group.

Our main results are that, in the general population, the law did not affect moral attitudes toward buying or selling sex. However, in accordance with our hypothesis, we find that people living in the Norwegian capital (Oslo) became more opposed to prostitution than the general population. This supports the more general hypothesis suggested by Soss and Schram (2007) that laws and policies are more likely to affect attitudes the more visible and proximate they are to people.

Comparing the results of previous studies on the effects of laws, regimes, and policies on attitudes further strengthens this point. The division and re-unification of Germany

(Svallfors 2009; Alesina and Fuchs-Schündeln 2007) was clearly visible and proximate to people and also affected attitudes as expected. In contrast, the US welfare reform studied by Soss and Schram (2007) was distant to most Americans, as was the law studied here to most Norwegians, and consequently there were limited effects on attitudes in both cases. The clear effects found on attitudes toward the Irish smoke-free law (Fong et al. 2006) are also expected since the effects were evaluated only among smokers. For this group, the law was clearly proximate, which can be compared to our Oslo sub-sample for which we also find the expected effects. Comparing the intended effects of the law to the results in the Oslo region, we can see that the politicians' intentions have been fulfilled. People in Oslo now think it is more immoral to buy sex than they used to. Given our identifying assumptions, these changes are not merely trends – they are causal effects of the law.

Our results are important for both policy and research. A large literature in economics, political science, and sociology has explored how laws may affect attitudes, yet the knowledge in this area is still sparse. More broadly, the literature on the importance of institutions often explores the effects of institutions via large-scale and politically infeasible changes (e.g., the division of Germany or Korea, colonialism, natural disasters, and wars). As Bhavnani (2009) argues, such natural experiments provide few possibilities for policy advice compared to investigations of effects of small-scale policy change.

We suggest that further research be undertaken to investigate the longer run effects of laws on attitudes and the effects of different types of laws and in different contexts. The comparison of realized and intended effects in the general population and in Oslo raises interesting questions not only about the contextual prerequisites for effects but also about their direction.

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Appendix. Full tables

Table A1. Difference in moral attitudes toward buying sex.

	(1) Base	(2) Full	(3) Trust	(4) Know 2	(5) Know 2+Trust
Norway	0.088	0.116	0.264	0.023	0.156
	(0.119)	(0.120)	(0.186)	(0.143)	(0.228)
Male	0.156	0.148	0.247	0.075	0.124
	(0.116)	(0.117)	(0.179)	(0.140)	(0.219)
Age	0.017***	0.016***	0.023***	0.018***	0.026***
	(0.005)	(0.005)	(0.007)	(0.006)	(0.009)
High education	0.038	0.040	0.246	0.069	0.248
	(0.121)	(0.122)	(0.192)	(0.146)	(0.238)
Low education	-0.078	-0.039	-0.127	0.018	0.222
	(0.194)	(0.197)	(0.337)	(0.255)	(0.430)
High income	-0.220	-0.107	-0.344	0.210	-0.369
	(0.258)	(0.262)	(0.380)	(0.306)	(0.467)
Low income	0.290**	0.257*	0.496**	0.205	0.445*
	(0.137)	(0.139)	(0.213)	(0.167)	(0.265)
Capital	0.259*	0.237	0.082	0.183	0.086
	(0.154)	(0.155)	(0.228)	(0.176)	(0.271)
Cohabit	0.253**	0.254**	0.291	0.016	0.023
	(0.125)	(0.126)	(0.191)	(0.151)	(0.235)
ΔTrust		-0.001		0.058	
		(0.037)		(0.045)	
ΔReligious		-0.137	0.278	0.067	0.438
		(0.361)	(0.560)	(0.431)	(0.679)
ΔPublic sector		0.040	0.062	0.029	0.037
		(0.039)	(0.074)	(0.051)	(0.097)
ΔGender equali.		0.019	0.044	0.038	0.050
		(0.035)	(0.063)	(0.044)	(0.084)
ΔCo-responsib.		-0.036	-0.026	-0.031	-0.017
		(0.026)	(0.041)	(0.033)	(0.053)
ΔAnti immigrat.		-0.022	-0.025	-0.015	-0.006
		(0.026)	(0.041)	(0.032)	(0.052)
ΔSexual liberal		-0.077***	-0.074**	-0.063**	-0.094**
		(0.021)	(0.035)	(0.026)	(0.041)
Constant	-1.106***	-1.076***	-1.653***	-0.900***	-1.342***
	(0.261)	(0.264)	(0.389)	(0.311)	(0.470)
Observations	2104	2067	862	1323	598
R-squared	0.01	0.02	0.03	0.02	0.03

Standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Table A2. Difference in moral attitudes toward selling sex.

	(1) Base	(2) Full	(3) Trust	(4) Know 2	(5) Know 2+Trust
Norway	0.098	0.136	0.273	0.142	0.097
	(0.125)	(0.126)	(0.193)	(0.151)	(0.229)
Male	0.007	0.002	0.014	-0.054	-0.054
	(0.122)	(0.122)	(0.186)	(0.148)	(0.221)
Age	0.006	0.005	0.014*	0.004	0.016*
	(0.005)	(0.005)	(0.008)	(0.006)	(0.009)
High education	0.080	0.052	0.436**	0.222	0.337
	(0.127)	(0.127)	(0.200)	(0.154)	(0.239)
Low education	0.039	0.056	0.327	0.187	0.681
	(0.204)	(0.205)	(0.350)	(0.269)	(0.432)
High income	0.173	0.216	0.298	0.202	-0.242
	(0.271)	(0.273)	(0.395)	(0.322)	(0.469)
Low income	0.031	-0.005	0.117	0.024	0.093
	(0.145)	(0.145)	(0.223)	(0.177)	(0.267)
Capital	0.159	0.181	0.311	0.189	0.235
	(0.161)	(0.161)	(0.237)	(0.185)	(0.272)
Cohabit	0.020	-0.004	-0.032	-0.273*	-0.453*
	(0.132)	(0.132)	(0.199)	(0.159)	(0.236)
ΔTrust		-0.005		0.041	
		(0.038)		(0.048)	
ΔReligious		-0.163	-0.182	0.075	0.026
		(0.380)	(0.582)	(0.453)	(0.682)
ΔPublic sector		0.092**	0.039	0.067	-0.024
		(0.041)	(0.077)	(0.054)	(0.098)
ΔGender equali.		0.016	0.089	0.047	0.050
		(0.036)	(0.066)	(0.047)	(0.084)
ΔCo-responsib.		0.001	0.013	0.009	0.076
		(0.027)	(0.042)	(0.035)	(0.053)
ΔAnti immigrat.		-0.026	0.006	-0.028	0.040
		(0.027)	(0.043)	(0.034)	(0.052)
ΔSexual liberal		-0.105***	-0.116***	-0.105***	-0.121***
		(0.022)	(0.036)	(0.027)	(0.042)
Constant	-0.550**	-0.467*	-1.189***	-0.347	-0.753
	(0.274)	(0.276)	(0.406)	(0.328)	(0.473)
Observations	2098	2062	860	1318	597
R-squared	0.00	0.02	0.03	0.02	0.04

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table A3. Difference in attitudes toward criminalization of buying sex.

	(1) Base	(2) Full	(3) Trust	(4) Know 2	(5) Know 2+Trust
Norway	0.014	0.016	0.098***	0.023	0.061
	(0.020)	(0.021)	(0.032)	(0.025)	(0.040)
Male	0.012	0.016	0.055*	0.005	0.060
	(0.020)	(0.020)	(0.031)	(0.024)	(0.038)
Age	0.001	0.001	0.003**	0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
High education	0.014	0.015	0.012	0.000	0.022
	(0.021)	(0.021)	(0.034)	(0.026)	(0.041)
Low education	0.001	-0.005	-0.016	-0.021	0.052
	(0.033)	(0.033)	(0.059)	(0.044)	(0.074)
High income	0.037	0.044	0.054	0.084	0.054
	(0.044)	(0.045)	(0.066)	(0.053)	(0.081)
Low income	0.027	0.024	0.059	-0.012	0.031
	(0.023)	(0.024)	(0.037)	(0.029)	(0.046)
Capital	0.035	0.029	0.011	0.020	0.009
	(0.026)	(0.026)	(0.040)	(0.031)	(0.047)
Cohabit	0.001	-0.002	-0.009	0.005	0.002
	(0.021)	(0.021)	(0.033)	(0.026)	(0.041)
ΔTrust		0.006		0.021***	
		(0.006)		(0.008)	
ΔReligious		-0.027	0.074	-0.151**	-0.036
		(0.061)	(0.097)	(0.075)	(0.117)
ΔPublic sector		0.002	-0.010	0.002	-0.016
		(0.007)	(0.013)	(0.009)	(0.017)
ΔGender equali.		0.002	-0.005	0.007	-0.004
		(0.006)	(0.011)	(0.008)	(0.015)
ΔCo-responsib.		-0.004	-0.008	-0.008	-0.007
		(0.004)	(0.007)	(0.006)	(0.009)
ΔAnti immigrat.		-0.002	-0.010	-0.007	-0.008
		(0.004)	(0.007)	(0.006)	(0.009)
ΔSexual liberal		-0.011***	-0.016**	-0.010**	-0.020***
		(0.004)	(0.006)	(0.004)	(0.007)
Constant	-0.079*	-0.082*	-0.212***	-0.060	-0.160**
	(0.045)	(0.045)	(0.068)	(0.054)	(0.081)
Observations	2103	2063	859	1319	596
R-squared	0.003	0.009	0.035	0.021	0.031

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table A4. Difference in attitudes toward criminalization of selling sex.

	(1) Base	(2) Full	(3) Trust	(4) Know 2	(5) Know 2+Trust
Norway	0.037*	0.037*	0.099***	0.063**	0.068
	(0.021)	(0.022)	(0.035)	(0.027)	(0.042)
Male	0.018	0.018	0.045	0.029	0.064
	(0.021)	(0.021)	(0.034)	(0.026)	(0.041)
Age	0.002**	0.02**	0.003**	0.002**	0.004**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
High education	0.012	0.010	0.000	-0.012	-0.017
	(0.022)	(0.022)	(0.036)	(0.027)	(0.044)
Low education	0.005	0.003	0.012	-0.008	0.066
	(0.035)	(0.035)	(0.063)	(0.047)	(0.079)
High income	-0.036	-0.041	-0.030	-0.073	-0.106
	(0.047)	(0.047)	(0.072)	(0.057)	(0.086)
Low income	0.002	-0.002	-0.012	-0.041	-0.044
	(0.025)	(0.025)	(0.040)	(0.031)	(0.049)
Capital	0.027	0.024	-0.019	0.043	0.001
	(0.028)	(0.028)	(0.043)	(0.033)	(0.050)
Cohabit	-0.003	-0.009	-0.053	-0.046*	-0.110**
	(0.023)	(0.023)	(0.036)	(0.028)	(0.043)
ΔTrust		0.008		0.017**	
		(0.007)		(0.008)	
ΔReligious		-0.062	0.075	-0.139*	0.043
		(0.066)	(0.108)	(0.082)	(0.129)
ΔPublic sector		0.003	-0.001	-0.002	-0.016
		(0.007)	(0.014)	(0.009)	(0.018)
ΔGender equali.		0.004	-0.0027	0.005	-0.005
		(0.006)	(0.012)	(0.008)	(0.015)
ΔCo-responsib.		0.001	-0.002	0.003	0.004
		(0.005)	(0.008)	(0.006)	(0.010)
ΔAnti immigrat.		-0.002	-0.009	0.000	-0.004
		(0.005)	(0.008)	(0.006)	(0.010)
ΔSexual liberal		-0.014***	-0.016**	-0.010**	-0.018**
		(0.004)	(0.007)	(0.005)	(0.008)
Constant	-0.131***	-0.121**	-0.171**	-0.122**	-0.141
	(0.047)	(0.047)	(0.073)	(0.058)	(0.087)
Observations	2087	2048	852	1310	591
R-squared	0.005	0.012	0.031	0.024	0.045

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table A5. Regressions with interaction terms.

	(1) Buying wrong	(2) Selling wrong	(3) Illegal buying	(4) Illegal selling
Norway	0.440	0.816	0.094	0.048
	(0.496)	(0.521)	(0.084)	(0.089)
Male	0.255*	0.046	-0.012	-0.008
	(0.152)	(0.160)	(0.026)	(0.027)
Age	0.026***	0.012*	0.003**	0.003**
	(0.006)	(0.007)	(0.001)	(0.001)
High education	-0.016	0.063	-0.003	0.015
	(0.164)	(0.172)	(0.028)	(0.030)
Low education	-0.209	-0.028	-0.042	0.020
	(0.239)	(0.252)	(0.041)	(0.043)
High income	0.048	0.720	0.083	-0.010
	(0.421)	(0.442)	(0.072)	(0.077)
Low income	0.237	0.128	0.029	-0.002
	(0.170)	(0.179)	(0.029)	(0.031)
Capital	0.113	0.089	-0.002	0.025
	(0.187)	(0.197)	(0.032)	(0.034)
Cohabit	0.070	0.026	-0.018	-0.041
	(0.168)	(0.177)	(0.029)	(0.030)
Age*Norway	-0.017*	-0.015	-0.004**	-0.002
	(0.010)	(0.011)	(0.002)	(0.002)
Male*Norway	-0.204	-0.036	0.065	0.069
	(0.237)	(0.249)	(0.040)	(0.043)
Highe*Norway	0.090	0.010	0.024	-0.009
	(0.244)	(0.257)	(0.042)	(0.044)
Lowe*Norway	0.202	0.046	0.091	-0.066
	(0.428)	(0.450)	(0.073)	(0.077)
Highi*Norway	-0.347	-0.859	-0.081	-0.050
	(0.535)	(0.563)	(0.091)	(0.097)
Lowi*Norway	0.154	-0.280	-0.019	0.004
	(0.290)	(0.306)	(0.050)	(0.052)
Capital*Norway	0.331	0.132	0.092	-0.007
	(0.334)	(0.351)	(0.057)	(0.060)
Cohab*Norway	0.413	-0.035	0.042	0.082*
	(0.252)	(0.265)	(0.043)	(0.045)
Constant	-1.318***	-0.855**	-0.114**	-0.124**
	(0.329)	(0.346)	(0.056)	(0.059)
Observations	2104	2098	2103	2087
R-squared	0.016	0.005	0.009	0.008

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table A6. Difference in attitudes toward prostitution in the Norwegian capital with Sweden as comparison group.

VARIABLES	(1) Buying wrong	(2) Selling wrong	(3) Illegal buying	(4) Illegal selling
Oslo	0.509*	0.289	0.134**	0.041
	(0.288)	(0.322)	(0.054)	(0.058)
Male	0.220	0.039	-0.003	0.000
	(0.135)	(0.151)	(0.025)	(0.0270)
Age	0.022***	0.009	0.003**	0.002
	(0.006)	(0.006)	(0.001)	(0.001)
High education	-0.091	0.019	0.012	0.018
	(0.146)	(0.163)	(0.027)	(0.029)
Low education	-0.167	0.048	-0.030	0.029
	(0.217)	(0.242)	(0.041)	(0.044)
High income	0.112	0.556	0.059	-0.064
	(0.350)	(0.391)	(0.066)	(0.071)
Low income	0.131	0.084	0.018	-0.012
	(0.151)	(0.170)	(0.028)	(0.030)
Capital	0.103	0.150	-0.012	0.022
	(0.173)	(0.193)	(0.032)	(0.035)
Cohabit	0.141	-0.019	-0.010	-0.020
	(0.147)	(0.164)	(0.028)	(0.030)
ΔTrust	-0.017	-0.047	-0.002	0.004
	(0.042)	(0.047)	(0.008)	(0.008)
ΔReligious	0.101	0.185	-0.043	-0.060
	(0.414)	(0.469)	(0.078)	(0.085)
ΔPublic sector	0.069	0.119**	-0.002	0.006
	(0.049)	(0.055)	(0.009)	(0.010)
ΔGender equali.	0.015	-0.017	0.007	0.014
	(0.045)	(0.051)	(0.009)	(0.009)
ΔCo-responsib.	-0.030	0.004	0.001	0.003
	(0.032)	(0.036)	(0.006)	(0.006)
ΔAnti immigrat.	-0.032	-0.037	0.003	0.002
	(0.031)	(0.034)	(0.006)	(0.006)
ΔSexual liberal	-0.062**	-0.068**	-0.012**	-0.012**
	(0.025)	(0.028)	(0.005)	(0.005)
Constant	-1.131***	-0.674**	-0.121**	-0.110*
	(0.297)	(0.332)	(0.056)	(0.059)
Observations	1281	1277	1280	1270
R-squared	0.027	0.016	0.016	0.013

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table A7. Difference in attitudes toward prostitution in the Norwegian capital with Norway as comparison group.

VARIABLES	(1) Buying wrong	(2) Selling wrong	(3) Illegal buying	(4) Illegal selling
Oslo	0.468	0.269	0.088*	0.019
	(0.315)	(0.301)	(0.047)	(0.049)
Male	-0.011	-0.022	0.058*	0.066**
	(0.209)	(0.199)	(0.031)	(0.032)
Age	0.009	-0.002	-0.001	0.000
	(0.009)	(0.008)	(0.001)	(0.001)
High education	0.072	0.050	0.020	-0.000
	(0.207)	(0.197)	(0.031)	(0.032)
Low education	0.087	0.041	0.023	-0.062
	(0.413)	(0.394)	(0.061)	(0.064)
High income	-0.148	-0.122	0.009	-0.071
	(0.383)	(0.365)	(0.057)	(0.060)
Low income	0.319	-0.188	0.011	0.009
	(0.270)	(0.258)	(0.040)	(0.042)
Cohabit	0.463**	-0.065	0.019	0.030
	(0.215)	(0.205)	(0.032)	(0.033)
ΔTrust	-0.006	0.056	0.020**	0.015
	(0.065)	(0.063)	(0.010)	(0.010)
ΔReligious	-0.409	-0.370	0.0450	0.037
	(0.615)	(0.587)	(0.092)	(0.095)
ΔPublic sector	0.040	0.081	0.006	-0.001
	(0.063)	(0.060)	(0.009)	(0.010)
ΔGender equali.	0.019	0.032	-0.002	-0.004
	(0.053)	(0.051)	(0.008)	(0.008)
ΔCo-responsib.	-0.026	0.018	-0.009	-0.001
	(0.042)	(0.040)	(0.006)	(0.006)
ΔAnti immigrat.	-0.043	-0.023	-0.009	-0.005
	(0.047)	(0.045)	(0.007)	(0.007)
ΔSexual liberal	-0.092**	-0.141***	-0.008	-0.015**
	(0.039)	(0.037)	(0.006)	(0.006)
Constant	-0.809*	0.025	-0.016	-0.068
	(0.426)	(0.406)	(0.063)	(0.066)
Observations	888	887	885	879
R-squared	0.019	0.023	0.024	0.019

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Paper II

Gender and overconfidence: are girls really overconfident?*

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Previous research finds that people are overconfident, and that men are more overconfident than women. Using a very precise confidence measure, this article shows however, that while boys are overconfident, girls are actually underconfident regarding their mathematics performance. We conducted a survey where 14 year old high school students were asked what grade they thought they would get in a mathematics test a week later. These results were then compared to their actual grade. Boys were overconfident about their grades, while girls were underconfident.

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I. Introduction

That people tend to overestimate their abilities is well documented (e.g., Croson and Gneezy 2009). Men also tend to be more overconfident than women (Estes and Jinos 1988; Soll and Klayman 2004; Niederle and Vesterlund 2007). However, Nekeby et al., (2008) find that women who self-select into a male-dominated environment may be at least as overconfident as men.

In this study, we asked 14 year old Swedish high school students what grade they thought they would get in a mathematics test a week later. These results were compared to their actual grade and we find evidence of boys being overconfident, while girls are underconfident. Compared to previous research we have a very good measure of confidence, where we can really measure if the respondents perform better or worse that they believe.

Our study is a complement to previous research in the fact that we study young subjects in a society characterized by a high degree of gender equality.[1] Also, we partly contest previous results because we actually find that girls are underconfident regarding their mathematics performance, while previous studies find that also women tend to be overconfident, although less so than men (Estes and Jinos 1988; Soll and Klayman 2004; Niederle and Vesterlund 2007). This finding is important since it may help to explain why women tend to be underrepresented in certain educations and types of work, as such it may help to explain the gender wage gap and labor market segregation. Also, it points to the importance of making school children better aware of their abilities.

II. Data and Results

Our sample consists of 78 students (43 girls and 35 boys) aged 14 in a high school in Karlstad in Sweden. The students were asked what grade they thought they would get in a mathematics test a week later. The question was *On the upcoming exam in*

[1] E.g. The Global Gender Gap Report 2008 ranks Sweden as the third most gender equal country in the world, see also Jakobsson and Kotsadam (2010).

mathematics, what grade do you expect to get? The answers to the question are presented in Table 1. As we can see, 47% of the girls and 63% of the boys thought they would get one of the two highest grades (VG or MVG) on the exam. Actually, no girls thought they would get the highest grade on the exam.

Table 1. Students estimation of their grade on the upcoming exam, in per cent

	Fail (IG)	Pass (G)	Good (VG)	Very good (MVG)	Total	Observations
Total sample	3	44	51	3	100	78
Girls	2	51	47	0	100	43
Boys	3	34	57	6	100	35

A week later, the students took the mathematics exam and the actual grades are presented in Table 2. As we can see, 56% of the girls and 49% of the boys got one of the two highest grades on the exam (VG or MVG).

Table 2. Actual grade on the exam, in per cent

	Fail (IG)	Pass (G)	Good (VG)	Very good (MVG)	Total	Observations
Total sample	5	42	45	8	100	78
Girls	2	42	47	9	100	43
Boys	9	43	43	6	100	35

Tables 1 and 2 give at hand that there seems to be a difference in the estimated grade and the actual grade, where girls underestimate their grade and boys seem to overestimate it. From this information we constructed a confidence measure (Confidence) that measures if the respondent underestimates, correctly estimates or overestimates test performance. If the respondent thought she would get a higher grade than she actually got on the exam the variable was coded as -1, if she thought she would get the same grade as the grade she actually got the variable was coded as 0, if the respondent overestimated her grade it was coded as 1. The distributions for the total sample, girls, and boys respectively are shown in Table 3. Here we see clear indications that girls tend to underestimate their mathematical ability, whereas boys tend to overestimate their ability.

Table 3. Distribution of Confidence, in per cent

	Underestimate	Correct estimate	Overestimate	Total	Observations
Total sample	18	67	15	100	78
Girls	23	72	5	100	43
Boys	11	60	29	100	35

In order to statistically confirm these differences we run an ordered probit regression with Confidence as the dependent variable. Marginal effects after ordered probit are presented in Table 4.

Table 4. Marginal effects after ordered probit

	Underestimate	Correct estimate	Overestimate
Boys	-0.182***	0.007	0.175***
	(0.066)	(0.047)	(0.068)

78 observations, Pseudo R2=0.058, log likelihood=-63.683.
Standard errors in parenthesis.
*** significant at 1%.

As compared to girls, boys are associated with a statistically significant 18 percent lower probability to underestimate their test grade, as well as an 18 percent higher probability to overestimate it.[2] Thus, we find clear evidence of overconfidence among boys, and underconfidence among girls

III. Discussion

Previous research find that people generally are overconfident in as diverse arenas as investment decisions, running, answering quiz questions, and in solving fictitious mathematical problems. And while both men and women are overconfident, men are generally more overconfident than women. This article shows, however, that while boys are overconfident, girls are actually underconfident regarding mathematics knowledge. We conducted a survey where high school students were asked what grade they thought they would get in a mathematics test a week later. These results were then compared to their actual grade. Boys were overconfident about their grade, while girls were underconfident.

