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The Norwegian Kindergarten Act and its effect on voter participation

An empirical analysis of how a welfare policy change affected voter participation in Norway

Master's thesis in Economics
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Abstract

The aim of this thesis was to investigate the effect on voter participation from the implementation of the Kindergarten Act in Norwegian municipalities in 1975. We constructed a panel data set with a municipal unit dimension and election year time dimension and used a DiD- approach to estimate this relationship. We estimated no casual additional effect on voter participation in fast- implementing municipalities compared to slow- implementing municipalities. We did obtain estimates which indicated a positive effect on voter participation after the implementation of the Act. These results are however uncertain as we are unable to control for macro- economic trends. We also saw stronger effects in voter participation from the subgroups we saw as benefiting most from the reform.

Sammendrag

Formålet med denne masteroppgaven var å undersøke effekten på valgdeltakelsen fra implementeringen av barnehagereformen i Norge i 1975. Vi konstruerte et paneldata sett der enhets dimensjonen viser norske kommuner og tids dimensjonen viser valgår. Vi brukte DiD metoden for å estimere dette forholdet. Vi fant ingen signifikant tilleggseffekt på valg deltakelsen i kommunene som implementerte reformen raskt i forhold til de som implementerte saktere. Derimot fant vi indikasjoner i form av en positiv effekt på valgdeltakelsen etter implementasjonen av reformen. Disse resultatene er derimot usikre, fordi makro økonomiske trender ikke er tatt hensyn til. Vi fant sterkere effekter hos subgruppene som vi antar ble mest påvirket av denne reformen.

Preface

This master's thesis is conducted as part of obtaining a master program in Economics at the department of Economics, NTNU. We especially want to thank our patient and supportive supervisor Costanza Biavachi for excellent guidance and feedback throughout the whole process. It has been truly inspiring to learn from such a devoted supervisor. To Ferdinand Frimann Jullumstrø Hansen, Oscar Hammerstad and Christoffer Gjerstad Sjursen thank you so much for great support, useful feedback and proof reading. Thank you Henrik Bråten, for always helping us with all of our latex problems. We also have to thank the rest of our gang for making stressful times fun. Last, but not least we would like to thank each other for valuable discussions and for, without compromise, pointing out each others blind spots.

Contents

1 Introduction

The bedrock of a well- functioning democracy is to ensure active participation and that people use their right to vote. Ensuring high voter participation is an effective shield against a less democratic society. Thus understanding what affects voter participation, and more specifically what causes an individual to use his or hers right to vote is important. Access to public goods is central in reducing inequalities and achieving a just distribution of influence and opportunity in a society. The question we have asked is whether providing public goods improve democratic processes by translating into higher voter participation.

To answer this question, we exploit the unique setting of the child care reform that was implemented by the Norwegian government in 1975. The Kindergarten Act stands as a turning point in the history of educational policy in Norway. The broad goal of the reform was to develop positive arenas for children‘s development and reduce parents‘stress related to combining children and labour participation. The reform led to a large expansion of child care coverage and all children in the age 3 to 6 were eligible to participate regardless of their background. The Kindergarten Act was provided as a universal public good and was a result of a welfare policy change. The debate surrounding the implementation increased awareness and acceptance from the citizens that the child care implementation was an important welfare policy goal. Based on this we want to investigate the causal effect of the Kindergarten Act implemented in Norway in 1975, on both overall and female voter participation.

Political participation has been a source of interest to many researchers for decades. An important focus has been to understand the determinants of voter participation. Socioeconomic status, education level, unemployment rates and gender have been identified as key drivers. Additionally, self-interest in policies and the feeling of civic duty are also important factors that determine people‘s political participation. Despite their rich contribution, few studies have focused on which role the government play in shaping individuals‘ voter participation, even less, how an policy change affect voter participation. Our contribution to the literature on political participation are to investigate the way voting patterns of local citizens is affected by the implementation of the Kindergarten Act, in which we specifically intend to discuss the following:

"Is there a causal relationship between the implementation of the Kindergarten Act and voter participation? Does the causal effect differ when we look at female voter participation?"