Finding this result in a particularly gender equal country with young participants is somewhat surprising. Previous research has found that more men than women describe themselves as competitive, and that this described difference increases with age (e.g., Campbell 2002), while Dreber et al. (2009) find no difference in competitiveness among young Swedish boys and girls. This lack of gender

[2] Using ordered logit regressions does not change the results (available upon request).

difference does not seem to carry over to overconfidence. Confidence is important for labour market outcomes and our result give an additional reason for the gender wage gap in Sweden. Moreover, although Sweden has a large degree of gender equality as compared to other countries, its labour market is highly segregated which is often explained by referring to the high level of female employment to start with. While this is probably the most important reason, our results suggest a complementary mechanism of self-selection due to different levels of confidence.

More research is needed with respect to under which conditions this stereotype about confidence is correct regarding actual behavior. There is also room for research on the extent that the culture may matter in this respect.

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Paper III

A field experiment of discrimination in the Norwegian housing market: sex, class, and ethnicity[a]

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Abstract

We test for gender, class, and ethnical discrimination in the Norwegian rental housing market, using fake application letters. Females, individuals with high job status, and ethnical Norwegians are more likely to receive positive call-backs. For example, being an Arabic man, working in a warehouse is associated with a 25 percentage points lower probability of receiving a positive response when showing interest in an apartment as compared to an ethnically Norwegian female economist. We conclude that gender, class, and ethnic discrimination exist in the Norwegian rental housing market, and ethnic discrimination seems to be most prevalent.

JEL: J71, R21

Keywords: discrimination, field experiment, housing market, sex, class, ethnicity

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I. Introduction

Ethnic discrimination in different types of markets is well documented across many countries (List 2004; Riach and Rich 2002) and its effects are found to be severe and the inequalities are further reproduced by the change in behaviour of the discriminated groups (Parsons et al., forthcoming). Although it is known that men and ethnic minorities are discriminated against in the housing market (see for instance Ahmed and Hammarstedt 2008) no study has so far investigated multiple-discrimination in this market. A common argument is, however, that the intersection of social attributes is important for the prevalence and magnitude of discrimination (e.g. Ruwanpura 2008). In this paper, multiple-discrimination (sex, class, and ethnic) in the Norwegian housing market is investigated by a field experiment on the Internet.

We use a field experiment in order to estimate parameters that would otherwise be impossible to evaluate (Banjeree and Duflo 2009). Most previous field studies on discrimination in the housing market have used audit studies with personal testers (e.g. Riach and Rich 2002 and Ondrich et al., 1999). This type of studies may suffer a bias since it is almost impossible to erase all the differences between testers and since such experiments are not double blind, i.e., testers are usually aware of the purpose of the study, which may affect how they act (Heckman 1998). Additionally, the variables of main interest (e.g. sex and ethnicity) are not assigned randomly (List 2004).

To overcome these problems we use correspondence tests with written applications, as has been done previously by one Spanish, one American, and two Swedish studies (Bosch et al. 2010; Carpusor and Loges 2006; Ahmed and Hammarstedt 2008; Ahmed et al., 2010). All these studies find that ethnic discrimination is a feature of housing markets. Ahmed and Hammarstedt (2008) also investigate gender discrimination and find that Swedish males are discriminated against as compared to Swedish women. Bosch et al. (2010) also integrate immigrant females and distinguish between applicants only signalling their name and those signalling a high status job. Our study is the first to integrate class differences and see how they relate to sex and ethnicity in discrimination practices at the housing market.

The paper proceeds as follows. The next section, Section II, presents the experimental design. Section III presents the empirical results, and Section IV concludes the paper.

II. Experimental design

The experimental design closely follows the design in Ahmed and Hammarstedt (2008), Ahmed et al., (2010), and Carpusor and Loges (2006). Between December 15 2009 and March 20 2010 we applied for 950 advertised apartments on the largest buy and sell site in Norway (www.finn.no). Private landlords announce apartments and we responded to ads from all over Norway. We use fictitious applicants whose names reflect male and female ethnical Norwegian, as well as one Arabic male and one Arabic female. An innovation of this study is to integrate socioeconomic class and we let our four names be either economists or warehouse workers. In total, eight fictitious applicants were created and randomly send out allowing us to analyze differences in positive call back rates (see Table 1).

Table 1: Definition of variables and share of positive answers

Dependent variable	**Explanation**	**Share of positive answers**
Positive	1 if invited to further contacts or a showing	0.558
Main independent variables		
Man	1 if man	0.523
Woman	1 if woman	0.595
Norwegian	1 if Norwegian	0.621
Arab	1 if Arab	0.494
Economist	1 if economist	0.589
Warehouse	1 if warehouse worker	0.524
Indicator variables		
Hanne economist	1 if woman, Norwegian, and economist	0.685
Hanne warehouse	1 if woman, Norwegian, and warehouse	0.628
Håvard economist	1 if man, Norwegian, and economist	0.610
Håvard warehouse	1 if man, Norwegian, and warehouse	0 .559
Mohammed economist	1 if man, Arab, and economist	0.492
Mohammed warehouse	1 if man, Arab, and warehouse	0.435
Fatima economist	1 if woman, Arab, and economist	0.571
Fatima warehouse	1 if woman, Arab, and economist	0.476

We created eight fictitious applicants by creating e-mail addresses of the form name.surname74@gmail.com. For these applicants, two Arabic and two Norwegian economists of different sex and two Arabic and two Norwegian warehouse workers of different sex, we used eight similar application letters of the form:

"Hi,
My name is X and I am 35 years old. I would like to sign up as interested in renting the advertised apartment. I am an economics graduate and I have been working as an advisor at a bank for eight years. (I work at a warehouse where I have had a fixed term contract for eight years). I am single, no children, non-smoking, and no payment complaints. Good references are available.
Sincerely, X"

X = Fatima Rashid, Hanne Heimstad, Mohammed Rashid, Håvard Jørgensen

Hence, the only relevant variables that vary between the applications are the names, signalling the ethnicity and gender of the applicants, as well as explicitly stating where the applicant works (bank vs. warehouse). The application procedure was then completely randomized and each landlord received one letter from one randomly selected fictitious applicant. In order not to infer extra costs on people we replied and rejected offers within three days.

III. Empirical analysis

Previous studies have found that women receive more positive answers than men (e.g. Ahmed and Hammarstedt 2008), and we expect to find the same in Norway. We also expect to find that Norwegians receive more positive answers than Arabs, and finally we expect economists to get more positive answers than warehouse workers.

These hypotheses are in line with the differences in positive answers shown in Table 1. In Table 2 we test if the differences in response rates between the groups are significant and the hypothesises outlined above cannot be rejected. The magnitudes of the differences are substantial. The probability of receiving a positive response is lowered by about 7 percentage points if the applicant is a man, by 13 percentage points if the applicant has an Arab sounding name, and by 7 percentage points if the applicant is a warehouse worker. The effects of ethnical discrimination are almost twice as big as the effects of gender and class discrimination so ethnicity is clearly of most importance for discrimination on the Norwegian housing market.

Table 2: Differences in the shares of positive responses

		Difference
Women 0.595	Men 0.523	0.072**
Norwegians 0.621	Arabs 0.494	0.127***
Economists 0.589	Warehouse 0.524	0.065**

Significant difference between the two groups in a two-sided test of the equality of proportions. *** p<0.01, ** p<0.05.

To further exploit the data we look into the differences in positive replies more closely in Table 3. The gender effect found in the total sample is also found for ethnic Norwegians; the Norwegian woman gets about 7 percentage points more answers than the Norwegian man (statistically significant at 10 percent). The Arab woman get about 6 percentage points more answers than the Arab man, but this difference is not statistically significant. Exploring the difference found between Norwegians and Arabs in the total sample further, we see that the effect is large both for women and men (13 and 12 percentage points respectively) and statistically significant at 1 percent. A higher socioeconomic class (signalled via being an economist instead of a warehouse worker) raises the response rate for Arabs with 8 percentage points (significant at 10 percent), for Norwegians the effect is 6 percentage points but not statistically significant. Also when looking at these subgroups, effects of ethnical discrimination are almost twice as big as the effects of gender and class discrimination.

Table 3. Differences in the shares of positive responses for subgroups

		Difference
Norwegian man 0.585	Norwegian woman 0.658	0.073*
Arab man 0.464	Arab woman 0.527	0.063
Norwegian woman 0.658	Arab woman 0.527	0.131***
Norwegian man 0.585	Arab man 0.464	0.121***
Arab economist 0.531	Arab warehouse 0.454	0.077*
Norwegian economist 0.648	Norwegian warehouse 0.593	0.055
Norwegian warehouse 0.593	Arab economist 0.531	0.062

Significant difference between the two groups in a two-sided test of the equality of proportions. *** p<0.01, * p<0.10.

By comparing across sexes and occupations we can gain an increased understanding of the differences in opportunities between Norwegians and Arabs in the Norwegian housing market. While having a higher status job increases your chances at the housing market for both Arabs and Norwegians (see Table 3), it is not enough to compensate for the negative effect of having an Arab sounding name, since Arab economists receive fewer positive responses (0.531) than their Norwegian peers working in a warehouse (0.593), this difference is though not statistically significant. This is a further indication of ethnical discrimination being more substantial than class based discrimination.

Turning to the differences between the eight applicants we see large differences but not that many differences are statistically significant, probably because of small sample size in each subgroup (see Table A1 in the Appendix). For example, being called Mohammed and working in a warehouse is associated with a statistically significant 25 percentage points lower probability of receiving a positive response when showing interest in an apartment as compared to the most favoured applicant, the Norwegian female economist.

Finally, previous studies (Ahmed et al. 2010; and Bosch et al. 2010) have tried to separate between statistical (Phelps 1972) and taste based discrimination (Becker 1957) by varying the degree of information signalled. These studies cannot rule out that taste based discrimination is important since they find substantial discrimination also when including information about marital status, employment, age, experience, and education in the application letters. Since we also include this information in our application letters we have tried to control for statistical discrimination in some dimensions. With our data we cannot really rule out any kind of discrimination, but the fact that the Arab bank advisor receives significantly more responses than the Arab warehouse worker is at least an indication that it is not only taste-based discrimination.

IV. Discussion

This study is the first to investigate how sex, socioeconomic class, and ethnicity are interrelated in discrimination practices at the housing market and the results are

disappointing. Similar to earlier studies we find extant discrimination against people with Arab names. We can also conclude that gender and class discrimination are present in the Norwegian rental housing market. The probability of receiving a positive response is lowered by about 7 percentage points if the applicant is a man, by 13 percentage points if the applicant has an Arab sounding name, and by 7 percentage points if the applicant is a warehouse worker. This indicates that ethnic discrimination is more substantial than discrimination by sex or class.

When integrating the three dimensions the magnitudes of decreased opportunities in the housing market for already disadvantaged groups is staggering. Mohammed, who is working in a warehouse has a 25 percentage points lower probability of receiving a positive response when showing interest in an apartment as compared to the most favoured applicant, the Norwegian female economist.

A limitation with our study (as well as for other similar studies of discrimination in the housing market) is that we signal ethnicity via the use of names, thus the results may not generalize to individuals with the same ethnicity but with another name. Another limitation is that we only consider discrimination in the response stage, but we do not consider discrimination at the showing stage. Thus, we do not know if discrimination at the actual decision of who gets the apartment is smaller or larger than what we find. Yet, our findings are important since it is the first to investigate multiple-discrimination in the housing market.

To gain further knowledge about discrimination on the housing market the next step would be to gather more data. This would enable us to explore the intersection of social attributes (sex, class, and ethnicity) in more dept. It would also be fruitful to integrate information about the landlords and apartments into the analysis (e.g., sex, ethnicity, type and cost of apartment). Considering the substantial discrimination we find this should be done in future research. To compare the prevalence of discrimination between different regions may also give indications on to which extent discrimination on the housing market correlates with region characteristics like prejudice against immigrants.

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Appendix

Table A1. Differences in the shares of positive responses for the different applicants

	Hanne economist	**Hanne warehouse**	**Håvard economist**	**Håvard warehouse**	**Fatima economist**	**Fatima warehouse**	**Mohammed economist**	**Mohammed warehouse**
Hanne economist	0.685 0.685							
Hanne warehouse	0.685 0.628	0.628 0.628						
Håvard economist	0.685 0.610	0.628 0.610	0.610 0.610					
Håvard warehouse	0.685 0 .559**	0.628 0 .559	0.610 0 .559	0 .559 0 .559				
Fatima economist	0.685 0.571*	0.628 0.571	0.610 0.571	0 .559 0.571	0.571 0.571			
Fatima warehouse	0.685 0.476***	0.628 0.476**	0.610 0.476**	0 .559 0.476	0.571 0.476	0.476 0.476		
Mohammed economist	0.685 0.492***	0.628 0.492**	0.610 0.492*	0 .559 0.492	0.571 0.492	0.476 0.492	0.492 0.492	
Mohammed warehouse	0.685 0.435***	0.628 0.435***	0.610 0.435***	0 .559 0.435*	0.571 0.435**	0.476 0.435	0.492 0.435	0.435 0.435

Significant difference between the two groups in a two-sided test of the equality of proportions.
*** p<0.01, ** p<0.05, * p<0.10.

Paper IV

What explains attitudes toward prostitution?*

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May, 2010

Abstract

We assess people's attitudes toward prostitution in Norway and Sweden, two countries that have made it illegal to buy sex. The laws were, however, put in place in different time-periods and embedded in different market structures and discourses. Compared to previous research, the present study is the first to use methods that can shed light on attitudes toward various aspects of prostitution while controlling for other factors. We find that men and sexual liberals are more positive toward prostitution, and that conservatives and those who support gender equality are more negative. Holding anti-immigration views is correlated with more positive attitudes toward buying, but not toward selling, sex. Norwegians are more positive than Swedes toward prostitution. It is also found that supporting gender equality has more explanatory power in Sweden than in Norway, and it is argued that this may be due to the gender equality framing of the Swedish debate.

Keywords: attitudes, norms, prostitution
JEL classification: I28, J88, K14

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1. Introduction

Prostitution[1] is seen as a problematic issue in most countries. States have tried to control prostitution in various ways, and most have adopted some sort of policy to support the efforts (Joyce Outshoorn 2004). In Norway and Sweden, prostitution is clearly perceived as a challenge (Charlotta Holmström and May-Len Skilbrei 2008). In Sweden, it has been illegal to buy sex, but not to sell, since 1999. In January 2009, Norway followed the example of its Nordic neighbor and went from a situation where it was legal to both buy and sell sex to making buying illegal. As these two countries are the first in the world to implement this kind of law, investigating the attitudes toward prostitution among Swedes and Norwegians is of great interest.[2] Comparing Norway and Sweden is also important since their policy histories regarding prostitution differ.

What shapes people's attitudes toward prostitution? Is there a difference between their attitudes toward buying and selling sex? Do views on gender equality play a role? These questions are central in this paper, which focuses on people's attitudes toward prostitution. Understanding these attitudes is important for understanding behavior in this hidden market. Also, comparing attitudes in two similar countries will give clues on how differences in policy regimes may interact with attitudes. Using a large dataset collected in 2008, which includes more than 3,500 Swedish and Norwegian respondents, we are able to study attitudes toward both buying and selling sex in a controlled regression setting.

Within feminist scholarship there is a division between those who see prostitution as harmful for a woman since she thereby contracts away freedom and sexuality, and those who see it as harmful because society generates a stigma via the double standards of sexual morality (Laurie Shrange 2007). These two positions render different normative conclusions on the legal framework surrounding prostitution, where the second one may imply that criminalization further stigmatizes sellers. Outshoorn (2004) identifies the two major opposing positions within the feminist debate on prostitution as one that views prostitution as "sexual domination and the essence of women's oppression" and one ("the sex-work

[1] We use the terms prostitution and buying/selling sex interchangeably. We do not intend to take a stance in the debates on this issue via our choice of labels.
[2] Also Iceland criminalized buying sex, but not selling, in April 2009 (ProCon.org, 2009).

position") that views it as work (Outshoorn 2004: 9). These two positions are thought to lead to opposing policy aims; i.e., the first position wants criminalization of the third parties profiting from prostitution (prostitutes are seen as victims and thereby not liable) while the second calls for decriminalization. There are clear differences among countries in terms of the weights of these two positions in the prostitution discourse. In the US, there is a tendency to favor the sex-work view, at least among academic feminists (Susan A. Basow and Florence Campanile 1990), yet maybe not among feminists in general (Basow and Campanile 1990). In Europe, feminists in Germany and the Netherlands clearly favor the sex-work view, whereas Swedish feminists are generally found at the other end of the spectrum (Petra Östergren 2006). The Swedish debate before the enactment of the law even included a polarization toward the "permissive attitude" within the EU (Yvonne Svanström 2004; Don Kulick 2003; and Östergren 2006).

As in the case of the gender equality discourse (Niklas Jakobsson and Andreas Kotsadam 2010; Mari Teigen and Lena Wängnerud 2009; and Trude Langvasbråten 2008) Norway and Sweden seem to differ in the prostitution discourse in that Swedes lean toward radical feminism and Norwegians toward liberal feminism.[3] For example, the Swedish point of departure has been that prostitution is violence against women, which is a common argument in the radical feminist discourse (Annelie Siring 2008). This tendency has also been clear in Swedish research that has looked at prostitution in light of unequal relations between the sexes. In Norway, on the other hand, the focus has rather been on personal problems and economic inequalities (Holmström and Skilbrei 2008). This can also be seen when looking at the policy histories of the two countries. In Sweden, the support for the view that prostitution is patriarchal oppression of women was strong among feminists within the ruling political parties in the years preceding the criminalization of buying sex. Interestingly, the 1998 government bill suggesting a criminalization of the buyer was part of the Violence against Woman Act. In contrast, the sex-work view did not have any influence on Swedish parliamentarians although the position was heard in the media debate (Svanström 2004).

[3] Liberal feminism focuses on changing individual female behavior to advance gender equality, while radical feminism centers around the proposition that men dominate women and that this power relation must be eliminated (Teigen and Wängnerud 2009).

Attitudes are likely to affect the demand for and supply of prostitution, and changed attitudes are therefore policy aims in both countries. According to Kulick (2003), the purpose of the Swedish law was "...to 'mark a stance' or 'send a message' that 'society' did not accept prostitution..." (p. 203). Della Giusta, Di Tommaso and Strøm (2008) argue that social stigma is an important determinant of the quantity of sex supplied and demanded. The stigma comes from a moral judgment, and since individuals care about their social standing in society, they face potential reputation losses from buying or selling sex. George Akerlof (1980) argues that the utility of an agent performing an activity depends on the beliefs and actions of other members of society. More specifically, he claims that reputation depends on adherence to a code of behavior and the proportion of the community members who support the code. Prostitution is stigmatized to different degrees in different societies, leading to different market equilibria in different countries (Della Giusta, Di Tommaso and Strøm 2008). All else equal, reduced stigmatization increases the marginal net gain of supplying sex as well as the marginal willingness to pay for it. Conversely, increased stigmatization reduces the marginal willingness to buy and sell, hence reducing the equilibrium quantity exchanged. Violations of norms may lead to sanctions like stigmatization or feelings of guilt (Richard H. McAdams and Eric B. Rasmusen 2006).

Understanding attitudes toward buying and selling sex among the general public helps us understand the degree of social stigma associated with buying and selling sex. More negative attitudes in the general public should theoretically lead to an increased stigma and thereby decrease both supply and demand. Hence, an understanding of attitudes helps us understand incentives and thereby market behavior. Empirically, value judgment variables have been shown to affect demand for sex among arrested male clients (Della Giusta, Di Tommaso and Strøm 2008), and in this paper we investigate values among the general population in two different countries. Understanding the attitudes toward the market is important in order to be able to assess the possibilities of implementing different legal structures and to assess the effects these structures may have. In Norway and Sweden, this is especially important since one of the main aims in both countries is to change attitudes and thereby decrease demand (Proposition 1997/98:55; Holmström and Skilbrei 2008; Norwegian Ministry of Justice 2008; and May-Len Skilbrei 2008). To credibly evaluate this aim, knowledge about attitudes before the reform is crucial.

The present paper is an important contribution to the prostitution literature since it uses a larger and more representative sample than previous related studies. Understanding attitudes among the general public is important since these attitudes affect the stigmatization which in turn affects incentives and behavior. Using regression analysis, we can reduce the bias inherent in other comparisons by controlling for confounding variables. As opposed to the previous statistical analyses in this field, we can hence shed further light on attitudes toward different aspects of prostitution (moral attitudes toward buying and selling, as well as attitudes toward criminalization). Our main findings are that men and sexual liberals are more positive toward prostitution, that both conservatives and those supporting gender equality are more negative toward prostitution, and that holding anti-immigration views is correlated with more positive attitudes toward buying sex. This is also the first paper to compare attitudes toward prostitution in Norway and Sweden, and a main finding in this regard is that Norwegians are more positive than Swedes toward prostitution, also when controlling for other factors that may affect attitudes toward prostitution. It is also found that promoting gender equality has more explanatory power in Sweden than in Norway, which may be due to the gender equality framing of the Swedish prostitution debate.

2. Previous research

The economics literature on prostitution is still sparse, although it has grown some in recent years (e.g. Samuel Cameron, Alan Collins and Neill Thew 1999; Lena Edlund and Evelyn Korn 2002; and Rocio Albert, Fernando Gomes and Yanna Gutierrez Franco 2007). Available studies have mainly focused on pricing, and more exactly on pricing as a reflection of risk preferences (Samuel Cameron and Allan Collins 2003; Vijayendra Rao, Indrani Gupta, Michael Lokshin and Samarajit Jana 2003; Peter G. Moffat and Simon A. Peters 2004; Paul Gertler, Manisha Shah and Stefano M. Bertozzi 2005; Steven D. Levitt and Sudhir Alladi Venkatesh 2007; and Arunachalam Raj and Manisha Shah 2008). These previous studies try to assess supply and demand in the market for prostitution, but scholars have to some extent also studied attitudes toward prostitution. Marina Della Giusta, Maria Laura Di Tommaso and Steinar Strøm (2008; 2009) model the market for prostitution and estimate the demand for prostitution among arrested male clients, and find that the demand increases if the client has a full-time job, is non-white, or is not married. Value judgment variables also seem to play a role for demand: the more a client accepts gender violence in

general and the more he is against sex-work, the less he demands, and the more he believes that sex workers like their job, the more he demands. However, the focus in previous economics studies has been on clients and not on the general population, although studying attitudes toward buying and selling sex in the general population should be of importance since the market is embedded in a broader societal context. The social structures and legal setting under which it functions is affected by, and also affects, people's attitudes.

A few previous studies within other branches of social sciences look at attitudes toward prostitution among the general public. Basow and Campanile (1990) use a sample of 89 undergraduate psychology students in the US and argue that attitudes toward rape and attitudes toward prostitution are related, as are attitudes toward women in general. Since their sample is small and only consists of students, and since other factors that may affect attitudes toward prostitution are not controlled for, the results are difficult to generalize. Ann Cotton, Melissa Farley and Robert Baron (2002) use a sample of 743 university undergraduates at four US universities and find a link between acceptance of "rape myths" (e.g., agreeing with "to dress in challenging clothes makes women who become sexually abused co-responsible") and attitudes toward prostitution. Their study has the same flaws as Basow and Campanile's, except that the sample size is larger.

The most comprehensive study to date of attitudes toward prostitution was carried out by Jari Kuosmanen (2008). His survey was sent out to a random sample of 2,500 Swedes aged 18-74. Only 45.4 percent responded, leading to a final sample of 1,134 people. He finds more support for the current Swedish law among women and younger respondents, and that higher education seems to only affect women's attitudes. Before Kuosmanen's (2008) study, there were three others (in 1996, 1999, and 2002) that looked at attitudes toward prostitution in Sweden (for a comprehensive review of these, see Kuosmanen 2008). To sum up their results, there seems to be more support for criminalization of both buying and selling sex following the introduction of the law, and women are more positive toward criminalization than men. There have also been a few investigations of attitudes toward prostitution in Norway ordered by the press (for full coverage and a discussion, see Jahnsen 2008). However, it is often unclear what the exact questions were, how many respondents they involved, and how the respondents were selected. Nonetheless, Jahnsen (2008) finds some

interesting regularities. Women, as well as those living in the capital region, seem to be more in favor of a criminalization of buyers. The correlation between age and views on criminalization is ambiguous. It is also found that feminists, left-wing sympathizers, and Christians are more in favor of criminalization than market liberals. The main problems with these studies on Sweden and Norway, however, are that they only consist of descriptive summary statistics and that the definitions of variables are not always clearly presented.

3. Hypotheses

We try to assess some previously suggested hypotheses in the prostitution literature, and also propose some additional ones. Cotton, Farley and Baron (2002) argue that "men might support prostitution because men are more likely to believe that male sexual urges are an imperative" (p. 1793). We too expect men to be more positive towards prostitution than women since this has been found in previous studies, but we do not speculate about the reason for this.

In the international debate and research on prostitution, it is often suggested that opposition to prostitution is grounded in a conservative world view – specifically in the view that non-reproductive extramarital sex is immoral (e.g., Della Giusta, Di Tommaso and Strøm 2008). It is important to highlight this issue in a Nordic context since the gender equality debate differs radically in this respect from the international discourse (Östergren 2006). We hypothesize that opposition to prostitution can be based on very different world views. A feminist can for instance see prostitution as violence against women in a patriarchal society, and we propose that people believing that gender equality is important are more inclined to view buying sex as immoral. Following previous research, moral conservatives are expected to be against both buying and selling sex (Rocio Albert, Fernando Gomez and Yanna Gutierrez Franco 2007), which is also suggested by the fact that the Swedish Christian Democrats wanted a criminalization of both buyers and sellers (Svanström 2004).

It has also been argued that racism is a key factor in explaining different perceptions about prostitution (Della Giusta, Di Tommaso and Strøm 2008; Melissa Farley and Vanessa Kelly 2000). The usual hypothesis is that racists have a different view of (foreign) prostitutes and that this "othering" is used to justify buying sex. Note that we have no hypothesis on the

relationship between racism and attitudes toward selling sex. The hypothesized attitudes of racists can be explained in at least two possibilities ways: (i) Racists may be against people coming to the country they live in to sell sex, and/or (ii) the "othering" mechanism might imply that racists feel that foreign prostitutes are different and they (racists) therefore tend to care less about, or even legitimize, the possibly deprived situations that prostitutes often find themselves in.

Moreover, previous research (e.g., Cotton, Farley and Baron 2002) has suggested that "rape myths" are important in explaining attitudes toward prostitution. "Rape myths" are a collection of opinions that are said to normalize violence against women (Basow and Campanile 1990). As suggested by previous literature, we expect there to be a positive correlation between acceptance of *rape myths* and thinking it is morally acceptable to both buy and sell sex. That is, people who embrace attitudes that normalize violence against women should be more positive toward prostitution.

We expect there to be a difference between Sweden and Norway reflected in, or possibly due to, their different legal histories, and we propose that Swedes are more negative toward buying sex than Norwegians; i.e., Sweden may have made buying sex illegal earlier than Norway as a result of being more negative toward buying sex. Alternatively, living under this law for several years may have made them more negative toward buying sex.

Concerning the differences between Norway and Sweden, we have two other specific hypotheses. Jahnsen (2008) analyzes the Norwegian media debate (about 500 newspaper articles) on criminalization of sex buyers in 2006 and 2007 and find that there are clear differences compared to the Swedish debate in that the Norwegian debate was not framed in a discourse of gender equality. We therefore hypothesize that those supporting gender equality should have more negative attitudes toward prostitution in Sweden. Regarding the market structure, an important Norwegian feature is the larger share of street prostitutes who are foreigners (especially Nigerian), at least before the Norwegian law was implemented and at the time our data was collected (Tveit and Skilbrei 2008). These foreign women have also been central in the Norwegian prostitution debate (Jahnsen 2008), hence we

hypothesize that the link between anti-immigration views and attitudes toward buying sex is more pronounced in Norway than in Sweden.

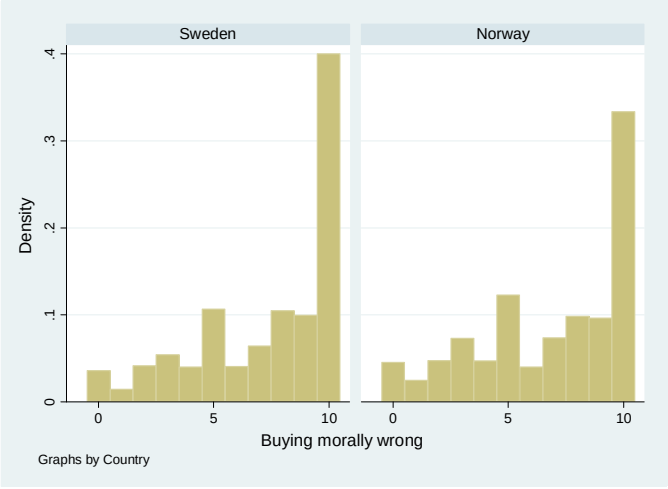
4. Data and descriptive statistics

We use survey responses from an Internet-based survey sent out in August 2008 to a random sample of 2,500 Norwegians and 3,000 Swedes aged 15--65. By the end of the survey period, 1,716 Norwegians (68.6 percent) and 1,815 (60.5 percent) Swedes had responded. TNS Gallup was hired to conduct the survey (www.tns-gallup.se/summary.aspx), which was sent to a random sample of Swedes and Norwegians participating in the Nordic internet panel "Nordic Forum Omnibus," administered by TNS Gallup. The panel consists of 130,000 individuals recruited via representative samples of Swedes and Norwegians (through mail and telephone) who volunteered to participate in surveys. The respondents had three weeks to answer the survey, and they received two reminders.

The survey included four main questions on people's attitudes toward prostitution. More exactly, the respondents were asked whether they think it is morally acceptable or morally unacceptable to buy sex and to sell sex respectively. They responded on a 0-10 scale, where 0 implied *morally acceptable* and 10 implied *morally unacceptable*. The respondents were also asked whether they think it should be illegal to buy sex and sell sex respectively; here the possible answers were *yes* and *no*.

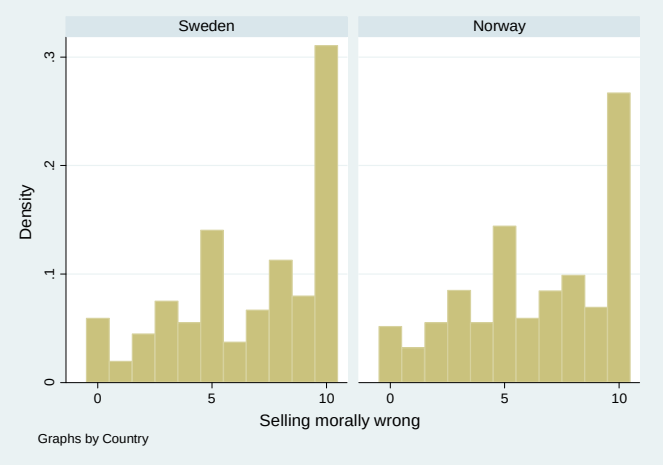
Figures 1 and 2 show the variation in the responses to the questions on attitudes toward prostitution with histograms for each country separately. As can be seen, there is variation in the expressed attitudes, not only within each country but also between the countries, with Swedes being more skeptical toward prostitution. A Wilcoxon rank-sum test gave at hand that the difference between Norway and Sweden is statistically significant at the 1 percent level regarding moral attitudes toward buying sex, and at the 5 percent level regarding moral attitudes toward selling sex. The distributions are clearly skewed to the left (measures of skewness -0.777 and -0.482 respectively), meaning that overall, most respondents believe both buying and selling sex is at least somewhat immoral.

Figure 1. Distribution of attitudes toward buying sex



Attitudes toward buying sex is measured by the answer to the question "*In your opinion, is it morally acceptable or morally unacceptable to buy sex?"* ranging from 0 for *Totally morally acceptable* to 10 for *Totally morally unacceptable.*

Figure 2. Distribution of attitudes toward selling sex



Attitudes toward selling sex is measured by the answer to the question "*In your opinion, is it morally acceptable or morally unacceptable to sell sex?"* ranging from 0 for *Totally morally acceptable* to 10 for *Totally morally unacceptable.*

Table 1 shows the variation in whether it should be illegal to buy and sell sex. A difference between Norwegians and Swedes is evident here as well: In Sweden, 62.6 percent think it should be illegal to buy sex, while in Norway 53.2 percent do. Also, in Sweden 54.2 percent think it should be illegal to sell sex, while in Norway 47.9 percent do. A Wilcoxon rank-sum test gave at hand that the difference between Norway and Sweden is statistically significant at the 1 percent level for both "*Criminalize buying*" and "*Criminalize selling.*"

Table 1. Attitudes toward the law on buying and selling sex

	Norway		**Sweden**	
	Yes	**No**	**Yes**	**No**
Should it be illegal to buy sex?	53.24	46.76	62.58	37.42
Should it be illegal to sell sex?	47.92	52.08	54.19	45.81

In addition to these questions, we also asked for the respondents' attitudes on issues linked to equality between the sexes, immigration, sexual conservatism, religious activities, and political views. We also have information on the respondents' age, gender, income, cohabitation status, education, and region of residence. Table 2 presents descriptive statistics for the sample: 47.5 percent are men and the average age is 39 years, 46.0 percent have at least some university education, 13.3 percent have only elementary education or less, 11.2 percent of the Norwegians live in Oslo, and 21.4 percent of the Swedes live in Stockholm. Since our youngest respondents are only 15 years old they can not possibly have obtained the highest level of education and it is very unlikely that they have a high income. As discussed further below, excluding respondents under age 26 did not change our results. We also used different classification criteria for income, but the results remained robust to these changes as well. The mean values of the variables in Table 2 are statistically different at the 1 percent level between Norway and Sweden, except for the mean values for *Religious* where the difference was statistically significant at the 10 percent level, and *Cohabit* and *Right* which did not differ between the countries. As can be seen in Table 2, however, the differences are small for all independent variables.

Table 2. Descriptive statistics.

Variable	Explanation	Pooled sample Mean (St. Dev)	Norway Mean (St. Dev)	Sweden Mean (St. Dev)
Selling wrong	"*Is it morally acceptable or morally unacceptable to sell sex?"* ranging from 0 *Aceptable* to 10 *Unacceptable.*	6.516 (3.169)	6.358 (3.148)	6.666 (3.182)
Buying wrong	*"Is it morally acceptable or morally unacceptable to buy sex?"* ranging from 0 *Aceptable* to 10 *Unacceptable.*	7.132 (3.075)	6.877 (3.140)	7.372 (2.994)
Criminalize selling	= 1 if respondent think it should be illegal to sell sex	0.511 (0.500)	0.479 (0.500)	0.542 (0.498)
Criminalize buying	= 1 if respondent think it should be illegal to buy sex	0.580 (0.494)	0.532 (0.499)	0.626 (0.484)
Male	= 1 if male	0.475 (0.499)	0.445 (0.497)	0.503 (0.500)
Age	Age	39.410 (14.060)	37.137 (13.790)	41.558 (13.978)
Age²	= Age * Age	1750.734 (1139.937)	1569.198 (1084.796)	1922.368 (1164.262)
Capital	= 1 if respondent lives in the capital city	0.165 (0.371)	0.112 (0.316)	0.214 (0.410)
Cohabit	= 1 if respondent is married or cohabiting	0.658 (0.475)	0.651 (0.477)	0.664 (0.472)
High education	= 1 if respondent has at least some university education	0.460 (0.498)	0.488 (0.500)	0.434 (0.496)
Low education	= 1 if respondent only has elementary education or less	0.133 (0.340)	0.098 (0.298)	0.167 (0.373)
High income	= 1 if respondent earns >45,000 SEK per month, or >600,000 NOK per year.	0.052 (0.221)	0.075 (0.263)	0.031 (0.173)
Low income	= 1 if respondent earns <20,000 SEK per month, or <200,000 NOK per year.	0.333 (0.471)	0.260 (0.439)	0.399 (0.490)
Norway	= 1 if respondent lives in Norway	0.486 (0.500)		
Religious	= 1 if respondent participates in religious activities at least once a month.	0.088 (0.283)	0.096 (0.295)	0.079 (0.270)
Public sector	"*How large should the public sector be?"* ranging from 0 *Much smaller than today* to 10 *Much larger than today.*	5.037 (1.807)	4.807 (1.837)	5.256 (1.752)
Gender equality	*"Do you think that gender equality is an important issue?"* ranging from 0 for *No* to 10 for *Yes.*	8.662 (2.041)	8.475 (2.084)	8.838 (1.984)
Right	= 1 if respondent answered 8-10 on a 0-10 scale where 0 indicates political left and 10 political right.	0.174 (0.379)	0.174 (0.378)	0.175 (0.380)
Left	= 1 if respondent answered 0-2 on a 0-10 scale, where 0 indicates political left and 10 political right.	0.149 (0.356)	0.121 (0.327)	0.176 (0.380)
Co-responsible if abused	*"Do you think women who dress challengingly are co-responsible if they become sexually abused?"* ranging from 0 *No* to 10 *Yes.*	1.928 (2.728)	2.113 (2.784)	1.753 (2.664)
Anti immigration	*"Do you think that there are too many foreigners in Norway/Sweden?"* ranging from 0 *No* to 10 *Yes.*	4.844 (3.404)	5.491 (3.273)	4.233 (3.413)
Sexual liberal	*"Do you think it is okay to have sex with unknown people?"* ranging from 0 *No* to 10 *Yes.*	5.415 (3.562)	4.757 (3.451)	6.039 (3.554)

The mean values of the variables are statistically different at the 1 percent level, except for the mean values for *Religious* where the difference was statistically significant at the 10 percent level, and *Cohabit* and *Right* which did not differ between the countries.

To assess the representativeness of our sample, let us compare the descriptive statistics of the respondents with the national statistics. In Sweden, 50.8 percent of the population are men, which corresponds well with our Swedish sample where 50.3 percent are men. However, only 44.5 percent of the Norwegian respondents are men, while the share of all Norwegians is 50.9 percent. The mean ages among 15--65 year olds are 40.1 in Sweden and 39.7 in Norway, while in our samples the mean ages are 41.6 and 37.2 years, respectively (Statistics Sweden 2008 and Statistics Norway 2008). What is more problematic is the

representativeness of our sample with respect to education: While the share of Swedes aged 16--65 with higher education is 31.8 percent, the share in our sample is 43.4 percent. For Norway, the percentages differ even more: 27.0 percent of all Norwegians aged 16—66 have university education, while the corresponding figure in our sample is 48.8 percent.

We conclude that our sample is fairly representative except in terms of education, where it is biased toward including highly educated people. While this should be considered when comparing raw correlations and mean values, the problem is somewhat alleviated in the regression analyses by explicitly controlling for education. Kuosmanen (2008) had the same problem, but in his case the problem is aggravated since no controlled regressions were carried out.

When testing the hypotheses some inevitable simplifications have to be made in the operationalization, especially regarding conservatism, racism, and rape myths. While we are not able to completely isolate all moral conservatives in our data, we do include religiosity as a proxy variable. Since *Religious* does not capture conservatism exactly (it probably captures some moral conservatives but not all), the variable *Sexual liberal* can be seen as a complement (moral conservatives should score low on this variable). The variables *Public sector* and *Right* can also help us get a better grip on respondents with different ideologies. At least two groups of people are captured by the variable *Right*: market liberals and conservatives. These two categories can be expected to have opposing views on the issue, as suggested by previous studies (Jahnsen 2008; Anne-Maria Marttila 2008). Market liberals are to some extent captured through *Public sector*. To disentangle the groups, we discuss these different variables together and we also estimate the interaction terms *Right *Public sector*[1] and *Right*Religious*. While we do not ask people whether they are racist, we do have a proxy for anti-immigration views via the question, "Do you think that there are too many foreigners in Norway/Sweden?". We expect a positive correlation between this variable and thinking it is morally acceptable to buy sex as well as not wanting to criminalize buying sex. We also conduct a sensitivity analysis using the question, "Do you think increased immigration would be positive or negative for the Swedish/Norwegian society?", and this yields similar results. Finally, while we do not include all questions from previous research that signal acceptance

of rape myths, we do include one: "Do you think that women who dress challengingly are partly co-responsible if they become sexually abused?".

5. Empirical framework and results

To assess what shapes attitudes toward prostitution, we first look at moral attitudes toward buying and selling sex respectively (see Section 4.1). Then we take a closer look at attitudes toward criminalization of buying and selling sex, respectively (see Section 4.2). Finally, we take a closer look at the differences between Norway and Sweden (see Section 4.3).

5.1 Moral views

In this section we investigate what factors are associated with moral views regarding prostitution. When the dependent variables are skewed, as in our case, techniques where the lognormal distribution is used are often preferred. We run OLS regressions although the dependent variable is neither continuous nor normally distributed. Ordered logit estimation yield similar results regarding marginal effects and significance levels so we run OLS regressions in order to ease the presentation of the results.[4] The specification in this setting is:

$$y_i = \beta_0 + \boldsymbol{\beta}_1 \mathbf{x}_i + \boldsymbol{\beta}_2 \mathbf{z}_i + \varepsilon_i, \quad (1)$$

where y_i is the attitude toward buying or selling sex (ranging from 0 for "morally acceptable" to 10 for "morally unacceptable") for individual *i*. **x** is a vector of socio-demographic control variables, and **z** is a vector of variables reflecting attitudes on other issues (see Table 1).

Table 3 shows the results from OLS regressions with moral views regarding buying sex (Columns 1-2) and selling sex (Columns 3-4) as dependent variables. Column 1 includes only socio-demographic variables. We note that higher education is positively correlated with believing that buying sex is morally unacceptable. It is obviously a concern that our age span includes people who can not possibly have achieved the highest level of education. However,

[4] The results are available upon request.

restricting the sample to those over 25 does not change the results presented in this paper.[5] As expected, males believe it is more morally justifiable to buy sex than females, but the explanation in Cotton, Farley and Baron (2002) that this is due to men being more likely to believe that male sexual urges are an imperative is not valid in our data since we have more women than men answering affirmative to the question, "Do you think men have greater sexual needs than women?". Furthermore, running separate regressions for men and women does not show big differences in the determinants of attitudes toward prostitution.[6] Compared to others, older people believe it is more morally unacceptable to buy sex, although this effect is diminishing. Cohabitation (including marriage) is also positively correlated with believing it is immoral to buy sex. Compared to Swedes, Norwegians think it is more morally justifiable to buy sex, as hypothesized. The difference between the countries is thoroughly explored in Section 5.3.

Column 2 includes the variables used to analyze more of the hypotheses discussed above. The significance of the effects of cohabitation and age disappears when including more variables. However, we still observe a positive effect for those younger than 26 when 10-year cohort dummies are included.[7] As predicted, both those who are religious and those who believe that gender equality is important think it is immoral to buy sex. Being right wing is negatively correlated with feeling it is immoral, albeit this is only significant at the 10 percent level. Those who want to increase the size of the public sector also think it is more morally unacceptable to buy sex. A variable that has been used by other researchers to signal "rape myths," *Co-responsible if abused*, is also negatively correlated with feeling it is morally unacceptable to buy sex, although this is also only significant at the 10 percent level. As hypothesized, those who think there are too many immigrants in their country are more inclined to think it is morally justifiable to buy sex, and so are sexual liberals. It can further

[5] The results are available upon request.
[6] *Gender equality* is more important for male attitudes toward buying sex, and being sexually liberal has a more positive association for women than for men regarding buying and selling sex. Low income women (as compared to middle income women) think that selling sex is more morally unacceptable while low income men (as compared to middle income men) think it is more morally acceptable. These results are available upon request.
[7] The results are available upon request.

be noted that the coefficient for the Norway dummy increases when we include the attitude variables.[8]

Table 3. OLS regressions. Buying wrong and Selling wrong dependent variables.

	(1)	(2)	(3)	(4)
	Buying wrong		Selling wrong	
Male	-2.028***	-1.494***	-2.001***	-1.412***
	(0.107)	(0.105)	(0.110)	(0.108)
Age	-0.059**	-0.040	-0.058**	-0.044
	(0.028)	(0.027)	(0.029)	(0.028)
Age2	0.001**	0.000	0.001***	0.001
	(0.000)	(0.000)	(0.000)	(0.000)
Capital	0.082	0.206	-0.231	-0.077
	(0.144)	(0.136)	(0.148)	(0.139)
Cohabit	0.239**	0.183	0.349***	0.241**
	(0.119)	(0.112)	(0.122)	(0.115)
High education	0.475***	0.327***	0.127	0.107
	(0.113)	(0.109)	(0.116)	(0.111)
Low education	0.167	0.198	0.272	0.238
	(0.180)	(0.171)	(0.186)	(0.175)
High income	-0.063	0.205	-0.193	0.127
	(0.239)	(0.227)	(0.246)	(0.232)
Low income	-0.064	-0.239*	0.124	-0.054
	(0.135)	(0.129)	(0.139)	(0.131)
Norway	-0.566***	-0.719***	-0.292**	-0.678***
	(0.111)	(0.110)	(0.114)	(0.113)
Religious		0.858***		0.966***
		(0.181)		(0.185)
Public sector		0.081***		0.088***
		(0.030)		(0.031)
Gender equality		0.180***		0.148***
		(0.026)		(0.026)
Right		-0.263*		-0.300**
		(0.137)		(0.140)
Left		0.249*		-0.168
		(0.145)		(0.148)
Co-responsible if abused		-0.037*		0.006
		(0.019)		(0.020)
Anti immigration		-0.082***		-0.018
		(0.016)		(0.016)
Sexual liberal		-0.228***		-0.283***
		(0.016)		(0.016)
Constant	8.899***	8.587***	7.782***	7.981***
	(0.592)	(0.659)	(0.611)	(0.675)
Observations	3164	3143	3157	3137
R-squared	0.12	0.23	0.12	0.24

Standard errors in parentheses.
* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

[8] In fact, this is driven solely by the *Sexual liberal* variable, and as shown later this variable has more explanatory power in Norway than in Sweden.

Columns 3 and 4 reveal the corresponding results for views on selling sex. As can be seen, most results point in the same direction as those for buying sex. The coefficient for being right wing is now negative and statistically significant at the 5 percent level. Having higher education, thinking there are too many immigrants in the country, and the responsibility variable are not statistically significant, however. We can therefore conclude that the hypotheses outlined above are supported, except for the "rape myth" hypothesis.

As discussed above, *Religious* does not capture conservatism exactly. We therefore include *Sexual liberal* as a complement. Moral conservatives should score low on this variable, and the fact that this coefficient is negative further indicates that conservatives are more likely to think prostitution is immoral. The variables *Public sector* and *Right* can also help us get a better grip on respondents with different ideologies. Belonging to the political right has a relatively small effect, although these respondents are actually less likely to think it is immoral to buy and sell sex. Respondents who score low on *Public sector*, i.e., they want to decrease the public sector, are less likely to think it is immoral to buy and sell sex, respectively.[9] Furthermore, we included interaction terms between *Right* and *Public_sector*$^{-1}$ (i.e., the inverse of the *Public sector* variable) as well as between *Right* and *Religious*. The interaction between *Right* and *Religious* is positive and thus points in the expected direction, i.e., given that you are right wing, being religious (probably capturing conservatives) increases the probability that you think prostitution is immoral. The term is never statistically significant, however, probably due to the fact that only 59 respondents are both right wing and religious in our sample. The interaction between *Right* and *Public_sector*$^{-1}$ is statistically significant and negative as expected, i.e., given that you are right wing, wanting to decrease the public sector (probably capturing market liberals) decreases the probability that you think prostitution is immoral.[10] We are therefore quite confident that we have captured these different groups, and the influences of different ideological strands seem to be as expected.