To answer our research question, we have assembled a panel data set that stretches out from 1967 to 1991. As key variables of interest we look at overall voter participation and female voter participation. To identify the causal effect be-

tween the Kindergarten Act and voter participation, we use a difference-in-difference model. More precisely, we compare voter participation before- and after the reform was implemented, in the municipalities where the child care coverage increased fast and in municipalities where the expansion was slower.

Interestingly, we find no additional causal effect of the Kindergarten Act on overall voter participation or female voter participation in fast- implementing municipalities. These results persist when we add different controls and robustness checks.

The remainder of the thesis will be structured in 11 chapters. The next chapter will provide background information on The Kindergarten Act, followed by a presentation of a relevant theoretical model by Ashenfelter et al. (1975) in chapter 3. Chapter 4 gives a review of previous literature of different factors that may have an impact on people's willingness to vote. We construct our data set and describe descriptive statistics in Chapter 5. Chapter 6 gives an overview of the estimation method, before we present our results, robustness checks and heterogeneity tests in Chapters 7, 8 and 9, respectively. We broadly discuss our findings in Chapter 10 and lastly, we provide our concluding remarks in Chapter 11.

2 The Kindergarten Act

The Norwegian Government implemented the child care reform in 1975, known as the Kindergarten Act. The reform can be viewed as a political answer to the increasing demand of publicly funded child care, as a results of an increasing share of female labour participants around that time. The reform was given as a service to all parents who wanted to use it (Leira 1992).

The funding of the reform began at 230 million NOK in 1975 and reached 700 million NOK in 1977. These funds were thereby separated after each municipalities' needs. In addition, new child care facilities were given supplementary federal funds over a five year period from 1976. These funds were aimed especially at regions with low child care finances. The reform also provided federal guidelines on pricing, educational content, group size, staff skill composition and physical environment. Such government assistance was intended to quadruple the number of child care spots within the next six years.

The municipalities were given the assignment to map down the need for child care slots and to prepare the expansion. The government did not restrain any requirements on the implementation, but the municipalities were legally responsible for extending the slots. The expansion period started in 1976, giving the municipalities some time to react to the policy change. In addition, this period had also the largest growth in child care coverage rates (Havnes et al., 2011). Approximately half of the municipalities in Norway expanding during this period, where the other half were slower in the expansion phase. Our study is based on the municipalities which expanded fast, in order to get variation in the data. The other municipalities are also included.

The introduction of the Kindergarten Act received positive responses from the society and led to childcare being a much bigger priority. In 1975, coverage rates for children between the age of 3 and 6 was less than 10 percent, but reached 28 percent in 1979. This led to the implementation of nearly 32 000 additional child care establishments.

3 Theoretical Framework

In this chapter, we present Ashenfelter et al. (1975) discussion of the Downs theory model (Downs, 1957). The Downs model for voter participation is influential in economics and politics. The model posits that the residents only vote if the utility of voting is higher than the cost of voting. There are two types of utility associated with voter participation. The first is the utility of contribution, which is the feeling of making a difference by voting. The second is physical utility, which is the positive feeling a person achieves by taking responsibility for being a resident. Ashenfelter et al. (1975) use the Downs model as a framework when they look at the cost of participating in elections. Since the marginal effect on an election result from the participation of one additional individual is very limited, the utility from voter participation often gets ignored. Therefore, the cost is an important factor to consider.

Ashenfelter et al. (1975) show that the size of the utility and the cost of voter participation may affect the political future. To illustrate this, they assume that there are only two candidates in a given election, A and B. Each candidate's potential to win leads to a different utility level for the voter, U(A) and U(B). The probability of a candidate to win if the voter does not vote is P(i|N), where i = A,B. If the individual votes, the probability of a candidate to win is given by P(i|V). The expected utility of the election outcome for a non-voter is given by:

$$U_N = U(A) \cdot P(A|N) + U(B) \cdot [1 - P(A|N)] \tag{1}$$

while the expected utility of the election outcome for a voter is:

$$U_V = U(A) \cdot P(A|V) + U(B) \cdot [1 - P(A|V)] \tag{2}$$

Ashenfelter calculated the value of a person's vote in an election as the difference between the expected utility of the outcome when the person is voting and when they are not. This difference is called the "strategic value". The strategic value is calculated as the difference between equation (2) and (1) as shown in equation (3)

$$\begin{aligned} U_V - U_N =& [U(A) - U(B)][P(A|V) - P(A|N)] \\ =& [U(A) - U(B)]P[0.5(1 - 1/T) < \theta < 0.5] \end{aligned} \tag{3}$$