5.2 Attitudes toward the law

In this section we try to assess which factors are important for the respondents' attitudes toward criminalizing buying and selling sex. The variables regarding attitudes toward the law

[9] Excluding *Public sector* makes the coefficient on *Right* larger and more statistically significant in the buying case.
[10] Results are available upon request.

on buying and selling sex are binary, and the estimations are therefore performed using probit regressions[11] with the following specification:

$$\Pr(y_i = 1 \mid \mathbf{z}_i, \mathbf{x}_i) = \mathrm{F}(\boldsymbol{\alpha}\mathbf{x}_i + \boldsymbol{\beta}\mathbf{z}_i), \qquad (2)$$

where $y_i = 1$ indicates that individual *i* thinks it should be illegal to buy or sell sex respectively, F is the standard normal cumulative density function, and the vectors **x** and **z** contain the same variables as in specification 1.

Table 4 shows attitudes on actual regulation of buying sex. If we include only socio-demographic variables (Column 1), we see that being male and living in Norway are highly associated with not wanting to criminalize buying sex. We expected the male coefficient to be significant since this has been indicated in previous research (e.g., Basow and Campanile 1990; and Kuosmanen 2008). Being older is also associated with not wanting to criminalize buying sex, while having higher education increases the probability of wanting to criminalize buying sex. When we in Column 2 also include seven value judgment variables, the marginal effects and significance levels of the previously included variables remain very much the same. The difference between Norway and Sweden is still highly significant: Living in Norway implies a 18 percent lower probability of wanting to criminalize buying sex. Being religious, wanting to increase the public sector, and supporting gender equality are also associated with a higher probability of wanting to criminalize buying sex. Having anti-immigrant views and being sexually liberal decrease the probability of wanting to criminalize buying sex, while the opposite holds for belonging to the political left. Belonging to the political right and thinking that women who dress challengingly are co-responsible if they become sexually abused are not statistically significantly associated with attitudes toward making buying sex illegal.

[11] The results are similar using logit regressions (available upon request).

Table 4. Marginal effects after probit. Criminalize buying and Criminalize selling dependent variables.

	(1)	(2)	(3)	(4)
	Criminalize buying		Criminalize selling	
Male	-0.332***	-0.276***	-0.289***	-0.233***
	(0.018)	(0.019)	(0.018)	(0.019)
Age	-0.022***	-0.021***	-0.016***	-0.016***
	(0.005)	(0.005)	(0.005)	(0.005)
Age2	0.000***	0.000***	0.000***	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
Capital	-0.014	0.005	-0.050**	-0.034
	(0.026)	(0.026)	(0.026)	(0.026)
Cohabit	0.036*	0.034	0.054**	0.043**
	(0.021)	(0.022)	(0.021)	(0.022)
High education	0.076***	0.061***	0.041**	0.050**
	(0.020)	(0.021)	(0.020)	(0.021)
Low education	-0.013	-0.011	0.020	0.009
	(0.032)	(0.034)	(0.032)	(0.033)
High income	-0.043	-0.002	-0.010	0.030
	(0.043)	(0.045)	(0.043)	(0.045)
Low income	-0.020	-0.051**	-0.003	-0.026
	(0.024)	(0.025)	(0.024)	(0.025)
Norway	-0.145***	-0.177***	-0.099***	-0.165***
	(0.020)	(0.021)	(0.020)	(0.021)
Religious		0.149***		0.121***
		(0.033)		(0.035)
Public sector		0.024***		0.014**
		(0.006)		(0.006)
Gender equality		0.025***		0.020***
		(0.005)		(0.005)
Right		-0.024		-0.056**
		(0.027)		(0.027)
Left		0.068**		-0.033
		(0.028)		(0.028)
Co-responsible		-0.006*		0.005
if abused		(0.004)		(0.004)
Anti immigration		-0.010***		0.002
		(0.003)		(0.003)
Sexual liberal		-0.036***		-0.038***
		(0.003)		(0.003)
Observations	3157	3136	3145	3126

Standard errors in parentheses.
* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Concerning attitudes toward regulation of *selling* sex (Table 4, Column 3), we see that the coefficients on male, age, Norway, and high education are very similar to the buying case (Column 1). Also as in the buying case, the magnitudes and significance levels of the socio-demographic variables remain more or less intact when we include the value judgment variables (Column 4). Living in Norway implies a 17 percent lower probability of wanting to criminalize selling sex. Being religious, wanting to increase the public sector, and supporting gender equality are also associated with having a higher probability of wanting to criminalize

selling sex, although these effects seem to be somewhat smaller than in the buying case (i.e., compared to the effects in Column 2). Belonging to the political right and being sexually liberal decrease the probability of wanting to criminalize selling sex.[12] Belonging to the political left, having anti-immigrant views, and believing that women who dress challengingly are co-responsible if they become sexually abused are not statistically significantly associated with attitudes toward criminalizing selling sex.

Those who are negative toward immigration are less likely to want to criminalize buying sex, which is in line with our hypothesis. Respondents who support gender equality are more likely to also support a criminalization of buying and selling sex. This is also true for respondents who attend religious activities at least once a month and those who do not have liberal views on sex (i.e., those who do not think it is appropriate to have sex with unknown people). These results are also in accordance with our hypotheses.

One of our hypotheses has not been confirmed: There is no support for the possibility that respondents who believe in "rape myths" have different attitudes toward regulation of prostitution, although admittedly we do not measure the entire "rape myth" concept but only one of several notions of it, i.e., the respondents' answers to the question about whether women who dress challengingly are co-responsible if they become sexually abused. Also, we control for other factors that may drive the attitudes towards prostitution. Earlier research (Basow and Campanile 1990; Cotton, Farley and Baron 2002) simply looked at pair wise correlations between attitudes toward prostitution and "rape myths" in samples of students, which is not a satisfactory way to assess this relationship.

5.3 A comparison between Norway and Sweden

Since the Norway dummy in the pooled regressions indicates large differences between Norway and Sweden, and since the countries have different legal histories, a deeper comparison between them is clearly motivated. Furthermore, previous research indicates that there are important differences in the institutions surrounding the markets for prostitution between the two countries.

[12] Also when examining attitudes toward the law we tested the interaction terms *Right * Religious* and *Right * Public_sector*[1], and they pointed in the expected directions (but *Right * Religious* was not statistically significant).

We start the comparison by looking at the moral views; the results are shown in Table 5.[13] In Columns 1 and 2, the dependent variable is holding a moral attitude against buying sex. Regarding our hypotheses, we see that there is a link between anti-immigrant views and thinking it is immoral to buy sex in Sweden only, and this difference is statistically significant at the 1 percent level.[14] Note that this contradicts our hypothesis of a stronger link between anti-immigration views and prostitution in Norway. A possible explanation to this is that holding anti-immigrant views is more common in Norway (as shown by a ranksum test), which may lead to a selection effect in Sweden. Furthermore, those who support gender equality in Sweden are not statistically significantly more likely to believe it is morally unacceptable to buy sex, which is not in line with our hypothesis.

With respect to selling sex (Table 5, Columns 3 and 4), the gender equality variable has larger explanatory power in Sweden than in Norway (the difference is statistically significant at the 5 percent level). This is in line with our hypothesis, possibly indicating an effect of the gender equality framing of the Swedish debate. Again we find that the correlation between anti-immigration views and attitudes toward prostitution is significant only in Sweden (statistically significant at the 1 percent level).

[13] Again running ordered logit regressions yields qualitatively the same results (available upon request).
[14] All the tests concerning difference in coefficients (in Table 5 and 6) in the different samples are performed using a pooled sample estimation with all explanatory variables interacted with Sweden. The results are available upon request.

Table 5. OLS regressions. Buying wrong and selling wrong dependent variables.

	Buying wrong		Selling wrong	
	(1)	(2)	(3)	(4)
	Norway	Sweden	Norway	Sweden
Male	-1.291***	-1.665***	-1.342***	-1.456***
	(0.164)	(0.138)	(0.160)	(0.148)
Age	-0.060	-0.009	-0.113***	0.065
	(0.039)	(0.039)	(0.038)	(0.042)
Age2	0.001	-0.000	0.001***	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)
Capital	-0.081	0.345**	-0.202	-0.030
	(0.240)	(0.163)	(0.233)	(0.175)
Cohabit	0.178	0.162	0.235	0.182
	(0.166)	(0.151)	(0.161)	(0.162)
High education	0.593***	0.182	0.249	0.052
	(0.162)	(0.148)	(0.157)	(0.158)
Low education	0.123	0.364*	0.005	0.524**
	(0.281)	(0.218)	(0.272)	(0.233)
High income	0.336	-0.155	0.293	-0.239
	(0.287)	(0.385)	(0.278)	(0.411)
Low income	0.028	-0.357**	0.181	-0.124
	(0.215)	(0.160)	(0.208)	(0.171)
Religious	0.698***	0.906***	0.795***	1.052***
	(0.260)	(0.251)	(0.253)	(0.270)
Public sector	0.058	0.091**	0.075*	0.077*
	(0.043)	(0.042)	(0.041)	(0.045)
Gender equality	0.142***	0.224***	0.089**	0.215***
	(0.037)	(0.035)	(0.036)	(0.038)
Right	-0.214	-0.351*	-0.286	-0.337*
	(0.203)	(0.186)	(0.197)	(0.199)
Left	0.597**	0.084	-0.094	-0.109
	(0.237)	(0.183)	(0.230)	(0.195)
Co-responsible	-0.013	-0.060**	0.023	-0.019
if abused	(0.028)	(0.027)	(0.027)	(0.029)
Anti immigration	-0.020	-0.122***	0.051**	-0.070***
	(0.025)	(0.021)	(0.024)	(0.022)
Sexual liberal	-0.286***	-0.183***	-0.333***	-0.240***
	(0.024)	(0.021)	(0.023)	(0.022)
Constant	8.239***	7.678***	8.867***	5.243***
	(0.918)	(0.935)	(0.893)	(1.001)
Observations	1502	1641	1499	1638
R-squared	0.23	0.24	0.27	0.23

Standard errors in parentheses.
* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

In order to compare the attitudes toward regulation of prostitution between Norway and Sweden, we again run probit regressions. The marginal effects are shown in Table 6. A noteworthy difference that supports our hypothesis is that supporting gender equality has more explanatory power regarding wanting to criminalize both buying and selling sex in Sweden than in Norway (the differences are statistically significant at 5 percent and 1 percent respectively). As in the case with moral attitudes toward buying sex, there is a link between

anti-immigrant views and wanting buying sex to be illegal in Sweden but not in Norway. This difference is statistically significant at the 5 percent level. Regarding *Criminalize selling*, there is actually a statistically significant positive effect of *Anti immigration* in Norway.

Table 6. Marginal effects after probit. Criminalize buying and Criminalize selling dependent variables.

	Criminalize buying		Criminalize selling	
	(1)	(2)	(3)	(4)
	Norway	Sweden	Norway	Sweden
Male	-0.293***	-0.269***	-0.233***	-0.236***
	(0.029)	(0.025)	(0.029)	(0.026)
Age	-0.024***	-0.020***	-0.020***	-0.011
	(0.008)	(0.008)	(0.008)	(0.008)
Age2	0.000**	0.000	0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Capital	-0.046	0.036	-0.053	-0.020
	(0.047)	(0.031)	(0.045)	(0.032)
Cohabit	0.024	0.038	0.005	0.066**
	(0.033)	(0.030)	(0.032)	(0.030)
High education	0.031	0.114***	0.052*	0.065**
	(0.032)	(0.028)	(0.031)	(0.029)
Low education	-0.021	0.046	0.019	0.036
	(0.055)	(0.041)	(0.054)	(0.043)
High income	-0.001	0.007	0.006	0.064
	(0.057)	(0.073)	(0.056)	(0.075)
Low income	-0.023	-0.059*	-0.031	-0.016
	(0.042)	(0.032)	(0.041)	(0.032)
Religious	0.187***	0.099**	0.098*	0.126**
	(0.048)	(0.048)	(0.051)	(0.050)
Public sector	0.027***	0.021**	0.010	0.016*
	(0.008)	(0.008)	(0.008)	(0.008)
Gender equality	0.014*	0.035***	0.005	0.033***
	(0.007)	(0.007)	(0.007)	(0.007)
Right	-0.037	-0.033	-0.047	-0.070*
	(0.040)	(0.037)	(0.039)	(0.038)
Left	0.160***	0.031	0.015	-0.049
	(0.044)	(0.036)	(0.045)	(0.037)
Co-responsible	-0.006	-0.006	0.006	0.004
if abused	(0.005)	(0.005)	(0.005)	(0.006)
Anti immigration	0.002	-0.018***	0.013***	-0.004
	(0.005)	(0.004)	(0.005)	(0.004)
Sexual liberal	-0.040***	-0.033***	-0.046***	-0.031***
	(0.005)	(0.004)	(0.005)	(0.004)
Observations	1499	1637	1496	1630

Standard errors in parentheses.
* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

To summarize the differences in the weights of the explanatory variables between Norway and Sweden, we can see that our hypothesis of gender-egalitarian attitudes being more important in Sweden is largely confirmed. The difference is statistically insignificant only for the variable that indicates how morally acceptable/morally unacceptable the respondents

perceive buying sex to be. This may come as a surprise since the Swedish law focuses only on buying sex. However, as put forth in the Norwegian debate (especially by Pro Sentret[15] whose position is that the stigmatization of sellers will increase as a result of the recently implemented law), a law that criminalizes buyers is likely to affect attitudes toward selling as well, since it puts focus on the issue and signals that there is a problem. Regarding our second hypothesis, that the link between anti-immigration views and attitudes toward buying sex is more pronounced in Norway than in Sweden, we find the opposite.

We know that there are considerable differences between Norway and Sweden regarding attitudes toward prostitution, which persist even after controlling for other relevant factors. Furthermore, in general there seem to be the same underlying individual-level explanatory variables at work in the two countries. If we have controlled for the relevant individual-level factors, it is plausible that the reason for the country differences lies at the macro level. As previously mentioned, there are for example differences between Norway and Sweden in terms of media coverage of prostitution and market structure.

There are other differences between the countries as well that may be of importance in this setting, the most important being those linked to gender discourses and gender practices, since, as Outshoorn (2004) argues, prostitution is intimately linked to sexuality and the prevalent gender order. That attitudes toward gender equality seem to differ between the two countries is a common finding (although this is partly contested by Jakobsson and Kotsadam 2010) that has been explained by macro-level factors such as history of urbanization, industrialization, and the demographic transition (e.g., Anne Lise Ellingsæter 1998). This highlights the importance of controlling for gender equality, but since we have only controlled for this at the individual level, we can not disregard the possibility that there is a macro-level gender ideology that influences individual values related to prostitution. The most plausible way in which this influence would work is through the way gender equality is talked about and understood in a country, i.e., through national gender discourses.

[15] Pro Sentret is an NGO that works with prostitutes and provides information on prostitution.

The differences in gender discourse between Norway and Sweden have been analyzed by, e.g., Teigen and Wängnerud (2009) and Langvasbråten (2008). Teigen and Wängnerud (2009) show that Norwegians more often use liberal feminist explanations for why societal top positions are dominated by men, while Swedes are more prone to using radical feminist explanations. Langvasbråten (2008) finds a similar gender discourse difference between the countries when studying governmental action plans for gender equality. As discussed in the introduction, this division also seems to be present regarding discourses on prostitution. It has also been suggested that the difference in views on criminalization that has existed between the Swedish and Norwegian left parties (both the Social Democrats and the Left Party in Norway were against a criminalization of the buyer until the mid 2000s) has to do with different perceptions of gender equality (Skilbrei 2008). As Kuosmanen (2008) argues, however, the Swedish public seems to perceive prostitution more as a general problem than as patriarchal oppression since so many want to criminalize selling sex as well. This does not imply, however, that the radical feminist discourse has not affected the extent to which prostitution is seen as a problem.

A final important macro-level difference is that Swedes have lived under a law that criminalizes buying sex for 10 years. As discussed earlier, it may be the case that the law was implemented earlier in Sweden than in Norway simply because Swedes were already more skeptical than Norwegians toward prostitution. As shown, however, the negative attitudes toward prostitution in Sweden were much less pronounced before the law was implemented (Kuosmanen 2008). Ola Sjöberg (2004) argues that institutions may influence world views and can be seen as normative orders. Similarly, Stefan Svallfors (2007) claims that norms in society may be altered by institutions since certain social phenomena are rendered visible and normative values of what is fair and just are embedded in the institutions. Legal philosophy often discusses the normativity of law, and it is argued that non-instrumental reasons for rule-following are important in that the law can signal what is morally unacceptable and thereby affect values (e.g., Péter Cserne 2004). Similar arguments are found in political science scholarship, especially among neoinstitutionalists who argue that institutions in general, and the law specifically, entail a logic of appropriateness (e.g., Guy B. Peters 2005). Economists as well have started to look at this issue (e.g. Emanuela Carbonara, Francesco Parisi and Georg von Wagnheim 2008) and argue that laws affect norms, although much

more research is needed in this field. In our dataset, it is not possible to explicitly test for the effect of any of these macro-level explanations, but we nevertheless believe them to be important, and therefore encourage future research in order to shed light on the issue.

6. Conclusion

Using a larger and more representative sample than previous studies, the present paper assesses people's attitudes toward prostitution in Norway and Sweden. The analysis is unique since other studies on the general population have only looked at pair-wise correlations and summary statistics. In contrast, we use statistical methods to shed further light on attitudes toward various aspects of prostitution (moral attitudes toward buying and selling sex, as well as attitudes toward criminalization) while controlling for other factors. This is essential for an actual understanding of attitudes toward prostitution, which has clear relevance since one of the main aims in Swedish and Norwegian prostitution policy is to change these attitudes. Understanding attitudes among the general public is also important since these attitudes affect the stigmatization which in turn affects market behavior.

Looking at our main findings, we can confirm the hypotheses that conservatives and those who support gender equality are more negative toward prostitution in general. As also suggested, those who hold anti-immigration views believe it is more morally acceptable to buy sex. We find no support, however, for the hypothesis that people embracing "rape myths" are more positive toward prostitution.

Large differences are found between Norway and Sweden. For instance, Norwegians are 18 percent more likely to not want to criminalize buying sex, and gender egalitarian attitudes have more explanatory power in Sweden. Contrary to our expectations, however, anti-immigration views do not seem to be more strongly associated with a desire to legitimize buying sex in Norway.

The clear differences in attitudes between Sweden and Norway (which persist when controlling for other factors) may be reflected in, or may be due to, the different legal histories of the two countries. Sweden may have made buying sex illegal earlier than Norway since Swedes are more negative toward buying sex. Alternatively, Swedes may be more

negative toward buying sex because they have lived under this law for several years. To shed light on this issue, future research will be able to take advantage of investigating the January 2009 implementation of the same law in Norway. Further research could also investigate the effects of the Swedish and Norwegian laws on market behavior, and try to disentangle the effects of a possible attitudinal change from other effects. Finally, the effects of the laws on trafficking flows are also important to investigate. For most people, the desired law in society would probably hinge on its effects. We favor a criminalization of prostitution since we believe it reduces trafficking, changes attitudes toward sexual exploitation and towards women as men's possessions, and reduces the amount of exploitation. We further favor the criminalization of the buyer and not the seller since we think it puts the responsibility and the blame on the wrongdoer.

All personal information that would allow the identification of any person or person(s) described in the article has been removed.

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Paper V

Why do you want lower taxes? Preferences regarding municipal income tax rates*

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Abstract

The factors shaping people's preferences for municipal labor income tax rates in Sweden are assessed using survey data. The tax rate actually faced by the respondents has explanatory power for their attitudes toward the tax rate only when a few socio-demographic explanatory variables are included. When a richer set of variables are included, the association disappears. The hypothesis that this small or nonexistent effect of the actual tax rate is caused by a Tiebout bias finds no support, yet IV-estimations indicate that the actual municipal tax rate may be of importance for attitudes toward the tax rate.

Keywords: tax preferences, attitudes, income tax

JEL classification: H24

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1 Introduction

Individual income taxes are an important part of government revenues in all western countries. To be able to collect these taxes, and since politicians want to get reelected, these taxes need to be perceived as legitimate. What determines people's preferences about income taxes is therefore of great interest. Do people vote with their feet, when they can, i.e., by moving, to pay taxes that accord with their preferences? And what determines their preferences? Are self-interest and misperceptions important?

These questions are central in this paper, which focuses on Swedish municipal taxes on labor income. Sweden has among the highest taxes in the world (OECD, 2005). The municipal labor income tax constitutes the largest source of revenue for the Swedish public sector, making it very important for the financing of the public sector. It is also of great significance individuals, since it is the largest tax they pay (STA, 2006).[1]

The earliest study (to my knowledge) of individual tax preferences (Jane and Likert, 1962) used interview data from Detroit, Michigan. Studying both attitudinal and socio-economic variables, Jane and Likert found that the most important variables are those reflecting self interest; income and education are most important for preferences about the income tax. Labor union membership, political party preference, and preferences about the size of the public sector are also important.

Edlund (1999, 2000) used Swedish survey data to investigate people's opinions about taxes on earned income (including those at the national level). He found that most people are positive to the income tax and prefer a progressive system, with lower rates for low income earners and higher for higher. He also found that younger people, highly educated individuals, and high income earners favor less progressivity (less difference in the rates).

Research in the U.S. found that people generally have little understanding of tax policies (Roberts et al., 1994). Yet using Swedish survey data on tax progressivity, Edlund (2003) found that people have a quite good understanding of tax progressivity, suggesting that the U.S. finding of little understanding is not necessarily generalizable to other countries.

[1] In Sweden, the tax rates on labor income are decided by the municipalities, and vary substantially across municipalities (of which there are 290). Unearned income is taxed only at the national level, and there are surtaxes on labor incomes above certain levels.

If people misperceive the taxes they pay, then having more knowledge could affect their opinions. In particular, if they overestimate the taxes they pay, and underestimate the benefits received, then having more knowledge might induce them to support higher taxes, and vice versa (Gemmell et al., 2004). Using Swedish survey data, Hammar et al. (2009) investigated people's opinions about eleven types of taxes, and found that people who claim to have a low level of knowledge about society preferred to reduce municipal income taxes more than did others. In line with the results in Edlund (1999), the highly educated were less likely to prefer reduced municipal income taxes and more likely to support raising them. The same was true for frequent newspaper readers. Those who believed in and supported the public sector more (i.e., who identified themselves as left, not right, on the political scale), and those with a favorable impression of politicians also generally supported municipal income taxes. Kumlin (2007) found, however, that dissatisfaction with public services in fifteen western European countries is unrelated to support for the welfare state and the taxes required to finance it.

Though previous studies have usually included income as a variable, they have not (to my knowledge) investigated in more dept the effect of varying tax rates on people's opinions about taxes. Using Swedish survey data from 1979 and 1991, Mörk (2005) studied the difference between local politicians' and voters' preferences for local taxes. Using a small number of control variables and not controlling for a Tiebout bias (as compared to this study), she found the local tax rate to be negatively related to people's willingness to increase the tax.

The present paper extends Hammar et al. (2009) by including actual current municipal labor income tax rates in assessing what factors are important for people's willingness to change them. This gives us the opportunity to find out whether the tax rate people face affects their attitudes and whether Tiebout sorting plays a role here. My findings are that the tax rate actually faced by survey respondents is not very important in determining the respondent's tax preferences. The reason there is not a more clear effect of the actual tax rate on tax preferences may be related to Tiebout sorting, yet the evidence for this is not strong. Possible explanations are that people do not know the actual tax rate in their municipality (or in others), or that they are subject to status quo bias where they come to accept the tax rate they face. Also, people with higher education, people who regularly read a newspaper, people who agree with the political left, and people who state that they are satisfied

with the municipal services are less likely to want to decrease the municipal tax. People with low income, people who claim to have a low level of knowledge about society, and people who agree with the political right are instead more likely to want to decrease the municipal tax.

The next section describes the data, while Section 3 presents the estimations and results. Section 4 summarizes and draws conclusions.

2 Data

The main data consist of responses from a survey mailed to a random sample of $3,000$ Swedes aged $18-85$ by the SOM Institute (www.som.gu.se/english) in 2004. Addresses were collected from the National Register, which includes all legal residents of Sweden; $1,774$ individuals (64%) responded (from 267 of the 290 municipalities). The respondents are representative of the Swedish adult population (Nilsson, 2005). Data from Statistics Sweden (www.scb.se) on municipal income tax rates in 2004 is also used.

The dependent variable in the analysis is people's attitudes toward the municipal income tax, shown in Table 1. More specifically, people are asked the following question: "Do you think that the following taxes should be increased or decreased?". Attitudes toward the corporate income tax and the real estate tax are shown for comparison. The corporate income tax appears to be the most popular, though more people favor decreasing than increasing it, and the real estate tax is clearly the least popular.[2]

Most people seem to care about the taxes they pay. Half the respondents favor decreasing the municipal income tax, and 8% favor decreasing it a lot, while only 5% favor increasing it (a little). Nevertheless, 82% are fairly satisfied with it, and favor no or small changes. In comparison, 21% favor decreasing the corporate income tax a lot or a little, and 71% favor decreasing the real estate tax a lot or a little. Thus, more people are at least somewhat satisfied with the municipal income tax.[3]

The actual municipal tax rates faced by the respondents (Table 2, below) varied from 28.9% (in Kävlinge) to 34.04% (in Dals-Ed). The mean was 31.58%, and the median 31.74%, indicating a distribution skewed slightly to the right. The three

[2]The real estate tax was abolished in 2008 and replaced with a municipal fee.

[3]This is also true when compared to all eleven taxes in the survey (Hammar et al., 2009).

Table 1: Swedish tax attitudes, 2004, in percent

	Abolish/ decrease a lot	Decrease a little	Keep unchanged	Increase a little	Increase a lot	No opinion	No response
Municipal income tax	8	42	35	5	0	8	2
Corporate tax	6	15	29	11	2	32	5
Real estate tax	39	32	16	1	0	10	1

No. of obs. 1,683

municipalities with the most inhabitants had rates of 30.35% (Stockholm), 31.8% (Gothenburg), and 31.23% (Malmo), while the three with the fewest inhabitants all had a slightly higher rate of 32.6% (Bjurholm, Sorsele and Dorotea).

Table 2: Swedish municipal income tax rates, 2004, in percent

Minimum	10th percentile	25th percentile	Median	75th percentile	90th percentile	Maximum
28.9	30.35	30.93	31.74	32.2	32.7	34.04

Table 3 provides summary statistics for the background characteristics. There are approximately equal numbers of men and women; 21% were 65 or older; 32% had low income; 29% had studied at a university; 14% had preschool children; 28% worked in the municipal sector; 35% lived in or near one of the three largest cities; one-third regarded themselves as sympathetic to the political left, one-third to the right; 62% regularly read a morning newspaper; 46% reported fairly good or very good public services in their municipality; and 34% trusted their local politicians.

Opinion balance (shown in the last column of Table 4) is an index indicating to what degree people favor (in this case) decreasing the municipal income tax, accounting for the strength of the preference. That is, the opinion balance is an attempt to quantify the strength of the preference to change the tax rate. By giving the alternatives "decrease a lot" and "increase a lot" a double weight as compared to "decrease a little" and "increase a little," the aim is to take account of the intensity of the preference.[4] There are some clear patterns in the distribution. A Wilcoxon rank-sum test gave at hand that the differences between men and women, young and old, people with preschool children and those without, and people who lived in cities and those who did not are not statistically significant. Those with high or low income are more likely to favor decreasing the tax (and those with middle

[4]Opinion balance = 2 ∗ "increase a lot" + 1 ∗ "increase a little" - 1 ∗ "decrease a little" - 2 ∗ "decrease a lot".

Table 3: Summary statistics, background characteristics, 2004

Individual characteristics	Dummy = 1 if	Mean	Standard deviation	Percentage 0	Percentage 1	Obs
Women	women	0.494	0.50	50.6	49.4	1659
Old (65-85)	65-85 years old	0.215	0.41	78.5	21.5	1659
Children	child 0-6 in household	0.135	0.34	86.5	13.5	1659
Low income	household yearly income is less than 11k euro (single adult) or 22k euro (two or more)	0.322	0.47	67.8	32.2	1565
High income	household yearly income exceeds 43k euro (single adult) or 65k euro (two or more)	0.322	0.47	67.8	32.2	1565
Low education	no high school degree	0.291	0.45	70.9	29.1	1637
High education	studies at university or university degree	0.291	0.45	70.9	29.1	1637
Municipal employee	working in municipal sector	0.280	0.45	72.1	28.0	1431
Newspaper	read morning newspaper 6-7 days/week	0.618	0.49	38.2	61.8	1645
Left	1 or 2 on a political scale 1-5	0.339	0.47	66.1	33.9	1595
Right	4 or 5 on a political scale 1-5	0.329	0.47	67.1	32.9	1595
Good services	services in municipality fairly good or very good, last 12 months	0.463	0.50	53.7	46.3	1470
Low knowledge	1-3 on a scale 1-10	0.200	0.40	80	20.0	1621
Low trust	low trust for municipal board	0.34	0.47	65.8	34.2	1618
Municipal characteristics						
Tax base	per capita as percentage of national mean	99.21	14.61			1519
Grants	intergovernmental grants per capita in thousands SEK	3.894	4.715			1519
Urban	living in one of 3 largest city regions	0.346	0.48	65.4	34.6	1657
Change '03	percentage point change in municipal tax-rate 2002-2003	0.56	0.71			1654
Change '04	percentage point change in municipal tax-rate 2003-2004	0.86	0.92			1654
Moved	moved to the municipality less than 3 years ago	0.09	0.29	91.1	8.9	1051

income are more likely to favor increasing it), the difference between low and middle income earners is statistically significant at the 1% level. Those with low education are much more likely to favor decreasing the tax (and less willing to increase it). Similarly, private sector employees are much more likely to favor decreasing the tax (and less likely to favor increasing it).

As expected, people supporting the political left are much less likely to favor decreasing the tax (and more likely to favor increasing it) than are those supporting the right. Regular newspaper readers, and those self-reporting a high level of knowledge about society, are also less likely than others to favor decreasing the tax (and more likely to favor increasing it). Those reporting good public services in their municipality and those trusting their municipal politicians are less likely to favor decreasing the tax. All these differences are statistically significant according to the Wilcoxon rank-sum test. Finally, those living in low tax municipalities (the 10% of the sample paying the lowest tax rate) are less likely than the 10% living in high-tax municipalities to favor decreasing the tax (and more likely to favor increasing it). However, this difference is not statistically significant.

3 Estimation and results

The aim of this section is to assess what determines people's attitudes toward the municipal labor income tax and how attitudes are affected by the taxes people face. Following a general choice framework developed by Bergstrom et al. (1982) and used in a similar context by Ahlin and Johansson (2001) and Ågren et al. (2007) I assume that an individual's preferred municipal income tax rate is given by

$$t_i^* = \beta_0 + \mathbf{x}_i'\boldsymbol{\beta} + \varepsilon_i, \tag{1}$$

where $\mathbf{x}_i$ is a vector of variables explaining t_i^*. We do not observe t_i^* directly. An individual expresses dissatisfaction with the actual tax rate (t_i) if it deviates from her preferred level. Individuals want to keep the tax rate unchanged if $t_i - \delta_1 \leq t_i^* \leq t_i + \delta_2$, decrease the tax rate somewhat if $t_i^* < t_i - \delta_1$, decrease it a lot if $t_i^* < t_i - \delta_1 - \gamma_1$, increase it somewhat if $t_i^* > t_i + \delta_2$, and increase it a lot if $t_i^* > t_i + \delta_2 + \gamma_2$. Where the deviation from the actual tax rate needed for an individual to express dissatisfaction with it does not need to be symmetric upwards

Table 4: Distribution of Swedish municipal income tax preferences, 2004, in percent

	Abolish/ decrease a lot	Decrease a little	Keep unchanged	Increase a little	Increase a lot	No opinion	Opinion balance*
Full sample	8.4	42.7	35.3	5.2	0.1	8.3	-54.1
Women	8.4	40.0	35.7	3.9	0.1	11.8	-52.7
Men	8.3	45.3	34.9	6.4	0.1	4.9	-55.3
Young (18-30)	9.9	35.9	36.2	2.1	0.0	15.9	-53.6
Old (65-85)	6.5	44.9	32.0	4.8	0.3	11.5	-52.5
Children	10.3	42.0	36.6	5.8	0.0	5.4	-56.8
No children	8.1	42.8	35.1	5.1	0.1	8.8	-53.7
High income	7.6	46.5	35.0	4.3	0.0	6.6	-57.4
Middle income	7.1	43.3	39.2	6.1	0.0	4.4	-51.4
Low income	10.5	41.3	30.0	4.8	0.4	13.1	-56.7
High education	6.5	39.0	40.9	6.5	0.0	7.1	-45.5
Low education	9.6	44.1	31.2	4.7	0.2	10.3	-58.3
Municipal employee	8.3	38.3	39.8	6.0	0.3	7.5	-48.3
Private employee	8.8	46.5	33.3	5.0	0.1	6.4	-58.9
Newspaper	6.6	42.8	37.8	6.0	0.1	6.8	-49.8
No newspaper	11.3	42.5	31.7	3.8	0.2	10.5	-60.9
Left	4.8	35.3	43.1	9.2	0.0	7.6	-35.7
Right	9.7	52.0	30.5	2.7	0.0	5.1	-68.7
Good services	6.5	41.6	39.4	5.9	0.3	6.3	-48.1
Bad services	11.8	48.4	27.5	5.2	0.0	7.2	-66.8
High trust	6.3	38.1	44.4	7.6	0.0	3.6	-43.1
Low trust	10.7	47.0	30.7	5.6	0.2	5.8	-62.4
High knowledge	7.1	42.1	40.5	6.4	0.0	4.0	-49.9
Low knowledge	13.3	43.5	23.5	4.3	0.3	15.1	-65.2
Urban region	8.4	46.2	32.6	5.4	0.2	7.3	-57.2
Not urban region	8.4	42.2	35.6	5.5	0.1	8.2	-53.3
High municipal tax	9.6	44.0	35.0	3.0	0.0	8.4	-60.2
Low municipal tax	9.7	39.5	36.8	6.1	0.0	7.9	-52.8

*Opinion balance = 2 ∗ "increase a lot" + 1 ∗ "increase a little" - 1 ∗ "decrease a little" - 2 ∗ "decrease a lot". Bold characters indicate a statistically significant difference between the pairs (at least at 10%).

and downwards; that is, δ_1 may not equal δ_2 and γ_1 may not equal γ_2. With this assumption, a tax rate that deviates one percentage point upwards from the tax rate preferred by an individual may trigger dissatisfaction; but not a tax rate that deviates one percent downwards.

Simple theoretical models of demand for local public goods imply that income, intergovernmental grants, and tax base should affect demand for local public goods and thus also tax preferences (Bergstrom et al., 1982; Ahlin and Johansson, 2001). Hess and Orphanides (1996) construct a model showing that families with more children prefer higher taxes than others. Edlund (2003) argues that social class should also be an important explanatory variable, as a self-interest effect. For example, manual workers tend to have a higher risk of unemployment, and thus a greater need for public support. Since women may be more dependent on the public sector when it comes to employment, benefits, and social services, Edlund (2003) argues that they should be less likely to promote lower taxes. Courant et al. (1979) argue

that public employees should have preferences for more public spending and should thus favor higher taxes. In line with the self-interest assumptions, also elderly and municipal employees are more dependent on the municipal sector, and should thus be less likely to promote a decrease in the municipal income tax.

Following equation (1), ordered probit regressions are used to analyze attitudes to the municipal tax rate, with willingness to change it ranging from 1 for "abolish/decrease a lot" to 5 for "increase a lot" as dependent variable. Table 5 (below) shows the estimated coefficients, and Table 6 (below) shows the marginal effects.[5] Specification 1 focuses on a few socio-demographic variables, chosen following the discussion above.[6] The municipal tax rate itself has a negative and statistically significant effect. Low income has a statistically significant negative effect, indicating a tendency of those with low income to favor reduced municipal tax rates. The same is true for high income earners. That low income earners would like to cut the tax may be due to an income effect; this tax has a large effect on their relatively small income. These results are also similar to the results in Edlund (1999) and Hammar et al. (2009). On the other hand, having at least some higher education (as compared to only high school) has a statistically significant positive effect (while having low education has a negative but not statistically significant effect), perhaps indicating that they do not overestimate the taxes they pay. Gender, being old, and having preschool children do not have statistically significant effects, which does not support the previous theoretical arguments indicating that females, elderly, and families with children should be more supportive of taxes used to finance public services, due to self-interest. The tax base in the municipality where the respondent lived, and intergovernmental grants to that municipality, are not statistically significant.

Specification 2 includes two new variables expected to affect preferences regarding municipal taxes: whether respondents are regular newspaper readers, and whether they are municipal employees. While the previous coefficients remain little changed, both of the new variables have statistically significant effects. Regular newspaper readers are more supportive of municipal taxes, perhaps because they are better informed about the taxes they pay and what the tax payments are used for,

[5]Table 8 in the appendix shows the corresponding OLS estimations. The OLS estimates correspond well with the ordered probit estimates.

[6]Using clustered standard errors does not change the results in any of the three specifications.

as proposed by Gemmell et al. (2004). Municipal employees also tend to support municipal taxes. This could reflect self-interest, but could also reflect commitment to the public services they help provide. This is in line with the results in Ahlin and Johansson (2001), where they show that municipal employees in Sweden have preferences for more spending on local schooling. From the discussion above, these results are as expected.

Specification 3 adds five "value judgement" variables: supporting the political left, or the political right; perceiving good municipal services; distrust in local politicians; and claiming to have a low level of knowledge about society. Pseudo R^2 is higher with these new variables included, also a link test for model specification implies that this specification fits the data better than the other two specifications.

The coefficients on political views (left and right) are highly significant, as is the coefficient on low level of knowledge about society. The coefficient on perceived good municipal services is less significant, while that on the level of distrust is not statistically significant at conventional levels. Reverse causality may be a problem when it comes to the variables on political views, though not including these variables does not change the significance levels and marginal effects of the other variables very much. An explanation to why tax base and intergovernmental grants do not have statistically significant effects (as is also the case in (Mörk, 2005)) could be that people do not know or assess this information when it comes to their preferences for the municipal income tax rate.

While most of the previous coefficients (and their significance levels) do not change much, the coefficient on being a municipal employee is now insignificant. Municipal employees tend to support the political left more than the right. Including these variables indicates that it is political views rather than employer that is important in determining the level of support for municipal taxes. Also, now the coefficient on high income is not statistically significant. Apparently, after controlling for political views and level of knowledge about society, perceptions about public services, and newspaper readership, the pure effect of income on support for municipal taxes becomes less pronounced. As in the other specifications, gender, being old, and having preschool children have no statistically significant effects.

The coefficient on the tax rate itself is smaller (and not statistically significant) than in the other specifications. Thus, the tax rate that people actually face in their municipality does not seem to have much effect on their level of support for

Table 5: Estimation of attitudes toward municipal income tax, 2004, ordered probit

	(1)	(2)	(3)
Tax rate	-0.079**	-0.071*	-0.046
	(0.036)	(0.038)	(0.041)
Tax base	-0.006	-0.006	-0.008
	(0.004)	(0.004)	(0.005)
Grants	-0.009	-0.012	-0.019
	(0.013)	(0.013)	(0.015)
Women	-0.016	-0.073	-0.034
	(0.059)	(0.066)	(0.072)
Old (65-85)	0.114	0.053	0.117
	(0.079)	(0.087)	(0.098)
Children	-0.039	-0.053	-0.004
	(0.085)	(0.089)	(0.096)
Low income	-0.154**	-0.144*	-0.159*
	(0.070)	(0.076)	(0.083)
High income	-0.143*	-0.187**	-0.124
	(0.080)	(0.086)	(0.093)
Low education	-0.075	-0.115	-0.113
	(0.071)	(0.077)	(0.086)
High education	0.201***	0.19**	0.212**
	(0.074)	(0.08)	(0.085)
Municipal employee		0.136*	0.026
		(0.075)	(0.081)
Newspaper		0.224***	0.235***
		(0.067)	(0.074)
Left			0.312***
			(0.085)
Right			-0.277***
			(0.089)
Good services			0.139*
			(0.072)
Low trust			-0.047
			(0.074)
Low knowledge			-0.259***
			(0.094)
Cut 1	-4.507	-4.185	-3.621
	(1.256)	(1.366)	(1.475)
Cut 2	-3.002	-2.645	-1.986
	(1.254)	(1.364)	(1.473)
Cut 3	-1.563	-1.213	-0.496
	(1.252)	(1.363)	(1.472)
Cut 4	-0.148	0.183	0.904
	(1.268)	(1.377)	(1.485)
Observations	1430	1257	1093
Log likelihood	-1576	-1375	-1154
Pseudo R^2	0.008	0.016	0.043

Dependent variable ranges from 1 for "abolish/decrease a lot" to 5 for "increase a lot." Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

municipal taxes in this specification. But what drives this result? As noted above, high education and regularly reading a newspaper are associated with living in a low tax municipality. Excluding both these variables (*High education* and *Newspaper*) turns the coefficient on actual tax rate statistically significant at the 10% level. Another variable for indicating media consumption (whether the respondent listens to or watches local news broadcasts regularly) is not associated with whether the respondent lives in a low-tax municipality. Including it as an explanatory variable in place of *Newspaper* shows that it has no explanatory power for attitudes to the tax rate. Neither does it change the significance levels or marginal effects of the other variables very much.[7] This indicaties that it is not information per se that is of importance for tax preferences. Also, the tax base and intergovernmental grants are associated with the actual tax rate (see Table 8). Excluding these two explanatory variables makes the actual tax rate statistically insignificant in all three specifications (i.e., also in specification 1 and 2).[8] The results regarding the effect of the actual tax rate are clearly sensitive to model specification; only in some specifications is it statistically significantly associated with tax attitudes. In the next section, the possible effect of the actual municipal tax on attitudes toward this tax will be investigated further.

Based on the coefficients from Specification 3, Table 6 (below) shows the marginal effects on the probability of a respondent choosing various levels of support for municipal taxes (for the dummy variables, these are actually first differences). Due to too few observations, the column *Increase a lot* is meaningless and therefore not presented here. Starting with the actual tax rate, a one percentage point higher tax rate (evaluated at the mean tax rate) implies a two percentage point higher probability of a respondent wanting to decrease the municipal tax somewhat or a lot, although as we have seen, this result is not statistically significant at conventional levels in this specification.[9] Moving from the minimum to the maximum tax rate increases the predicted probability of a respondent wanting to decrease the municipal tax somewhat or a lot by 9.2 percentage points.

Turning to the statistically significant effects, low income earners are, compared to middle income earners, 6 percentage points more likely to want to decrease the

[7]These results are available upon request.

[8]These results are available upon request.

[9]For Specifications 1 and 2, this marginal effect is about 3 percentage points (not presented here).

Table 6: Marginal effects based on ordered probit estimations of attitudes toward municipal income tax, 2004

	Abolish/ decrease a lot	Decrease some	Keep unchanged	Increase
Tax rate	0.006	0.012	-0.013	-0.005
Tax base	0.001	0.002	-0.002	-0.001
Grants	0.002	0.005	-0.005	-0.002
Women	0.004	0.009	-0.010	-0.003
Old (65-85)	-0.014	-0.032	0.033	0.013
Preschool children in home	-0.001	0.001	-0.001	-0.000
Low income	0.022*	0.040**	-0.046*	-0.015**
High income	0.017	0.032	-0.036	-0.012
Low education	0.015	0.029	-0.033	-0.011
Higher education	-0.026***	-0.058**	0.060**	0.022**
Municipal sector employee	-0.003	-0.007	0.007	0.003
Regular newspaper reader	-0.032***	-0.060***	0.069***	0.022***
Political left	-0.038***	-0.085***	0.088***	0.034***
Political right	0.038***	0.070***	-0.081***	-0.027***
Good public services	-0.018*	-0.037*	0.040*	0.014*
Low trust for politicians	0.006	0.012	-0.014	-0.005
Low social knowledge	0.038**	0.062***	-0.077***	-0.023***

Marginal effects for continuous variables and first difference for dummies following Specification 3, Table 5. *Increase a lot* not presented due to few observations. *** p<0.01, ** p<0.05, * p<0.1.

tax rate somewhat or a lot, and 2 percentage points less likely to want to increase it. Respondents with higher education are 9 percentage points less likely to want to decrease the tax rate and 2 percentage points more likely to want to increase it. This is also true for regular newspaper readers. Compared to those in the political middle, those who supported the left are 13 percentage points less likely to want to decrease municipal taxes somewhat or a lot, 9 percentage points more likely to want to keep them unchanged, and 3 percentage points more likely to want to increase them, while those supporting the right are 11 percentage points more likely than those in the middle to want to decrease taxes, 8 percentage points less likely to want to keep them unchanged, and 3 percentage points less likely to want to increase them. Respondents believing that the municipal services are good are 6 percentage points less likely to want to decrease the tax rate and 1 percentage point more likely to want to increase it, while respondents believing that their knowledge of society is low are 10 percentage points more likely to want to decrease the tax rate, and 2 percentage points less likely to want to increase it.

Going from a tax base a half standard deviation below the mean (92% of the mean tax base) to half a standard deviation above the mean (107% of the men tax base) increases the probability of wanting to decrease the tax rate somewhat or a lot by 4.6 percentage points. A standard deviation increase in intergovernmental grants increases the predicted probability of a respondent wanting to decrease the municipal tax somewhat or a lot by 3.4 percentage points. However, these effects are not statistically significant.

3.1 Tiebout bias

Why does the actual tax rate not seem to have a more clear effect on respondent attitudes toward municipal taxes? It is possible that some kind of Tiebout effect is at work (Tiebout, 1956). The municipal labor income tax is the only tax that varies across municipalities in Sweden, and respondents might be more satisfied with this tax because of the possibility of moving to a municipality with a tax rate more to their liking. An indication of this is that the municipal income tax is the tax that most people are satisfied with according to the data used in this study.

If location of residence is exogenous and respondents are randomly distributed over municipalities, we would expect those paying higher taxes to be more supportive

of decreasing tax rates than those paying lower taxes. In a Tiebout setting, where location is endogenous, a person who does not like the tax rate in her municipality could move to another, with a tax rate more to her liking. In this case, the estimated coefficient of the effect of tax rates on desire to change them would be underestimated in our regressions. That is, some of those who prefer low tax rates might already have moved to lower tax municipalities. The more their choice of residence has already been affected by the municipal tax rate, the smaller the coefficient for the effect of the tax rate. We could call this a Tiebout bias (Ahlin and Johansson, 2000; Rubinfield et al., 1987).

As proposed by Rubinfield et al. (1987), instrumental variable estimation might correct the bias due to the endogeneity problem. Instrumental variable estimation is conducted via a two-step procedure where the endogenous variable is regressed on the instrumental variables and the exogenous variables from the original estimation. In the second stage, the regression of interest is estimated as usual, except that in this stage, the endogenous variable is replaced with the predicted values from the first stage regression.

I use four variables assumed to affect the preference municipality mismatch but not the preferred tax rate. This choice of variables follows Rubinfield et al. (1987) and Ahlin and Johansson (2000). One indicates whether the individual lives in one of the three major urban regions in Sweden (*Urban*), and is meant to measure the availability of municipality choice. There are multiple municipalities within commuting distance in each region, and this should decrease the mismatch, since it is possible to choose from several municipalities with different tax rates. By the same token, a variable indicating a recent move is included (*Moved*), since more recent movers should be more satisfied with the tax rate in the municipality they have chosen to move to. The other two variables indicate whether or not there was a change in the municipal tax rate from 2002 to 2003, or from 2003 to 2004 (*Change '03* and *Change '04*). Since moving is costly, people might choose not to move even though the tax rate has recently changed from their preferred level. A large change in the tax rate would, at least if unexpected, make the mismatch larger.