The share of votes the voter thinks candidate A will receive is given by θ, while T is the expected number of people that will vote. The strategic value is determined by two factors. The first is the difference in how much utility the voter will get from each candidate. People are more likely to vote if the difference is high. The second factor is the expected share of the votes candidate A will get, θ. $P[0.5(1-1/T) < \theta < 0.5]$

is the increased probability that candidate A will win, or create a tie, by adding the voters vote. If $\theta > 0.5$, the voter expects candidate A to win, regardless of their vote and will therefore not vote. If T is large, $P(0.5(1-1/T))$ will be close to 0.5. Then a vote will be negligible on the election outcome, and thus, the voter will not vote. For example with T = 1000, θ must be between 0.4995 and 0.5.

The individual wants to vote for the candidate that yields the highest utility. The cost of voting is presented as U(C).

$$[U(A) - U(B)] \cdot P[0.5(1 - 1/T) < \theta < 0.5] - U(C) > 0 \tag{4}$$

The problem with this is that the utility from the result does not satisfy the motivation to vote in itself. This is called a "voting paradox". One individual cannot make a difference in an election and thus the utility cannot be measured this way. The Downs model tries to avoid this paradox by saying that voter participation itself provides utility. Ashenfelter avoids this paradox by including additional benefits of voting.

Ashenfelter explains a different way to avoid the voter participation paradox by considering the psychological utility of voting, U(D). It is natural to look at psychological utility as it reflects emotions like social responsibility and sense of duty. It also reflects guiltiness by not voting. The voting decision can now be written as:

$$[U(A) - U(B)] \cdot P[0.5(1 - 1/T) < \theta < 0.5] = U(D) - U(C) \tag{5}$$

where an individual will vote if the cost of voting is smaller than the psychological and strategic benefits of voting. The cost of voting is still an important component in the voting decision. In addition to strategic benefits, psychological utility affects the decision to vote in Ashenfelter.

In our thesis, we want to assess if the Kindergarten Act led to higher voter participation. The Kindergarten Act was provided as a universal public good and was a result of a welfare policy change. The welfare policy change may increase the voter's psychological utility, U(D). If the voter's psychological utility increases, their benefit of voting will increase. Based on (5), we expect that the probability of voting increases in terms of this benefit. If this is true, our results will show that the municipalities that expanded the child care coverage are experience higher voter participation.

A large body of literature has emerged in an effort to try to quantify the elements of U(D) and U(C). In the next chapter we briefly discuss the empirical literature on voting behavior. As discussed next, our contribution is to provide a

shock to U(D) by looking at an exogenous change in governmental policy.

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4 Why do people vote?

A rich collection of literature exist on why people vote and who votes. Up until now, much of the focus has been on the relationship between individual- and municipality specific characteristics and their effect on voter participation. On the contrary, research on the relationship between the implementation of government policies and voter participation is scarce (A. L. Campbell, 2003). Even though the relationship between the implementation and government policies and voter participation is rather unexplored, we were able to find some literature on the topic.

Between 1990 and 2004 the US had a declining trend in voter participation. During this period many states implemented a welfare reform to reduce the independence for government benefits. Corman et al. (2017) found that voter participation declined 3-4 % less for low income women that were effected by the welfare reform than low income women who were not affected by the welfare reform.

Muñoz et al. (2012) investigated if austerity policies after the financial crisis in 2008 increased voter participation amongst workers in the public sector. The authors expected an increase in voter participation due to austerity measures, but found the effect to be relatively small.

In terms of individual characteristics, most studies expand their analysis using age as a control variable. A specific reason is that age presents the cohort composition in the municipality. Earlier research finds that the propensity to vote increases with age. However, the participation decreases after the age of 75 (Strate et al., 1989; Harder et al., 2008). These findings are often attached to differences in cohort and life cycle between the age groups. Young adults are often in a transition phase. Pursuing professional goals, moving out for the first time or starting a family are all factors that tend to decrease political participation. The interest for politics have a tendency to increase as people get older, because people are more exposed to politics through social groups such as colleagues and friends. They may feel a stronger norm to vote, since they are more involved in society. When people get old, their health usually get worse, which impact their ability to go out and interact in society. They are more likely to lack a mobilizing partner, which make them less likely to vote.

At a municipal level, voter participation varies with unemployment, education, income, demographics, gender and ethnicity. The relationship between voter participation and the unemployment rate is often analyzed as the unemployment rate is a concrete indicator of the economic situation in a country. Burden et al. (2014) argue that voter participation increases when the unemployment rate increases as people tend to blame politicians when their financial situation is soaring. Similarly, Brody et al. (1977) find a positive relationship between unemployment and voter participation. Rosenstone (1982) disagrees and argues that there is a positive correlation

between the opportunity cost of voting and economic problems.

To study the relationship between voter participation and education, income and occupation, Verba et al. (1987) created a socio-economic status model. Their findings suggest that voter participation increases with higher socio-economic status. Further, Wolfinger et al. (1980) separate the SES model in to three parts and find that education is a key factor in explaining voter participation. They find that educated people are more likely to follow political campaigns and participate in elections due to a higher sense of duty to their communities. Similarly, A. Campbell et al. (1960) find that the propensity to vote increases with education.

Other factors such as party affiliation in politics, group norms, self-interest and people seeing voting as a civic duty also seem to affect voter participation. People also tend to have a higher participation if they believe that they can affect the outcome (Downs, 1957; Wolfinger et al., 1980; Teixeira, 1987; Coleman, 2004; Blais, 2000).

Previous research imply that people's self-interest is driving their attitudes towards different policies, and thereby increase their political participation. Acting in "self-interest" implies that young adults in a society should be more supporting towards implementations regarding child care and older people should be more positive towards elderly care (Blekesaune et al., 2003 p.416). This statement is supported by Pettersen (2001), which shows that young adults in Norway are in favour of child care institutions and older people in Norway are in favours of elderly care institutions. Further, the findings from Hasenfeld et al. (1989) show that people with bad health condition and unemployed people are more supporting towards transfers that benefits them, than people which were not affected by these benefits.

5 Data

In this chapter we describe the data we use in our analysis and the sources from which they are derived. These sources include the Norwegian Centre for Research Data (NSD), Statistics Norway (SSB) and local government data collected from Fiva et al., 2012 [1]. After we have described the data, we present the descriptive statics, before we lastly provide a discussion of data limitations.

We have assembled an unbalanced[2] panel data set with a municipal unit dimension and a time dimension. The municipal dimension consists of 417 Norwegian municipalities. The time dimension consists of local election years from 1967 to 1991 [3]. Each election year corresponds to the end of an electoral cycle. The time period covers the cycle of the policy area from before and after the Kindergarten Act was signed into law by the Norwegian government in 1975. The pre-reform period, uses data from 1967, 1971 and 1975, while the post-period consists of data from 1979, 1983, 1987 and 1991.

Treatment and Control group

The childcare reform we exploit in our empirical analysis has been used, as noted in the introduction part, in several studies performed by Havnes and Mogstad. In our analysis, we have looked at 417 municipalities and separated them into treatment and control groups according to the definition put forth by Havnes et al. (2011): *"To define the treatment and comparison group, we order the municipalities according to the percentage point increase in child care coverage rates from 1976 to 1979. We then separate the sample at the median, letting the upper half constitute the treatment municipalities and the lower half the comparison municipalities"* [4]. This can be interpreted as the municipalities that were fast to implement the Act, and those that were slow to implement the Act. The treatment group consists of 209 municipalities and the control group of 208 municipalities. Figure (1) illustrates the geographical distribution between the treatment- and control group. The red area presents the municipalities which expanded fast, and the grey area presents the municipalities which were slower to expand.