Using these variables (*Urban*, *Moved*, *Change* '03, and *Change '04*) as instruments for the actual tax rate, we can test for a potential Tiebout bias and, in the case of a bias, improve the estimation of the causal effect of the actual municipal tax rate on the attitudes towards this tax. The instrumental variable regressions,

as well as an OLS comparison, are presented in Table 7.[10]

The dependent variable in the first step is the actual tax rate in the municipality where the respondent lives. We can see that the municipal tax rate is indeed correlated with the chosen instruments (which are supposed to affect municipal choice but not the preferred tax rate).[11] This is supported by the Cragg-Donald statistic, which indicates that the instruments are not weak. This imply that the instruments are good predictors of the actual tax rate and that the predicted values have enough variation to be used as instruments. The Sargan test suggests that the instruments are valid. This imply that the instruments do not seem to affect tax rate preferences directly, but only the mismatch, as we have assumed.

The dependent variable in the second step is the level of support for municipal taxes, ranging from 1 for "abolish/decrease a lot" to 5 for "increase a lot." Here the tax rate is replaced with the predicted values of the tax rate from the first-stage regression. The second-stage results show that (instrumented) tax rate has a statistically significant negative effect on tax attitudes.[12]

Using the Hausman test, we can test whether the tax rate is endogenous in our estimations; i.e., whether the tax rate is correlated with the error term. The Hausman test does not suggest that the IV-specification is preferable for any of the tested combinations of instruments. That is, the null that the municipal tax rate is exogenous is not rejected (the p-value ranges from 0.110 to 0.156 in the three specifications presented in Table 7) . This is true for all possible combinations of our four instruments. The specifications presented in Table 7 are closest to passing the Hausman test. Thus, the results of the test are robust to the inclusion of different instruments.

This suggests that a Tiebout bias is not a problem in this setting, yet the results

[10] In the IV-estimation carried out here, OLS is used since this makes it easier to carry out the tests (if the instruments are weak and if they are valid). The estimates are very similar using ordered probit instead (and the result of the Hausman test is the same). Table 9 in the appendix presents the full first and second steps of the preferred IV-estimation.

[11] People living in urban regions tend to face higher tax rates, while those who have moved recently live in municipalities with lower tax rates. When it comes to municipalities that recently changed their tax rates, the effects go in different directions; municipalities that increased their tax rates in 2003 tend to have lower tax rates than others, while those who increased their tax rates in 2004 instead tend to have higher tax rates than others. The reason for this is that municipalities that increased their tax rates in 2003 increased it from a relatively low level, while this is not the case for municipalities that increased their rates in 2004.

[12] A modified Breuch-Pagan test (not presented) suggests that heteroskedasticity is not a problem, hence I do not use robust standard errors (although doing so does not change the results).

Table 7: Testing for Tiebout bias

Dependent variable: attitudes towards municipal income tax rate				
	OLS	IV 1	IV 2	IV 3
Panel A: Second stage results				
Tax rate	-0.030	-0.131*	-0.122*	-0.121*
	(0.026)	(0.069)	(0.069)	(0.069)
Panel B: First stage results for tax rate				
Urban		0.117*	0.115	
		(0.070)	(0.071)	
Change '03		-0.374***	-0.375***	-0.342***
		(0.046)	(0.046)	(0.041)
Change '04		0.791***	0.790***	0.778***
		(0.066)	(0.067)	(0.065)
Moved			-0.074	
			(0.090)	
Observations	1093	1091	1085	1091
F-value	6.25			
Hausman p-value		0.110	0.145	0.156
Cragg-Don. F-value		62.45	46.40	92.12
Sargan p-value		0.359	0.145	0.495

Estimated with 2SLS. Only results for tax rate and instruments presented. In the appendix, Table 9, the full first and second stage of $IV1$ is presented. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

from previous studies have been quite sensitive to the choice of instrumental variables (Ahlin and Johansson, 2000). The result of the Hausman test should therefore be accepted only with some caution. Even though it is not possible to reject the null of no Tiebout bias, when the municipal tax rate is instrumented for, the coefficients get considerably larger (and statistically significant at the 10% level) than in the OLS counterpart (see second stage in Table 7). When the effect of Tiebout sorting is accounted for, the coefficient for the tax rate increases by a factor of more than 4, as compared to the OLS case. This is at least an indication that actual tax rates matter for attitudes.

But, why is not the case for Tiebout sorting stronger? One reason could be that people are not aware of the different tax rates in nearby municipalities, or do not know whether they live in a high or low tax municipality. In this case, their desire to change the municipal tax rate might depend, to some extent, on misperceptions of how high their tax rate actually is.[13] An indication of this is that people have

[13]Noting that the estimated model allows the respondent to misperceive the actual tax rate, this

unrealistic expectations about taxes and government budgets: about 64% of the respondents would like to decrease their tax rate, while only 27% would like to decrease the public services provided by the public sector financed by the taxes. Another reason why people might not move as a result of differences in municipal tax rates is "editing," whereby people rule out less important factors in their decision making (Kahneman and Tversky, 1979). The municipal tax rate may be one such less important factor. A status quo bias, where individuals prefer what they have compared to what they do not have, is also a possibility (Kahneman et al., 1991). John et al. (1995) found that, although there is some support for Tiebout sorting, there are generally more important factors o consider when deciding where to live.

4 Conclusion

Coming back to the questions in the opening paragraph. People in high tax municipalities are to some extent more likely to want lower tax rates, and people in low tax communities are to some extent more likely to want higher tax rates. While it is tempting to interpret this quite modest effect of the actual tax rate on tax preferences as a Tiebout effect, i.e., people move to municipalities with their preferred tax rate and do not like to change the tax, the evidence for this is not very strong. Another possible explanation is that people do not always know their actual tax rates, or how they compare to tax rates in nearby municipalities.

Since better-informed people may be less likely to want to decrease tax rates, measures to increase public knowledge about taxes may be important for the legitimacy of income tax collection.

Possible self-interest variables, such as being a municipal employee, having young children, or being 65 or older, do not seem to be important in determining people's desire to change tax rates. Those with low and high income (as compared to middle income earners) are more likely to want to decrease their tax rates, however. Political views seem to be important in determining people's tax preferences: those who support the political right are more likely to want to decrease tax rates, while those who support the left are less likely. Of course, the self-interest factors might affect political views, not tax preferences directly. Also, reverse causality may be a problem when it comes to the variables on political views, though not including

explanation would imply large misperceptions.

these variables does not change the results regarding the other variables very much.

To further address the questions concerning what is important for people's tax preferences, it would be interesting to ask whether people know their actual tax rates and whether they know what their tax payments are used for. This would make it possible to distinguish whether people who know what their taxes are used for have different preferences regarding tax rates than those who do not.

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A Appendix

Table 8: Attitudes toward municipal income tax, 2004, OLS

	(1)	(2)	(3)
Tax rate	-0.053**	-0.048*	-0.030
	(0.024)	(0.026)	(0.027)
Tax base	-0.004	-0.004	-0.005
	(0.003)	(0.003)	(0.003)
Grants	-0.006	-0.008	-0.012
	(0.008)	(0.009)	(0.010)
Women	-0.010	-0.049	-0.023
	(0.039)	(0.044)	(0.045)
Old (65-85)	0.074	0.032	0.070
	(0.053)	(0.058)	(0.062)
Children	-0.025	-0.034	-0.002
	(0.057)	(0.060)	(0.062)
Low income	-0.102**	-0.094*	-0.097*
	(0.047)	(0.051)	(0.053)
High income	-0.097*	-0.127**	-0.081
	(0.054)	(0.058)	(0.060)
Low education	-0.049	-0.076	-0.073
	(0.048)	(0.052)	(0.055)
High education	0.136***	0.129**	0.136**
	(0.050)	(0.052)	(0.054)
Municipal employee		0.092*	0.017
		(0.050)	(0.052)
Newspaper		0.149***	0.148***
		(0.045)	(0.047)
Left			0.199***
			(0.055)
Right			-0.176***
			(0.057)
Good services			0.088*
			(0.046)
Low trust			-0.028
			(0.047)
Low knowledge			-0.163***
			(0.060)
Constant	4.544***	4.298***	3.815***
	(0.843)	(0.909)	(0.940)
Observations	1430	1257	1093
R^2	0.018	0.035	0.090

Dependent variable ranges from 1 for "abolish/decrease a lot" to 5 for "increase a lot." Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Testing for Tiebout bias, IV 1

	Step 1	Step 2
Tax rate		-0.131*
		(0.069)
Tax base	-0.015***	-0.006***
	(0.004)	(0.00)
Grants	0.019**	-0.010
	(0.010)	(0.010)
Women	0.030	-0.019
	(0.049)	(0.046)
Old (65-85)	0.103	0.078
	(0.067)	(0.063)
Children	-0.156**	-0.022
	(0.066)	(0.062)
Low income	-0.076	-0.105**
	(0.057)	(0.053)
High income	-0.038	-0.091**
	(0.064)	(0.060)
Low education	-0.015	-0.077
	(0.058)	(0.055)
High education	-0.106*	0.114**
	(0.058)	(0.055)
Municipal employee	0.071	0.028
	(0.055)	(0.052)
Newspaper	-0.152***	0.132***
	(0.050)	(0.048)
Left	-0.006	0.199***
	(0.058)	(0.054)
Right	-0.059	-0.183***
	(0.061)	(0.058)
Good services	-0.046	0.89*
	(0.049)	(0.046)
Low trust	0.056	-0.023
	(0.051)	(0.048)
Low knowledge	-0.003	-0.163***
	(0.064)	(0.060)
Urban	0.117*	
	(0.070)	
Change '03	-0.374***	
	(0.046)	
Change '04	0.791***	
	(0.066)	
Constant	33.131***	
	(0.383)	
Residual		0.19
		(0.12)
Observations	1091	1091
F-value	23.52	
Hausman p-value		0.110
Cragg-Don. F-value		62.45
Sargan p-value		0.359

Dependent variable in step 1 is actual tax rate. In step 2 municipal tax rate attitudes. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Paper VI

Intergovernmental grants and fiscal competition*

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May 5, 2010

Abstract

This theoretical paper shows how a central government can induce a policy concerning a municipal matter through a package of a policy requirement and a grant. We find that, due to fiscal competition and the possibility for citizens to move between municipalities, the central government can make the municipalities adopt the policy requirement although the municipalities make a loss from doing so. We apply this model to a recent Swedish child-care fee reform and can explain why all Swedish municipalities implemented the maximum child-care fee although it had a negative impact on many municipalities' finances.

Keywords: child care, user fee, fiscal competition, municipality, intergovernmental grant

JEL classification: H77, H42, H72

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1 Introduction

A central government wants to implement a policy concerning a municipal matter. However, for political reasons, it does not want to intervene too much and does not want to take away the sovereignty of the municipalities. Hence, it has to make an offer that the municipalities cannot resist. By offering a grant, conditional on implementing the policy, the central government can make all municipalities implement the policy voluntarily.[1] The question is how large such a grant would have to be. With independent municipalities, the grant would need to be sufficiently large to cover the municipal costs of the reform. In this paper we show that, when there is fiscal competition between municipalities, the grant does not have to be sufficient to cover the cost of the reform for the municipalities – they will implement it anyway. Hence, in a matter where there is fiscal competition, it is much cheaper for the central government to make the municipalities come their way, than without fiscal competition.

Jurisdictions may compete with low taxes so as to attract firms and high income citizens (Zodrow and Mieszkowski, 1986; Wilson, 1986, 1999), with low levels of social assistance so as not to attract welfare recipients (Brueckner, 2000), or with high levels of public good provision to compete for residents (Wilson and Gordon, 2003). Brueckner (2000) sketches a model showing that welfare migration decreases benefit levels compared to a situation without migration; states choose lower benefit levels than they would have if the poor could not move into their state. Hence, this fiscal competition creates a "race to the bottom." Fiva and Rattsø (2006) and Dahlberg and Edmark (2008) find evidence for strategic interactions among local jurisdictions concerning welfare benefits in Scandinavian countries, and the latter study shows a significant race-to-the-bottom. In Fiva and Rattsø (2006) this is prevented mainly due to grants from the central government. Day and Winer (2006) only find small effects of public policy on moving patterns in

[1] That central governments use grants to promote their own interest has received a lot of attention in the literature since Musgrave and Musgrave (1976). Johansson (2003) finds empirical evidence of this in Sweden, and Borck and Owings (2003) is one of many empirical papers finding strategic distribution of intergovernmental grants in the US.

Canada. In a recent paper, McKinnish (2007) finds some evidence of welfare migration when comparing welfare participation at state borders to participation rates in state interiors.

In this paper, we study user-fee competition. To our knowledge, the only previous paper looking at this specific kind of fiscal competition is Fuest and Kolmar (2007), who show that user-fee competition tends to make decentralized solutions inefficient.[2] The literature on fiscal competition has mainly been concerned with the efficiency aspect, whether competition leads to inefficiently low taxes or levels of public spending or not.[3] In this paper, we do not analyze the efficiency aspects of fiscal competition, but rather its consequences for policy implementation. We find that fiscal competition among municipalities enables a central government to make municipalities implement a reform that is costly to the municipalities but favorable to mobile citizens.

One area in which fiscal competition may be an issue is publicly subsidized child care, which is an increasingly important task in many countries. How the child care system is organized has effects on who bears the costs, on female labor force participation, on children's wellbeing, and on fertility. Even though there are vast differences between different child care systems, the coverage is high and the subsidies are large in many Western countries. Furthermore, increasing female labor force participation by improving child care is a political objective for the European Union (Roit and Sabatinelli, 2007). Hence, publicly subsidized child care is on the political agenda in many countries. In this paper, we explicitly regard subsidized child care and fiscal competition arising from the magnitude of the subsidies.

We present a model where there is fiscal competition among municipali-

[2]Huber and Runkel (2009) acknowledges the importance of user fees, but study tax competition and not competition in terms of user fees *per se*.

[3]Zodrow and Mieszkowski (1986) show that distorting taxes on mobile capital reduces public services, while Fuest and Kolmar (2007) find that inefficiency may imply either too high or too low levels of user fees and Wilson and Gordon (2003) find that expenditure competition actually increases efficiency. Brueckner (2004) finds that both results are possible under different conditions and Eggert and Sørensen (2008) find that tax base mobility may be welfare-enhancing up to some point. Keen and Marchand (1997) show that fiscal competition may distort the mix of public spending.

ties, which use combinations of taxes and child-care fees to attract families with children. In spite of the costs of providing child care, families are net contributors to their municipalities, and are therefore attractive to them.[4] In such a setting, we show that when the central government wants to induce a policy that favors mobile families, namely reduced child-care fees, competition among municipalities enforces the implementation even if it is costly to municipalities.

Moreover, we illustrate the implications from the model with a recent Swedish child-care fee reform. In Sweden, families with preschool children are more mobile across municipalities than other citizens (Statistics Sweden, 2003, 2006a), and municipalities can therefore compete for them using mixes of child-care fees and municipal income tax rates. In 2002, the central government induced a reform, which implied radical reductions in municipal child-care fees for most Swedish families with young children. One of the central government's official reasons for implementing the maximum child-care fee was to improve the economic wellbeing of families with young children. Another aim was to increase parents' labor supply. The reform implied the largest difference for those with the highest incomes, who therefore were the most likely to alter their labor supply. High-income earners in Sweden pay a state income tax in addition to the municipal income tax paid by everyone. Hence, one could suspect that increasing state tax revenues might have been an incentive for the central, while not for the local governments to implement the reform.

While the reform was voluntary to municipalities, they were given a grant if they decreased their child-care fees to a rather low maximum fee. For many municipalities, the conditional grant was not large enough to cover the losses from the fee reduction (Wikström, 2007), yet every single municipality chose to implement the reform. The theoretical model presented in this paper explains this perhaps surprising outcome as fiscal competition over families with young children. As other municipalities implemented the reform, local governments felt forced to do the same in order not to have a relatively lower

[4]Berggren and de Beer (2007) and Central union of local authorities (2006) suggest that families with young children are indeed net contributors to Swedish municipalities.

attractiveness among families with children and thereby risk suffering an even greater loss due to families moving to other municipalities.

This paper contributes to the literature in that it models a situation where a central government can make use of competing municipalities to reach its goals. It also explicitly models a conditional grant, which makes it possible to assess the relation between central and local governments in general and in the context of a reform like the recent Swedish maximum-fee reform.

The rest of the paper is organized as follows. In Section 2 we present the fiscal competition model and derive an equilibrium between two local jurisdictions. In Section 3 we analyze how a central government can make both municipalities adopt a policy that might make them both worse off. Then follows Section 4 where the model is applied to the Swedish child-care fee reform. Section 5 concludes the paper.

2 The Model

Before analyzing in Section 3 what happens when a reform is implemented, let us derive the pre-reform equilibrium.

There are two jurisdictions inhabited by a number of immobile citizens. There are also a number of mobile citizens, who move across the jurisdictions. Both kinds of households consume a private good and a publicly provided one, but we assume that the immobile households (e.g., older people) consume a non-rival public good and mobile households (e.g., families) consume a local private good (in our case child care).

The immobile citizens outnumber the mobile ones and are therefore median voters in both jurisdictions.[5] They decide on the municipal tax rate, the amount of the non-rival good to provide, and how much to subsidize the service that only the mobile households use. The two jurisdictions compete over the mobile citizens by means of user fees and taxes. We present the model in terms of two municipalities providing subsidized child care, for which mobile families with children pay user fees. However, the model is applicable to any

[5]That the median voter is immobile has been common practice in the literature on fiscal competition since the seminal papers by Brown and Oates (1987) and Wildasin (1991).

kind of user-fee competition.

Consider two municipalities ($i = A, B$), of which both have a mass of immobile inhabitants without children of $M \geq 1$. For simplicity, everyone has the same gross income, y, while permanent inhabitants in B have a stronger preference for the public good than those in A. In the economy, there is also a continuum of families with young children of unit mass, families who are mobile between the two municipalities. For simplicity, each family consists of one parent and one child.

2.1 Families

The first part of the model illustrates the mobile users'; i.e., the parents' choice of which municipality to reside in. This choice depends on the child-care fees φ_i and the tax rates t_i in the two municipalities ($i = A, B$), and on the degree of attachment to the municipalities, described by $k = [0, 1]$. k is uniformly distributed among parents and those with a low k prefer municipality A and those with a high k prefer B.[6] The utility of a parent in a specific municipality is described by an extremely simple quasi-concave function of private consumption and the municipal preference

$$V_A = V\left(x_A - k\right), \tag{1}$$

$$V_B = V\left(x_B - (1 - k)\right), \tag{2}$$

where x_i is private consumption allowed in municipality i, $i = A, B$. The budget constraint if one lives in municipality i is

$$y(1 - t_i) = x_i + \varphi_i, \tag{3}$$

where y is the fixed income and t_i is the proportional tax rate in municipality i. All parents are assumed to work (and receive income y) and to utilize pub-

[6]This assumption assures interior solutions concerning the number of inhabitants in each municipality and is in line with the original Hotelling model on spatial competition (Hotelling, 1929), and is also used by, e.g., Mansoorian and Myers (1997).

licly provided care for their child to the same extent, priced at the fee φ_i. In equilibrium, the marginal parent (with the marginal value $k^*(\varphi_A, \varphi_B, t_A, t_B)$) is indifferent between the two municipalities. Setting $V_A^* = V_B^*$ gives the threshold value in equilibrium:

$$k^* = \frac{1}{2} + \frac{y(t_B - t_A) + \varphi_B - \varphi_A}{2}. \tag{4}$$

All parents with $k < k^*$ locate in A, and those with $k > k^*$ locate in B. Since the mass of parents is normalized to unity, the number of parents residing in A can be denoted $N_A = k^*$. Differentiating (4) shows how parents would migrate in response to changes in tax rates and child-care fees:

$$\frac{\partial k^*}{\partial \varphi_A} = -\frac{1}{2} < 0, \qquad \frac{\partial k^*}{\partial \varphi_B} = \frac{1}{2} > 0, \tag{5}$$

$$\frac{\partial k^*}{\partial t_A} = -\frac{y}{2} < 0, \qquad \frac{\partial k^*}{\partial t_B} = \frac{y}{2} > 0. \tag{6}$$

Hence, parents choose where to live depending on the differences in child-care fees and tax rates between the municipalities.

2.2 Municipalities

The second stage of the model considers the municipalities' choices. The median voter is an immobile non-user in both municipalities. We could, for instance, think of these permanent inhabitants as older citizens who have become very much attached to their municipality and therefore would not think of moving. The median voter is assumed to not only care about private consumption but also to receive utility from a publicly provided public good, G. We assume that this good is of use for the immobile inhabitants only, and not for the mobile ones. Although this is a simplification, we could think of G as, e.g., spending on cultural activities, elderly care, or museums that are generally visited by the elderly to a larger extent than by families with

children.[7] Although the median voters have no interest in child care *per se*, they would be willing to subsidize it in order to attract families with young children if they are net contributors to the municipal budget, so as to increase the tax base (see, e.g., Bergstrom and Blomquist, 1996).

We assume that the permanent inhabitants in municipality A have a stronger preference for private consumption, whereas municipality B consists of permanent inhabitants with a stronger preference for the public good. Thus, for given levels of public and private consumption, the marginal rate of substitution between the goods will not be equal in the two municipalities, but

$$\frac{U_G^{A\prime}(\bar{c},\bar{G})}{U_c^{A\prime}(\bar{c},\bar{G})} < \frac{U_G^{B\prime}(\bar{c},\bar{G})}{U_c^{B\prime}(\bar{c},\bar{G})}. \tag{7}$$

The median voter in municipality i solves the following problem taking the behavior of mobile parents and of municipality j into account:

$$\max_{t_i,G_i,\varphi_i} U^i\left(c_i,G_i\right), \quad i=A,B, \tag{8}$$

where $c_i = y\left(1-t_i\right)$ and where $U^i(c,G)$ is quasi-concave with $U''_{cG} \geq 0$, implying that increasing the amount of the public good would not reduce the marginal utility of private consumption. (8) is maximized subject to the municipal budget constraint, that total tax revenue from inhabitants both with and without children are to be divided into public good provision and provision of child care for families with children. We normalize the unit cost of child care provision to one, and denote user fees φ. Hence, the budget constraint reads

$$G_i = t_i y(M+N_i) - N_i(1-\varphi_i), \tag{9}$$

where N_i and M are the number of inhabitants with and without children in municipality i. Maximizing (8) subject to (9) and the actions of municipality j, we can rewrite the resulting first-order conditions for interior solutions as

[7] The simplification that G does not enter the utility function of families with children assures that their moving decision is determined in one dimension only.

$$y\,\frac{U_c^{i\,\prime}}{U_G^{i\,\prime}} = y(M+N_i) + \frac{\partial N_i}{\partial t_i}\big(t_i y - (1-\varphi_i)\big), \tag{10}$$

$$N_i = \big(1-\varphi_i - t_i y\big)\frac{\partial N_i}{\partial \varphi_i}, \quad i = A, B. \tag{11}$$

An interior solution concerning φ requires that $\big(1-\varphi_i - t_i y\big) < 0$, i.e., that families with children are actually net contributors. If they were not, then the median voter would simply charge $\varphi = 1$. However, it is likely that tax revenues actually exceed costs of child-care provision in municipalities (Berggren and de Beer, 2007). Therefore, we will henceforth assume interior solutions, so that $\varphi_i < 1$ optimally, $i = A, B$. Equation (11) can, together with (4) and (5) be used to formulate the following reaction functions for the two municipalities:

$$\varphi_A = \frac{2 + \varphi_B + y\,(t_B - 2t_A)}{2}, \tag{12}$$

$$\varphi_B = \frac{2 + \varphi_A + y\,(t_A - 2t_B)}{2}. \tag{13}$$

Hence, there is a competing interaction between the two municipalities. The higher the tax rate and child-care fee in the other municipality, the higher the child-care fee can be for a given tax rate.[8] Simultaneously solving (12) and (13) gives us the possible equilibria to this game:

$$\varphi_i^* = 2 - y t_i^*, \qquad i = A, B. \tag{14}$$

Using φ_i^* in (4) gives

$$\tilde{k}^* = \frac{1}{2}. \tag{15}$$

Hence, the municipal child-care fee is a negative function of the own tax

[8]Note though that $\varphi_i \leq 1$, or parents would buy child care in the private market instead.

rate only and there will be equally many inhabitants in both municipalities in equilibrium.

Having done this, equations (14) and (6) can be substituted into (10), which soon boils down to the standard Samuelson condition for both municipalities:

$$U_c^{i\,\prime} = MU_G^{i\,\prime}, \quad i = A,\ B. \tag{16}$$

Using these solutions in the municipal budget constraint implies that

$$G_i^* = t_i^* yM + \frac{1}{2}. \tag{17}$$

We can thus conclude that even when there are mobile families, the tax rate and public good provision are entirely decided by the Samuelson condition concerning the immobile inhabitants (Note that due to the constant income of all citizens, the tax is in effect a lump-sum tax). Hence, there will be Pareto efficient policy rules in both municipalities. Equation (16) assures that the tax rate and public good provision follow the Samuelson condition, and that the marginal rate of substitution is the same in both municipalities, i.e. $U_G'/U_c' = 1/M$. From (7) we know that if the tax rates and public goods provision were the same in both municipalities, they would differ in their MRS. In order for the median voter in A to have the same MRS as the one in B, there must be a lower tax rate and less public good provision in A than in B. Hence,

$$t_A^* < t_B^*, \quad G_A^* < G_B^*. \tag{18}$$

Since municipalities gain from having parents in the municipality ($G_i^* > t_i^* yM$), the child-care fee is set as a negative function of the municipal tax rate according to (14), which therefore implies that

$$\varphi_A > \varphi_B. \tag{19}$$

Hence, we have an initial Pareto efficient[9] equilibrium where the two mu-

[9]Considering the permanent inhabitants.

nicipalities have different child-care fees and tax rates, but the same number of inhabitants and net revenues from parents.[10]

3 Introducing a maximum fee

Let us assume that the central government is a benevolent social planner that wants to maximize social welfare in the economy, where social welfare is a weighted sum of the utilities in the economy:

$$W = \alpha MU^A + \beta MU^B + (1 - \alpha - \beta)V, \tag{20}$$

where U^i is the utility of the median voter in municipality i and V is the average utility of a family with children.[11] Maximizing W in (20) with respect to the two tax rates and fees results in first-order conditions that are presented in Appendix C. The resulting tax rates are the same as in the competitive equilibrium,[12] but the central government would prefer other child-care fees. Disregarding the utility of families with children, we get the standard result that fees are too low in the competitive setting as compared to the optimal one (cf. Zodrow and Mieszkowski, 1986; Wilson, 1986, 1999). In our setting this is counteracted by the fact that when families with children are taken into account the optimal fees are lower. In Appendix C we show that if the weighted marginal utility of consumption for families with children is higher than for the median voters without children in the two municipalities, then the competitive equilibrium implies too high child-care fees in both municipalities compared to the optimal solution. Since all adults have the same gross income Y and the families with children pay a child-care fee and also have two people (adult + child) to feed with their net income it is not a far-fetched assumption that families with children have a higher marginal utility of consumption. Therefore, the central government would like the two mu-

[10] Net revenues= $t_A^* y N_A - (1 - \varphi_A)N_A = \frac{1}{2} = t_B^* y N_B - (1 - \varphi_B)N_B$.

[11] We assume that the central government is concerned with the families' consumption only and not with their attachment to the municipality of residence. Therefore we concentrate on the threshold family.

[12] This is not surprising, since the constant pre-tax income makes the tax a lump-sum one.

nicipalities to reduce their child-care fees. The exact level is of no importance for our purpose, since we are interested in the political economy mechanisms in and between municipalities. More exactly, we focus on how the central government can induce municipalities to implement a reform that they do not really like. Let us therefore assume that the central government does not want any parent to pay a larger child-care fee than $\bar{\varphi}$, which is lower than the existing child-care fees, determined in Section 2.2.

3.1 Unchanged tax rates

Since child care is a municipal matter, the central government cannot impose the lower fee directly. However, by offering a *per child* grant, γ to municipalities conditional on decreasing their child-care fee to $\bar{\varphi}$, the central government can indirectly get the desired result. This policy is somewhat similar to a matching grant where the municipalities are required to match the central government spending; the studied grant does not necessarily match municipal spending, though, but is rather conditional on certain municipal policy. The question is, how large does γ have to be to make municipalities actually adopt $\bar{\varphi}$? Taxes are, for the moment, assumed to be fixed. The rationale for this is that the decision on the implementation of the reform and the tax decision may be separate, so that municipalities first make the choice whether or not to adopt the policy without taking altered taxation into consideration. In Section 3.2 we, however, release this constraint and let municipalities change their tax rates. Then, the analysis is more complex, and we will use the grant γ derived in the present subsection as an upper bound in that analysis.

In order to judge whether the median voters in the two municipalities are better or worse off implementing the reform when keeping taxes constant, it is sufficient to only look at the effects on total net revenues collected from parents. This is because tax rates, and thereby private consumption for the median voters are constant and that $U''_{CG} \geq 0$; hence, we can just look at the amount of public goods: if it increases, then utility increases and vice versa.[13] When municipality i adopts the lower fee, it makes a loss of $\varphi_i - \bar{\varphi}$

[13]Also Bergstrom and Blomquist (1996) make the analysis in terms of maximizing net

per family. However, it also gets a grant γ per family and more families may move into the municipality thanks to decreased fees.

If a municipality implements the reform, then total net revenue from mobile parents, TR, will change in the following way:

$$\Delta TR = ty(N_1 - N_0) - N_1(1 - \bar{\varphi}) + N_0(1 - \varphi) + \gamma N_1, \tag{21}$$

where $N_0 = 1/2$ and N_1 is the number of parents in the municipality after the reform.[14] Whether the change is positive or negative depends not only on the actual fee loss $(\varphi - \bar{\varphi})$ and on the grant γ, but also on the actions of the other municipality, since migration depends on the *relative* taxes and fees in the two municipalities according to (4). The changes in total revenue for A and B are shown in Table 1 below. Each cell in the table presents $(\Delta TR_A,\ \Delta TR_B)$.

Table 1: $(\Delta TR_A,\ \Delta TR_B)$ depending on the two municipalities' actions.

	φ_A	$\bar{\varphi}$
φ_B	0 , 0	$\frac{\gamma(1+\varphi_A-\bar{\varphi})-(\varphi_A-\bar{\varphi})^2}{2}$, $\frac{\bar{\varphi}-\varphi_A}{2}$
$\bar{\varphi}$	$\frac{\bar{\varphi}-\varphi_B}{2}$, $\frac{\gamma(1+\varphi_B-\bar{\varphi})-(\varphi_B-\bar{\varphi})^2}{2}$	$\frac{\bar{\varphi}-\varphi_B-(\varphi_A-\bar{\varphi})(\varphi_A-\varphi_B)+\gamma(1+\varphi_A-\varphi_B)}{2}$, $\frac{\bar{\varphi}-\varphi_A-(\varphi_B-\bar{\varphi})(\varphi_B-\varphi_A)+\gamma(1+\varphi_B-\varphi_A)}{2}$

As is clear from Table 1, if neither of the municipalities adopts $\bar{\varphi}$, then of course nothing happens to TR, and if only one adopts the maximum fee, then the other municipality will for sure make a loss due to a resulting outflow of parents $(\bar{\varphi} - \varphi_i < 0,\ i = A,\ B)$. What happens to TR in the implementing municipality depends on the size of the governmental grant, γ as do the effects on TR if both municipalities adopt the maximum fee, which is described below.

revenues.

[14]This is applicable to both municipalities, and subscript i is suppressed for notational convenience.

Proposition 1. *With migration possibilities and for all $\bar{\varphi} < \varphi_B < \varphi_A$, the lowest conditional grant that makes both municipalities adopt the child-care fee $\bar{\varphi}$ is $\gamma = \frac{(\varphi_A - \bar{\varphi})^2}{1+\varphi_A-\bar{\varphi}}$.*

Proof. See Appendix B.1.

□

Moreover,

Proposition 2. *The conditional grant $\gamma = \frac{(\varphi_A - \bar{\varphi})^2}{1+\varphi_A-\bar{\varphi}}$ is lower than what would have been required for both municipalities to adopt the reform in absence of migration.*

Proof. Without any migration possibilities, i.e., if parents are also permanent inhabitants, (21) is reduced to

$$\Delta TR_i = N_i(\gamma + \bar{\varphi} - \varphi_i), \tag{22}$$

which means that without migration, municipality i will adopt $\bar{\varphi}$ if and only if $\gamma \geq \varphi_i - \bar{\varphi}$ so that it does not make a loss from implementing the reform. Because $\varphi_A > \varphi_B$, a conditional grant $\gamma \geq \varphi_A - \bar{\varphi}$ would be required for both municipalities to adopt $\bar{\varphi}$ without mobility. Comparing the two grants, we find that a smaller grant is required in presence of mobility:

$$\gamma_{immobile} - \gamma_{mobile} = \varphi_A - \bar{\varphi} - \frac{(\varphi_A - \bar{\varphi})^2}{1 + \varphi_A - \bar{\varphi}} = \frac{\varphi_A - \bar{\varphi}}{1 + \varphi_A - \bar{\varphi}} > 0. \tag{23}$$

□

Hence, it will be cheaper for the central government to make both municipalities implement the reform in the presence of mobility and thereby create fiscal competition. Actually,

Proposition 3. *With the grant $\gamma = \frac{(\varphi_A - \bar{\varphi})^2}{1+\varphi_A-\bar{\varphi}}$, both municipalities implement the reform, although they both make a loss from doing so.*

Proof. The per-family grant $\gamma = \frac{(\varphi_A - \bar{\varphi})^2}{1+\varphi_A-\bar{\varphi}}$ assures that $\Delta TR_A = 0$ if A is the sole implementor. However, according to Proposition 1, B will also implement the maximum fee, which will reduce A's total revenues. The effect on total revenues for A when both municipalities adopt the maximum fee is:

$$\Delta TR_A = \frac{\bar{\varphi} - \varphi_B - (\varphi_A - \bar{\varphi})(\varphi_A - \varphi_B) + \gamma(1 + \varphi_A - \varphi_B)}{2} = \frac{\bar{\varphi} - \varphi_B}{2(1 + \varphi_A - \bar{\varphi})} < 0. \tag{24}$$

The effect on total revenues for B is:

$$\begin{aligned} \Delta TR_B &= \frac{\bar{\varphi} - \varphi_A - (\varphi_B - \bar{\varphi})(\varphi_B - \varphi_A) + \gamma(1 + \varphi_B - \varphi_A)}{2} = \\ &= \frac{(\bar{\varphi} - \varphi_A)(\varphi_A - \varphi_B)^2 + (\bar{\varphi} - \varphi_A) - (\bar{\varphi} - \varphi_B)(\varphi_A - \varphi_B)}{2(1 + \varphi_A - \bar{\varphi})} < 0, \end{aligned} \tag{25}$$

since $(\varphi_A - \bar{\varphi}) > (\varphi_B - \bar{\varphi})$ and $(\varphi_A - \varphi_B) < 1$.

□

Hence, we end up in an equilibrium where both municipalities adopt the reform despite making a loss.[15]

Comparing changes in total revenue in (24) and (25), we can also see that municipality B loses more than municipality A:

$$\begin{aligned} \Delta TR_A - \Delta TR_B =& \frac{\bar{\varphi} - \varphi_B}{2(1 + \varphi_A - \bar{\varphi})} - \frac{(\bar{\varphi} - \varphi_A)(\varphi_A - \varphi_B)^2 + (\bar{\varphi} - \varphi_A) - (\bar{\varphi} - \varphi_B)(\varphi_A - \varphi_B)}{2(1 + \varphi_A - \bar{\varphi})} \\ =& \frac{(\varphi_A - \varphi_B)\big[\bar{\varphi}(1 - \varphi_A + \varphi_B) + 1 - \varphi_B + \varphi_A(\varphi_A - \varphi_B)\big]}{2(1 + \varphi_A - \bar{\varphi})} > 0. \end{aligned} \tag{26}$$

When both municipalities adopt the maximum fee, parents will move from municipality B to A, since the decrease in child-care fee is larger in A.

[15] Note though that both municipalities still gain from an extra parent moving to the municipality: $t_i^* y + \gamma - (1 - \bar{\varphi}) > 0$. For A, the net gain is $\frac{1}{1+\varphi_A-\bar{\varphi}} > 0$ and for B it is $\frac{1+(\varphi_A-\varphi_B)(1+\varphi_A-\bar{\varphi})}{1+\varphi_A-\bar{\varphi}} > 0$.

This means that, according to (4), the population in A is no longer $1/2$, but rather

$$N_A = \frac{1}{2} + \frac{\varphi_A - \varphi_B}{2} > \frac{1}{2}. \tag{27}$$

Hence, the former high-fee municipality will now have more inhabitants than the former low-fee municipality.

One may of course think of the possibility to adjust the tax rate and fee optimally as a response to the other municipality's implementation *instead* of introducing the maximum fee. However,

Proposition 4. *If the other municipality introduces the maximum fee, it is always at least as good for the municipality to introduce the maximum fee at a constant tax rate as to optimally change the tax rate and fee.*

Proof. See Appendix B.2. □

3.2 Changed tax rates

In Section 3.1 we showed that the central government can make both municipalities adopt the maximum fee $\bar{\varphi}$ by offering them a sufficiently large grant γ. As shown in (24) and (25), both municipalities face lower net revenue and thereby a decrease in public good provision, implying that $U_c' < MU_G'$. This means that the median voter in each municipality would like to increase the tax rate in order to get more of the public good and thereby restore the equality $U_c' = MU_G'$. However, it is not as simple as that when there are mobile parents; a one-sided higher tax rate would induce an outflow of contributing parents.

The maximum fee $\bar{\varphi}$ can be viewed as an additional constraint on the median voter's maximization problem. Before the reform, the optimal mix of tax rate and public good was determined irrespective of parents, and child-care fees were thereafter set as a function of the tax rate so as to attract parents. This resulted in one municipality having a high tax rate, a large amount of the public good, and low child-care fees (B), whereas the situation was the opposite in the other municipality (A). The maximum-fee reform

implies that some of the autonomy is taken away from municipalities, since they cannot freely choose their child-care fees anymore. When the municipalities, who both have implemented the maximum fee, $\bar{\varphi}$, which entitles them to a grant, γ,[16] decide on the tax rate, t_i, and the amount of public goods, G_i, the maximization problem therefore looks like

$$\max_{t_i, G_i} U^i\left(c_i, G_i\right), \quad i = A, B, \tag{28}$$

s.t. the budget constraint

$$G_i = t_i y M + \frac{1 + y(t_j - t_i)}{2}\big(t_i y - 1 + \bar{\varphi} + \gamma\big), \quad j \neq i, \tag{29}$$

and the chosen t_j of the other municipality because the number of mobile families in each municipality depends on the relative tax rate (since the child-care fee is the same in both municipalities). The first-order conditions give:

$$U_c^i{}' = U_G^i{}'\big[M + \frac{y(\hat{t}_j - 2\hat{t}_i) + 2 - \bar{\varphi} - \gamma}{2}\big], \tag{30}$$

where $\hat{t}$ indicates the optimal tax rate after the reform. Hence, the mix of tax rate and public good is no longer only a matter of the preferences of the median voter, since child-care fees cannot be used to please parents anymore. Hence, the Samuelson condition is violated and we get an inefficient solution. Equilibrium tax rates and public goods in the two municipalities are therefore implicitly determined by the following equation system:

[16] We are not able to solve for a specific γ, which is sufficiently large to make both municipalities adopt $\bar{\varphi}$ when they are free to alter their tax rates. However, we know that the sufficient grant, with altered tax rates, $\gamma \leq \frac{(\varphi_A - \bar{\varphi})^2}{1 + \varphi_A - \bar{\varphi}}$. Since $\gamma = \frac{(\varphi_A - \bar{\varphi})^2}{1 + \varphi_A - \bar{\varphi}}$ was sufficient to make both municipalities adopt the maximum fee instead of altering their tax rate, a higher grant cannot be necessary when they are allowed to alter their tax rates.

$$U_c^{A\,\prime} = U_G^{A\,\prime}\big[M + \frac{y(\hat{t}_B - 2\hat{t}_A) + 2 - \bar{\varphi} - \gamma}{2}\big], \tag{31}$$

$$G_A = t_A y M + \frac{1 + y(\hat{t}_B - \hat{t}_A)}{2}\big(\hat{t}_A y - 1 + \bar{\varphi} + \gamma\big) \tag{32}$$

$$U_c^{B\,\prime} = U_G^{B\,\prime}\big[M + \frac{y(\hat{t}_A - 2\hat{t}_B) + 2 - \bar{\varphi} - \gamma}{2}\big], \tag{33}$$

$$G_B = t_B y M + \frac{1 + y(\hat{t}_A - \hat{t}_B)}{2}\big(\hat{t}_B y - 1 + \bar{\varphi} + \gamma\big), \tag{34}$$

Although this equation system cannot be solved analytically, a couple of things can generally be concluded.

Proposition 5. *After both municipalities have adopted the maximum fee and optimally adjusted their tax rates, the former low-tax municipality will have increased its tax rate but will still have a lower tax rate than the high-tax municipality.*

Proof. When the municipalities have implemented $\bar{\varphi}$, there is an unambiguously positive effect from increasing the tax rate from t_A^* for municipality A:

$$\begin{aligned}\frac{\partial U^A}{\partial t_A} &= -yU_c' + U_G'\frac{2M + 2 + y(t_B^* - 2t_A^*) - \bar{\varphi} - \gamma}{2} \\ &= -yU_c' + U_G'\frac{2M + y(t_B^* - t_A^*) + \varphi_A - \bar{\varphi} - \gamma}{2},\end{aligned} \tag{35}$$

since $yt_A^* = 2 - \varphi_A$ initially. Initially, before the maximum fee was introduced or any taxes were altered, $U_c' = MU_G'$, which allows us to rewrite (35) as

$$\frac{\partial U^A}{\partial t_A} = U_G'\left[-M + \frac{2M + y(t_B^* - t_A^*) + \varphi_A - \bar{\varphi} - \gamma}{2}\right] > 0. \tag{36}$$

Hence, A will initially increase its tax rate until $\frac{\partial U^A}{\partial t_A} = 0$.[17]

[17] It is, however, not clear what B will do, i.e., whether t_B will increase or decrease. t_B will increase if and only if $2(\varphi_B - \varphi_A)(1 + \varphi_A - \bar{\varphi}) + \varphi_A - \bar{\varphi} > 0$.

However, even if A increases its tax rate and it is unclear what B does, also in the new equilibrium, $\hat{t}_B > \hat{t}_A$. If $\hat{t}_A = \hat{t}_B$ and both municipalities had the same child-care fee, then equally many parents would live in A and B, which in turn would imply that public good provision in the two municipalities would be equal and that the bracketed expressions in (31) and (33) would be identical. This in turn means that $U_c^{A\prime}/U_G^{A\prime} = U_c^{B\prime}/U_G^{B\prime}$. However, according to (7) this cannot be true.

By the same reasoning, $\hat{t}_A$ cannot exceed $\hat{t}_B$. If $\hat{t}_A > \hat{t}_B$, then $c_A < c_B$. Moreover, the bracketed expression in (33) would exceed that of (31), implying that $U_c^{A\prime}/U_G^{A\prime} < U_c^{B\prime}/U_G^{B\prime}$. If this is to hold, it is necessary that $G_A < G_B$. However, from (32) and (34) we get that $G_A - G_B = \frac{y(t_A - t_B)}{2}\left[2M + 4 - \hat{t}_A - \hat{t}_B - 2\bar{\varphi} - 2\gamma\right] > 0$. Hence, $\hat{t}_A$ cannot exceed $\hat{t}_B$. This means that also after optimal changes in the tax rates, $\hat{t}_A < \hat{t}_B$. □

Since A still has a lower tax rate than B while the two municipalities now have the same child-care fee, A will be inhabited by more parents than B:

$$N_A = \frac{1}{2} + \frac{y(\hat{t}_B - \hat{t}_A)}{2} > \frac{1}{2}. \tag{37}$$

In order to assure that there will be a positive number of families living in both municipalities, i.e., $N_A \in (0,1)$, we assume that the after-reform tax rates are not too diverse, i.e., $y(\hat{t}_B - \hat{t}_A) \in (0,1)$.

Proposition 6. *After the introduction of the maximum fee and after optimal adjustment of tax rates, the median voters in both municipalities are worse off than before.*

Proof. See Appendix B.3.

□

Hence, after the maximum fee is introduced the median voters in both municipalities lose even after optimally adjusting the tax rates. Hence, the situation from Section 3.1 that municipalities implement the reform although losing from doing so prevails also when they can adjust their tax rates to the

new situation. Moreover, we have shown that the former low-tax municipality increases its tax rate, while we cannot generally tell what happens to the tax rate in B. In order to see what is likely to happen, we have run some numerical simulations (available upon request). They suggest that both municipalities increase their tax rates, but not sufficiently to restore the pre-reform level of G. Hence, median voters in both municipalities get less both private and public goods consumption. The simulations also suggest that tax rates will be more compressed after the reform.

4 The Swedish reform

The model should be applicable on a broad spectrum of user-fee reforms and intergovernmental relations in general. In this section, we present an illustrative example of it, namely a recent Swedish child-care fee reform. We briefly describe the reform and discuss the implementation in the light of the model.[18]

In Sweden, subsidized child care is a municipal matter. Since 1995, municipalities are obliged to supply child care to all children aged 1–5. The financing comes from central government grants, local municipal tax revenues, and from parent fees. Even though the actual pre-reform fee structure was more complex than the situation modeled in this paper, it is quite clear that some municipalities had relatively high fees and low tax rates, while others had the opposite situation. Hence, our model from Section 2.2 gives a fairly good illustration of the pre-reform situation in Sweden.

The maximum-fee reform, which took effect in 2002, aimed at improving the economic situation for families with young children by introducing a new fee structure for publicly subsidized child-care. The central government wanted child-care fees to be considerably lower. Since child care is the responsibility of municipalities, the reform was voluntary, but if municipalities agreed to adopt the new fee structure, they would receive a conditional grant from the central government.

[18] A more thorough description of the Swedish child-care fee system and the reform is presented in Appendix A.

The central government claimed that the grants on average were sufficient to cover the revenue losses in the municipalities, although some municipalities lost and others gained because of the standardized costs schedule, on which the grants are based (Swedish national agency for education, 2004b). However, the municipalities claimed that the reform was underfinanced (Central union of local authorities, 2003), and the risk of some municipalities losing money due to the reform was highlighted already in the proposition (Proposition, 1999). Before the reform the center and right wing parties also questioned the financing of the reform, since the effects of higher demand was not fully included (Utbildningsutskottet, 2000).

Some municipalities implemented the reform already in 2001, e.g., Gothenburg, Malå, Ragunda, Sundbyberg and Överkalix. From the perspective of our model, these municipalities found the benefits from being sole implementors to be high even without the governmental grant for the first year. In 2002, almost all of the other municipalities implemented the reform, although many of them were skeptical realizing that it would be costly. Comments from some municipalities (e.g., Nacka and Järfälla) show that they were not in favor of the reform due to its negative economic consequences. Still, they both implemented the reform in 2002. Also, the central union of local authorities argued that it would be hard for a single municipality not to implement the reform, although implementation was said to be voluntary (Proposition, 1999).

An illustrative example is a note from the centrist party (Centerpartiet) in the municipality of Högsby, which states that they did not want to implement the reform but felt forced to do it, due to competition from other municipalities (Högsby kommunfullmäktige, 2001). In the parliament debate, the right-wing parties claimed that the reform in fact was not voluntary because of how the reform was financed (Kammarens protokoll, 2000). These claims are clear indications that fiscal competition really played a role in the implementation of the child-care maximum-fee reform.

The two municipalities Karlstad and Kalix implemented the reform in 2003, i.e., some time after it had become possible to get the conditional government grant. These municipalities had higher than average tax rates

and child care fees that were among the lowest in the country, making them most likely to lose from implementing the reform (as shown in Section 3). According to the municipalities' decisions, they indeed chose not to implement the reform initially because it would be too costly (Kalix's municipality, 2001; Karlstad's municipality, 2001).[19] In terms of our model, being the only municipalities with child-care fees higher than the maximum fee could potentially have caused an outflow of families, which would have caused an even greater loss than adopting the maximum fee.