[1] Panel data set that covers local governments in Norway from 1972 to 2016. The variables are constructed from account data provided by NSD

[2] The data set is unbalanced due to missing values in some variables

[3] 1967, 1971, 1975, 1979, 1983, 1987 and 1991

[4] See Havnes et al., 2011 p.11

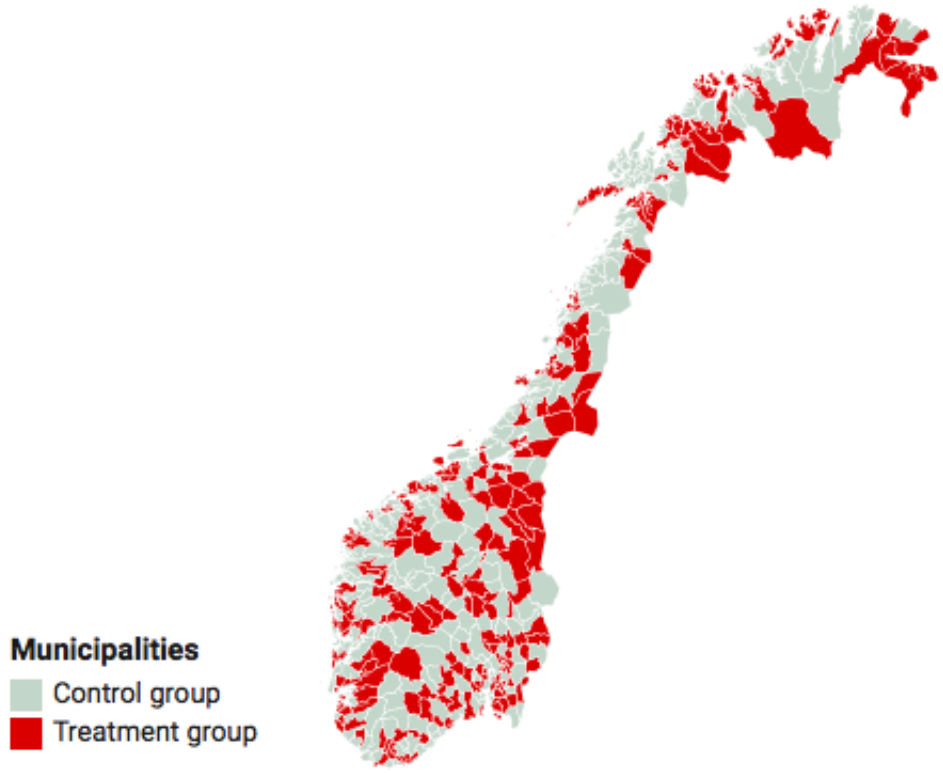

Figure 1: Rollout of the child care reform after the expansion period

Utilizing this data imposed challenges to the formation of our data set. First, Havnes et al. (2011) used the existing municipality codes from 2006, while our data is collected with municipality codes from 1970. In this period, several municipal reforms have been implemented in Norway which has led to several municipalities being merged. As a result, the municipality codes used to separate the municipalities into treatment and control group do not match our municipality codes. This problem made us unable to match all of the municipalities in the two groups. We solved this problem by merging together all the municipalities that later became one, into hypothetical municipalities. Thus, we were able to match our data with the treatment- and control groups. A full list of these municipalities is provided in appendix A.1. The variables connected to these specific municipalities were constructed by finding the average values, which did not differ significantly from the original value.

Figure (2) displays the average increase in child care coverage for both groups over the period of interest. While differences are high in the expansion period, the control group moves towards the same level in child care coverage after 1985.

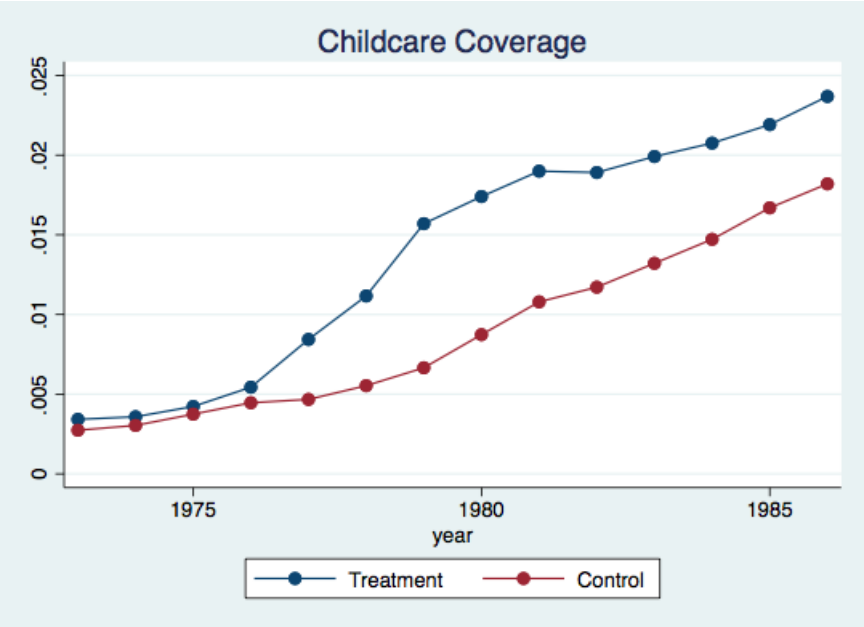

Figure 2: Average increase in child care coverage. The supply of child care coverage is divided on the amount of children in the age 3-6 years old.

Dependent Variables

The two dependent variables we use in our analysis are overall voter participation and female voter participation. Both are based on data from NSD[5]. For our main analysis we use overall voter participation. Overall voter participation is presented as the share of eligible inhabitants that voted in the local election in each municipality. The variable is constructed by using the total number of votes divided by the number of citizens eligible to vote. Female voter participation is presented as the share of eligible female inhabitants that voted in the local election in each municipality. The same procedure is applied here, by using the total number of female votes, divided by the total number of all eligible female voters. Exclusively looking at female voter participation is interesting as it is reasonable to assume that this group is more affected by child care reforms than men. A problem with comparing data across municipalities is differing population sizes between municipalities. By constructing the dependent variable as a share, we control for these differences.

Control Variables

Previous studies have suggested several factors that are affecting citizens voting behavior. Our pick of control variables is influenced by these findings. Unfortunately, the lack of available data from this period made it difficult to use all of the variables we initially intended to use.

To account for individual specific characteristics, we include age and gender from NSD. The variables are constructed as a share, where the amount of inhabitants

[5]Norwegian Centre for Research Data

in that group is divided by the total number of inhabitants. The age variable is further categorized into three groups. The first age group represents the share of inhabitants between the age 20 and 35. We chose this specific age group as it represents a young demographic that is eligible to vote, and is a group that more frequently than others have small children. As an example, the average age of having one's first child in 1970 was 23 for women and 26 for men. This is also referred to as the family variable. Individuals between the age of 36 and 65 represents an older demographic where having small children is much less frequent. The *older* group represents the oldest demographic where having children is most infrequent. We decided not to look at those under 20, as they were not eligible to vote until 1977, which accounts for almost half of the time period in our analysis. A variable for women is included to control for different voting patterns between men and women. This variable is defined as the share of women.

To control for municipal characteristics we include data on public spending in each municipality. More specifically, we look at how much each municipality invests in education, culture, transport, infrastructure, central administration costs, their elders and other health related sectors. The idea is that the level of public spending in a municipality is indicative of how that municipality is doing financially. All variables are measured in NOK 1000 per capita. All data on public spending is collected from FIVA.

5.1 Descriptive Statistics

Table (1) presents the mean and standard deviation values for the included variables in our baseline model.

	Treatment	Control
Dependent Variables		
Voter Participation	0.723[0.062]	0.710[0.062]
Female Voter Participation	0.729[0.066]	0.718[0.066]
Control Variables		
Age 2035	0.191[0.031]	0.199[0.030]
Age 3665	0.333[0.028]	0.328[0.028]
Age older	0.153[0.041]	0.139[0.039]
Women	0.490[0.013]	0.492[0.012]
Unemployment	0.015[0.013]	0.017[0.014]
C.E Education	7.888[1.787]	7.743[1.901]
C.E Elderlycare	4.591[3.555]	4.076[3.465]
C.E Healthsocial	3.258[2.353]	3.285[1.900]
C.E Culture	1.308[0.768]	1.253[0.715]
C.E Transport	0.567[0.986]	0.494[0.715]
C.E Centraladmin	2.161[1.317]	1.980[1.252]
Children	0.106[0.022]	0.108[0.021]
Municipalities	209	208

Table 1: Descriptive statistics

For the dependent variable we observe that the mean values of average voter participation is 1.3 percentage points higher in the treatment group, compared to the control group. Average female voter participation is 0.5 percentage points higher in the treatment group than in the control group.