All Swedish municipalities have adopted the maximum fee in accordance with the central government's intentions, although the reform was said to be voluntary and although the costs for providing child care in many municipalities have increased. Wikström (2007) shows that the change in cost after the reform has been quite small for most municipalities, although for some municipalities the costs have increased substantially. Hence, while several municipalities have lost from the reform, they have chosen to stick with it anyway, probably because they realize they would lose even more if they did not.[20]

From the numerical simulations briefly mentioned in Section 3.2, we predicted both that municipalities would increase their taxes after the reform and that taxes would become more compressed. It so turns out that the local income-tax rates have indeed increased on average since the implementation of the maximum fee, and that the variance has decreased (Statistics Sweden, 2006b), just as predicted by our model (although aspects other than child care admittedly do affect municipalities' tax rates). To summarize this discussion, the implementation of the Swedish maximum child-care fee is an example of how a central government can take advantage of user-fee competition between local governments in the implementation of user-fee reforms, as described by our model.

[19] In terms of our model they realized that $\gamma < \varphi_i - \bar{\varphi}$.

[20] This is well in line with the study by Gustafsson et al. (2002) on an earlier Swedish child care reform, which concludes that local governments respond strongly to incentives set up by the central government.

4.1 Reforms and mobility

As described above, our model illustrates how a central government can take advantage of fiscal competition among local jurisdictions to implement reforms in its own interest. However, this can only be done concerning matters where fiscal competition can be assumed to be a real issue, for instance due to mobility, i.e., if mobility is high in the targeted group, then the scope for the central government to take advantage of the situation is higher.

An illustration of the applicability of the model is that in Sweden, where the reform took place, families with preschool children (0–6 years old) move between municipalities to a much larger extent than most other age groups (except for those aged 18–22), while pensioners are the least mobile citizens (Statistics Sweden, 2003, 2006a). When the government wanted a reform that favored highly mobile families, who municipalities actually gain from attracting and therefore compete over, it could be done without fully compensating the municipalities for their costs through the maximum child-care fee reform.

A similar reform was decided on and implemented just after the maximum child-care fee reform: maximum fees in elder care. The reforms were similar in their claimed purposes; to aid families with small children and the elderly, respectively. However, the reform on maximum fees in elder care was not voluntary for municipalities; on the contrary, they were obliged by law to implement the new fee structure (Proposition, 2000). This indicates that since pensioners are costly to municipalities and are very immobile across municipalities the central government did not have the possibility to underfinance and make this reform voluntary and still get it universally implemented.

So, the scope for this fiscal competition mechanism to work increases with the mobility of the group the reform is directed to. For the central government to universally implement a voluntary reform is cheaper for highly mobile groups. These general predictions of the model is in line with what has actually happened in the Swedish case.

5 Conclusions

Using a spatial competition model with mobile citizens and two local jurisdictions, we have shown that a central government can induce local governments to implement a reform they would not have implemented without mobility and fiscal competition. Due to fiscal competition, both local jurisdictions implement the reform although the conditional grant from the central government is not sufficient to cover the losses. The reason is a kind of prisoners' dilemma, where they both find it more profitable to implement than not to, irrespective of what the other jurisdiction does. In general terms, the model illustrates how a central government can take advantage of fiscal competition between local jurisdictions to implement reforms in its own interest.

In this paper we illustrate this by investigating a reduction of child-care fees in a stylized economy with two municipalities. Both municipalities lose net revenues when they reduce their fees and receive the grant. This leads to inefficiency, where too little of a public good is provided in both municipalities. In a second step, when municipalities alter their tax rates as a consequence of the implemented reform, we find that the median voters become worse off also after optimally adjusting tax rates, which to, at least one municipality, means an increase.

We model competition in terms of child-care fees when families are free to move between municipalities. Hence, it can be costly for a municipality not to implement the reform, since families can choose to move to a municipality that does. The results can also be generalized to account for competition in terms of votes and yardstick competition. An incumbent local government could face a very high political cost by not implementing the proposed reform if neighboring municipalities do, as in, e.g., Besley and Case (1995).

The model is applied to a recent Swedish child-care fee reform and can thereby explain the somewhat puzzling observation that all Swedish municipalities implemented a voluntary maximum child-care fee reform although it had a negative impact on the finances of many municipalities. Hence, this is a real-life example where a central government actually takes advantage of fiscal competition between local governments for policy implementation.

A Appendix: The Swedish child-care fees

Since 1995, Swedish municipalities are obliged to supply child care to all children aged 1–5, and in the year of the reform, 2002, 85 % of all eligible children were enrolled. The financing comes from central government grants, local municipal tax revenues, and parent fees. Before the maximum fee reform, child-care fees were entirely determined by municipalities, and in 1999 they covered about 16 % of the total costs (Swedish national agency for education, 2000). Before the maximum fee reform, child care fees varied a lot; the difference for a typical family was almost SEK 28,000 (EUR 2,905) per year between the municipalities with the highest and the lowest fees (Swedish national agency for education, 2004a).[21] In most municipalities, fees depended largely on family income.

In 2000, the social democratic government delivered Proposition (1999) on the maximum fee and related issues on child care to the parliament. A majority in the parliament (the social democrats, the left, and the green party) decided to implement the proposition. A minority, consisting of the center and right wing parties, voted against the reform. The part of the reform that is analyzed in this paper is the maximum fee, which took effect on the first of January 2002. By the first of January 2003, all municipalities had implemented the reform.

Since the reform, municipalities are not allowed to charge fees higher than 3 % of gross family income for the first child in child care, 2 % for the second child and 1 %for the third. The fee for any additional children is zero. There is also a cap stating that there is a maximum amount that municipalities may charge per child. In 2002, the cap implied that no one was to pay more than SEK 1,140; 760; and 380 for the first, second, and third child in child care. Since 2004, the fees are SEK 1,260; 840; and 420 for families earning SEK 42,000 per month or more (Swedish national agency for education, 2007). As discussed by Brink et al. (2007), while families in all income groups faced lower fees after the reform, high income families

[21] Ragunda was the municipality with the lowest fee in 1999, while Täby had the highest. The municipality where the earned income tax was the highest was Ragunda, while Täby had one of the lowest.

gained the most in both absolute and relative terms. Still, there are some possibilities for municipalities to choose a fee structure that is below the maximum. In 2006, 64 % (186 of the 289 municipalities) had fees that did not depend at all on the time children spent in child care. This is an increase from 3 % of all municipalities in 2001, i.e., before the reform was implemented (Swedish national agency for education, 2007).

In 1999, 76 % of children aged $1-5$ were enrolled (Swedish national agency for education, 2001), in 2002 that number had increased to 85 %. During the same period children being at home with a parent decreased from 18 to 13 % (Swedish national agency for education, 2004a). The average number of hours spent by a child in child care is 30 hours per week. This is actually a one hour per week decrease in the average time spent in child care from 1999 to 2002. The reason for this average decrease is that children with unemployed parents, or parents on parental leave are now allowed at least 15 hours of day care per week. 86 % of the municipalities now allows unemployed these 15 hours, and 91 % allows parents on parental leave this time; the remaining municipalities allows even more time for these groups. This have increased the number of children with few hours of presence. This was also the intention of the reform; to make sure that also these children could participate in child care and get the intended stimuli from this, and give unemployed parents a possibility to search for a job in an efficient way (Swedish national agency for education, 2007).

The Proposition (1999) as a whole consisted of several issues regarding child care. First, children (at least one year old) with unemployed parents or parents on parental leave should be allowed to subsidized child care for at least 15 hours a week. Second, there should be a maximum fee (studied in this paper). Finally, free preschool should be offered to all children between four and five for at least 525 hours per year. The financing of the reform consists of a grant conditional on implementation of the reform. The grant depends on the characteristics of the municipalities. In2002 and 2003 the grant was SEK 3.4 billion (Swedish national agency for education, 2007). To ensure quality, an additional 500 million SEK per year was granted. The grants are distributed to the participating municipalities according to the

standard cost concept based on the number of children and the average cost of child care in Sweden (SFS 2001:160, 2001; SFS 2001:161, 2001).

B Appendix: Proof of Propositions

B.1 Proof of Proposition 1

Proof. Comparing ΔTR_B in Table 1, we see that if municipality A (with the highest initial fee) implements the reform, it is always optimal for B to also implement it, irrespective of the size of the grant, since

$$\frac{\bar{\varphi}-\varphi_A-(\varphi_B-\bar{\varphi})(\varphi_B-\varphi_A)+\gamma(1+\varphi_B-\varphi_A)}{2}-\frac{\bar{\varphi}-\varphi_A}{2}= \tag{38}$$
$$=\frac{\gamma(1+\varphi_B-\varphi_A)+(\varphi_B-\bar{\varphi})(\varphi_A-\varphi_B)}{2}>0 \quad \forall\ \gamma\geq 0.$$

Hence, it is sufficient to find a grant that makes A adopt $\bar{\varphi}$ to make sure that both municipalities adopt it.

Municipality A has a dominant strategy in implementing the maximum fee, irrespective of the actions of municipality B if the per-family grant $\gamma \geq \frac{(\varphi_A-\bar{\varphi})^2}{1+\varphi_A-\bar{\varphi}}$. [22] As shown above, this also implies that B implements the reform.

The next step is to show that there is no lower grant that makes both municipalities adopt the maximum fee. In order for B to have a dominant strategy of implementing the reform irrespective of municipality A's behavior, it is necessary that $\gamma \geq \frac{(\varphi_B-\bar{\varphi})^2}{1+\varphi_B-\bar{\varphi}}$. This grant is smaller than the grant needed to make A implement the reform since

$$\frac{(\varphi_A-\bar{\varphi})^2}{1+\varphi_A-\bar{\varphi}}-\frac{(\varphi_B-\bar{\varphi})^2}{1+\varphi_B-\bar{\varphi}}=\frac{(\varphi_A-\bar{\varphi})(\varphi_B-\bar{\varphi})(\varphi_A-\varphi_B)+(\varphi_A-\bar{\varphi})^2-(\varphi_B-\bar{\varphi})^2}{(1+\varphi_A-\bar{\varphi})(1+\varphi_B-\bar{\varphi})}>0.$$

[22] This grant leaves TR_A unchanged if A is the sole implementor. If B has already implemented the reform, a smaller grant is sufficient, $\gamma \geq \frac{(\varphi_A-\bar{\varphi})(\varphi_A-\varphi_B)}{1+\varphi_A-\varphi_B}$, for A to implement the reform as well. However, $\gamma \geq \frac{(\varphi_A-\bar{\varphi})^2}{1+\varphi_A-\bar{\varphi}}$ is the smallest grant for which it is a dominant strategy for A to implement the reform irrespective of B's behavior.

Hence, it would be cheaper for the central government to offer a grant that makes B implement the reform and then hope for A to follow than the other way around. However, depending on the relations between φ_A, φ_B, and $\bar{\varphi}$, that grant may not be sufficient for A to also implement the reform. More exactly, if $(\varphi_B - \bar{\varphi}) < (\varphi_A - \bar{\varphi})(\varphi_A - \varphi_B) + (\varphi_B - \bar{\varphi})(\varphi_A - \varphi_B)^2$, then municipality A will not implement the reform conditional on B doing it. Hence, that grant is not sufficiently large to guarantee that both municipalities implement the reform.

Hence, the lowest grant that makes both municipalities voluntarily implement the reform irrespective of the relative difference between φ_A andφ_B is $\gamma = \frac{(\varphi_A - \bar{\varphi})^2}{1 + \varphi_A - \bar{\varphi}}$.

□

B.2 Proof of Proposition 4

Proof. Differentiating (10)–(11), we obtain the optimal reactions of municipality i if municipality j changes its fee φ for $i = A, B$; $j = A, B$; $i \neq j$:

$$\frac{\partial t_i}{\partial \varphi_j} = -\frac{(MU''_G - U''_{cG})(\varphi_j + yt_j)}{4y(U''_c - 2MU''_{cG} + M^2U''_G)} < 0, \tag{39}$$

$$\frac{\partial \varphi_i}{\partial \varphi_j} = \frac{1}{2} - y\frac{\partial t_i}{\partial \varphi_j} > 0, \tag{40}$$

$$\frac{\partial G_i}{\partial \varphi_j} = \frac{(MU''_G - U''_{cG})(\varphi_j + yt_j)}{4(U''_c - 2MU''_{cG} + M^2U''_G)} > 0, \tag{41}$$

since we assume that $U''_{cG} \geq 0$. Moreover, the overall effect on the median voter's utility in i is unambiguously positive when the municipality reacts optimally to a fee increase in j:

$$\frac{\partial U_i}{\partial \varphi_j} = -yU'_c\frac{\partial t_i}{\partial \varphi_j} + U'_G\frac{\partial G_i}{\partial \varphi_j} = \frac{U'_G(\varphi_j + yt_j)}{4} > 0, \tag{42}$$

according to (16). If j introduces the maximum fee, i.e., reduces its fee from φ_j to $\bar{\varphi}$, the change in utility for the median voter in i can be approximated by $\frac{U'_G(\bar{\varphi} - \varphi_j)}{2} < 0$, where we evaluate U'_G at the starting point, $U(c_0, G_0)$. This

utility loss can then be compared with the utility loss in case of introducing the maximum fee, i.e., the $\Delta TR|\bar{\varphi}$ for municipalities A and B calculated in (24) and (25), multiplied by U'_G evaluated at the starting point. Denoting the utility change in case of altered taxation and fees $\Delta U|t$ and in case of implementing the maximum fee $\Delta U_A|\bar{\varphi}$, we find that

$$\Delta U_A|t - \Delta U_A|\bar{\varphi} = U'_G\big[(\varphi_A - \bar{\varphi})(\varphi_A - \varphi_B) - (\varphi_A - \bar{\varphi})(\varphi_A - \varphi_B)\big] = 0, \tag{43}$$

$$\Delta U_B|t - \Delta U_B|\bar{\varphi} = U'_G\left[\frac{(\varphi_B - \bar{\varphi})(\varphi_B - \varphi_A) - \gamma(1 + \varphi_B - \varphi_A)}{2}\right] < 0, \tag{44}$$

since $\varphi_A > \varphi_B$. Hence, for A it is equivalent to implement the maximum fee or to optimally react with an altered policy, while it is strictly better for B to implement the maximum fee; hence, none of the municipalities could be better off by not implementing the maximum fee.

□

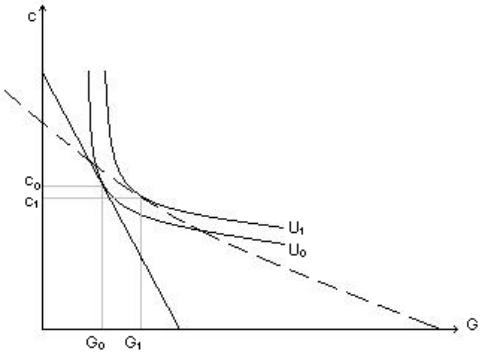
B.3 Proof of Proposition 6

Proof. According to the equation system (31) – (34), we cannot generally tell whether utility for the median voters will increase or decrease. We will, however, present three necessary conditions for a utility increase and show that they cannot be simultaneously fulfilled in any of the municipalities. Figure 1 shows what the relation between the solutions before and after the reform must look like in order to have a higher utility for the median voter after the reform than before.

The initial budget constraint is linear with the slope $-M$ and we get a tangency point between it and the indifference curve at the initial utility level U_0, (at c_0,G_0) according to (16).[23] After the maximum fee has been implemented, the budget constraint is no longer linear but instead strictly

[23]The budget constraint is linear, since the municipality can alter φ_i to affect the number of inhabitants.

Figure 1: Possibly higher utility after the reform



convex and determined by (29).[24] Hence, its appearance could be something like the dashed curve in Figure 1. In order to admit increased utility, the two budget constraints must cross, and such crossing occurs where G determined in (17) equals G determined in (29) for the same tax rate, i.e., where $\frac{1}{2} = \frac{1+y(\hat{t}_j - t_i)}{2}(yt_i - 1 + \bar{\varphi} + \gamma)$. If the median voter in municipality i is to gain utility after the reform and changed taxes, a necessary condition is thus that the after-reform tangency point between an indifference curve and the new budget constraint occurs to the right of this crossing; i.e., we require that

$$yt_i - 1 + \bar{\varphi} + \gamma \geq \frac{1}{1 + y(\hat{t}_j - \hat{t}_i)}. \tag{45}$$

To the right of the crossing, more of the public good is provided along the new budget constraint than along the old one at the same tax rate.[25] This especially holds for $t_i = 1$, which implies that

[24]Differentiating (29) with respect to yt_i, and taking into account that $\frac{\partial t_j}{\partial t_i} = 1/2$ in optimum, we get the slope of the new budget constraint

$$\frac{dG_i}{dc_i} = -\frac{\partial G_i}{\partial yt_i} = -M - \frac{2y(\hat{t}_j - \hat{t}_i) + 3 - \bar{\varphi} - \gamma}{4} < 0,$$

since $y(\hat{t}_B - \hat{t}_A) \in (0, 1)$. Moreover, the budget constraint is convex since $\frac{d^2 G_i}{dc_i^2} = \frac{1}{4} > 0$.

[25]Note that this is a necessary requirement for higher utility; we have not shown that this segment actually exists.

$$G_i|_{t_i=1} = yM + \frac{1+y(t_j-1)}{2}(y-1+\bar{\varphi}+\gamma) > yM + \frac{1}{2}$$
$$\Rightarrow \quad \big(1+y(t_j-1)\big)\big(y-1+\bar{\varphi}+\gamma\big) > 1 \tag{46}$$

is required for the median voter in municipality i to be able to get increased utility. Since the new budget constraint is strictly convex, it must be flatter than the old one to the right of their crossing (if they cross). Hence, a third requirement for increased utility is that the indifference curve is flatter at the tangency point after the reform (at c_1,G_1) than before the reform (at c_0,G_0), i.e., that U_c'/U_G' determined in (30) is greater than $U_c'/U_G' = M$. Hence, for the median voter in municipality i to have at least the same utility as before, the following must hold:

$$y(\hat{t}_j - 2\hat{t}_i) + 2 - \bar{\varphi} - \gamma \geq 0. \tag{47}$$

Hence, equations (45) , (46), and (47) are simultaneously necessary for the median voter's utility not to decrease, although they are by no means sufficient.

We have shown that the former high-tax municipality still has a higher tax rate, i.e., $\hat{t}_B > \hat{t}_A$. Rewriting (46) for municipality A, we get:

$$2 - \bar{\varphi} - \gamma < y, \tag{48}$$

then it follows that the following inequality must hold

$$y(\hat{t}_B - 2\hat{t}_A) + 2 - \bar{\varphi} - \gamma < y(\hat{t}_B - 2\hat{t}_A - 1) < 0, \tag{49}$$

which contradicts condition (47). Hence, the two necessary conditions (46), and (47) cannot hold simultaneously for municipality A, so utility for the median voter in A is reduced when the maximum fee is introduced.

Rewriting condition (47) for B gives

$$y\hat{t}_B - 1 + \bar{\varphi} + \gamma \leq 1 - y(\hat{t}_B - \hat{t}_A) < 1, \tag{50}$$

since $y(\hat{t}_B - \hat{t}_A) \in (0, 1)$. Rewriting (45) gives

$$y\hat{t}_B - 1 + \bar{\varphi} + \gamma \geq \frac{1}{1 + y(\hat{t}_A - \hat{t}_B)} > 1. \tag{51}$$

Hence, (50) requires that the net contribution of a family is less than one and (51) that it is greater than one, two conditions that obviously cannot be true simultaneously. Hence, a tangency point like the one at (c_1,G_1) in Figure 1 cannot exist for municipality B since two of the necessary conditions for higher utility cannot be fulfilled at the same time. We can thus conclude that also the median voter in B gets reduced utility also after having optimally modified the tax rate.

□

C Appendix: First-order conditions for the central government's problem

$$\max_{\{\varphi_A, t_A, \varphi_B, t_B\}} W = \alpha MU^A + \beta MU^B + (1-\alpha-\beta)V, \tag{52}$$

$$\frac{\partial W}{\partial \varphi_A} = \alpha MU^A_G{}'\big[N_A + \frac{\partial N_A}{\partial \varphi_A}(t_A y + \varphi_A - 1)\big] - \beta MU^B_G{}'\big[\frac{\partial N_A}{\partial \varphi_A}(t_B y + \varphi_B - 1)\big] - (1-\alpha-\beta)N_A V' = 0 \tag{53}$$

$$\frac{\partial W}{\partial t_A} = -\alpha MU^A_c{}' y + \alpha MU^A_G{}'\big[y(M+N_A) + \frac{\partial N_A}{\partial t_A}(t_A y + \varphi_A - 1)\big] - \beta MU^B_G{}'\frac{\partial N_A}{\partial t_A}(t_B y + \varphi_B - 1) - (1-\alpha-\beta)N_A y V' = 0 \tag{54}$$

$$\frac{\partial W}{\partial \varphi_B} = \beta MU^B_G{}'\big[(1-N_A) - \frac{\partial N_A}{\partial \varphi_B}(t_B y + \varphi_B - 1)\big]) - \beta MU^A_G{}'\big[\frac{\partial N_A}{\partial \varphi_B}(t_A y + \varphi_A - 1)\big] - (1-\alpha-\beta)(1-N_A)V' = 0 \tag{55}$$

$$\frac{\partial W}{\partial t_B} = -\beta MU^B_c{}' y + \alpha MU^B_G{}'\big[y(M+1-N_A) - \frac{\partial N_A}{\partial t_B}(t_B y + \varphi_B - 1)\big] + \alpha MU^A_G{}'\frac{\partial N_A}{\partial t_B}(t_A y + \varphi_A - 1) - (1-\alpha-\beta)(1-N_A)y V' = 0 \tag{56}$$

From (5) and (6) it is obvious that $\frac{\partial N_i}{\partial t_i} = y\frac{\partial N_i}{\partial \varphi_i}$, $i = A,\ B$. Using this together with (53) in (54) gives:

$$\frac{\partial W}{\partial t_A} = -\alpha M {U_c^A}' + \alpha M {U_G^A}' M = 0 \Leftrightarrow {U_c^A}' = M {U_G^A}', \tag{57}$$

and likewise for municipality B. Hence, tax rates are set optimally in both municipalities in the competitive setting; only the choices of child-care fees are distorted due to fiscal competition and to neglecting families with children.

In (53), the first term refers to the effect for the median voter in municipality A (the only term taken into account in the competitive equilibrium) and the second term is the effect on municipality B. The median voter in A does not take into account the revenue loss in B, which is caused by a lower φ_A. Hence, φ_A is set too low in the competitive equilibrium, which is also the standard result in the fiscal-competition literature. The last term is the effect on families counteracting the previous effect. According to this effect, φ_A is too high in the competitive equilibrium since it does not consider the reduced consumption possibilities of families. [26] The condition for the competitive equilibrium to give a too high child-care fee is thus that the effect on families are greater than that on municipality B, i.e., that

$$(1-\alpha-\beta)N_A V' > \beta \frac{{U_c^B}'(t_B y + \varphi_B - 1)}{2}. \tag{58}$$

In the competitive case, $(t_B y + \varphi_B - 1) = 1$ and $N_A = \frac{1}{2}$, implying that the condition boils down to $(1-\alpha-\beta)V' > \beta {U_c^B}'$, i.e., if the weighted marginal utility of consumption of families exceeds that of the median voter in municipality B, then φ_A is set too high in the competitive equilibrium. The same reasoning holds for φ_B, so we conclude that if the weighted marginal utility of consumption of the threshold family exceeds the weighted marginal utilities of private consumption of the median voters in the two municipalities, then both child-care fees are higher than optimal.

[26] All families originally living in municipality A (N_A) get their utility decreased with the same magnitude, i.e., V', which should be a reasonable approximation considering marginal changes.

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