From the individual specific control variables we observe a higher share of people under the age of 35 in the control group and a higher share of people above the age of 36 in the treatment group. We also observe a slightly higher share of women in the control group.

With respect to municipal characteristics, we observe that current expenditures is higher in the treatment group in every respect with the exception of 'healthsocial'.

5.2 Challenges with the data

The specific time period we analyse constraints our analysis. First, it reduces the availability of statistics making us unable to include some of the control variables we originally wanted to use. For example, the problem with using current expenditures is that the resources used to finance different sectors may be earmarked. Average private income could be a more precise and realistic measurement, nevertheless this data is not available for this time period.

In addition, we only have data for current expenditures from 1972. These two years compose 847 missing variables out of 2898 observations for this variable.

Furthermore, 23 municipalities were left out when we merged our codes with the data that defined the treatment and control group. Since we do not have information about when these municipalities implemented the reform, these are excluded from our analysis. If these municipalities differ from the other included municipalities, our result might suffer from selection bias. However, these municipalities make up a small share of our sample.

6 Method

Our identification strategy relies on variation in the initial speed at which child care coverage was implemented across municipalities in Norway after the reform was initiated by the Norwegian government. To be more precise, we compare voter participation before and after the reform in municipalities where childcare increased fast(the treatment group) and in municipalities where the expansions were slower(the control group).

To estimate the causal effect of the child care reform on voter participation, we use a difference in difference (DiD) approach. The key factor with the DiD is to calculate the effect of a treatment on the outcome, by comparing the mean change over time in the variable of interest between a treatment- and control group. In contrast to the conventional DiD approach, our analysis is not based on an increase from no child care coverage to full coverage, but rather the differences in the speed of implementing the child care coverage. By using the DiD we exploit that the roll out of the reform took place at different times in different municipalities.

For the DiD approach to represent a valid causal effect, two main assumptions need to be fulfilled. These are the assumption of random assignment and the assumption of parallel trends in the outcome variable in the pre-treatment period. Random assignment is concerned with the exogeneity of the implementation of the reform. That is, making sure that the implementation of the reform is random. For this to hold, the timing of treatment cannot correlate to other determinants of the outcome variable. We address this concern in chapter 7, where we look at differences between the municipalities in both groups in the pre-reform period. The assumption of parallel trend states that the control group must, on average, represent the counterfactual outcome of the treatment group. That is, in the hypothetical absence of the implementation of the reform, voter participation needs to increase or decrease at the same rate in both groups. A divergence from this trend in the post-treatment period, would indicate a treatment effect. In chapter 7 we discuss the parallel trend assumption further and perform a visual test and a placebo test to reassure that this assumption is fulfilled. The DiD method is illustrated in figure (3).

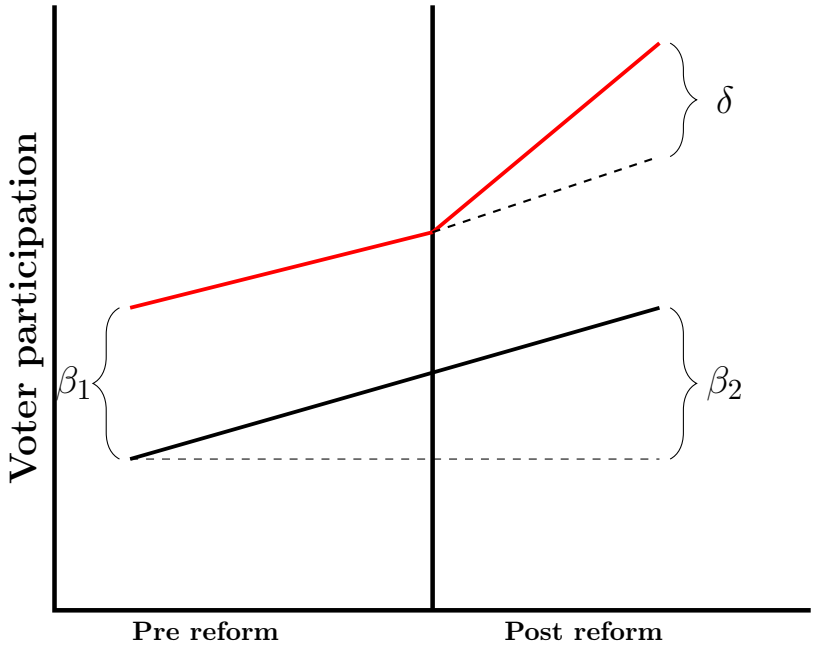

Figure 3: Illustration of the difference-in-difference method

The black line represent the trend in voter participation for the control group and the red line represents the trend in voter participation for the treatment group. The dashed line along the red line for the treatment group represent the counterfactual voter participation trend for the treatment group. In the figure we have assumed that the Kindergarten Act led to a break in the line for the treatment group, which deviated from the previously parallel lines of development in average voter participation.The distance between observed trend and counterfactual trend will therefore provide the causal effect of the Kindergarten Act on voter participation. Thus, the difference between the differences before and after the Kindergarten Act contributes to identification.

Equation (6) represents our regression model without control variables. This equation is estimated by using ordinary least squares (OLS) and cluster standard errors

$$Y_{it} = \alpha + \beta_1 Treat_i + \beta_2 After_t + \delta Treat_i \cdot After_t + u_{it} \tag{6}$$

where the coefficients α, β_1, β_2 and δ are unknown parameters and u_{it} is the stochastic error term.

Y_{it} is the dependent variable and determines voter participation in a specific municipality i at time t. Due to our specification, Y_{it} presents overall voter participation and female voter participation. $Treat_i$ is a dummy variable and identifies the municipalities in the treatment group. The dummy variable equals 1 if the municipality is in the treatment group and 0 otherwise. $After_t$ identifies the time period

in our data and determines the pre- and post-reform period. The dummy variable equals 1 when $t\epsilon[1979, 1983, 1987, 1991]$ [6], 0 otherwise.

The interaction term $Treat_i \cdot After_t$ presents the treated municipalities in the post-reform period. The coefficient δ is the DiD estimator and is often referred to as the *average treatment effect*, since it measures the effect of the reform on the mean outcome to voter participation. The average treatment effect is illustrated in Table (2).

	Before	After	After-Before
Comparison	α	$\alpha + \beta_1$	β_2
Treatment	$\alpha + \beta_1$	$\alpha + \beta_1 + \beta_2 + \delta$	$\beta_2 + \delta$
Treatment-Comparison	β_1	$\beta_2 + \delta$	δ

Table 2: Illustration of the DiD estimator

The estimator can be presented as the difference in average outcome in the treatment group before and after the reform minus the difference in average outcome in the control group before and after the treatment:

$$\hat{\delta}_{DID} = (\bar{Y}_{1T} - \bar{Y}_{0T}) - (\bar{Y}_{1C} - \bar{Y}_{0C})$$

When performing this analysis are we able to control for two potential distortions. First, the DiD estimator allows for initial differences in voter participation between the groups, due to the focus on changes instead of absolute values. Additionally, it controls for macroeconomic changes. Thus, these factors will not be able to effect our estimated outcome.

A concern related to our analysis is that voter participation is dependent of factors that are not included in the baseline model. If there are systematic differences in these factors between the treatment and the control group, we will have a selection bias problem. We control for this concern by estimating our baseline equation with and without a set of control variables defined as X_{it}.

Our regression model, including the control variables can be presented like this:

$$Y_{it} = \alpha + \beta_1 Treat_i + \beta_2 After_t + \delta Treat_i \cdot After_t + \beta_3 X_{it} + u_{it} \tag{7}$$

Where, X_{it} represents the vector of covariates included in the regression. This is the population represented in age groups, unemployment rate, share of women and current expenditures.

After estimating the baseline model, we perform a series of robustness checks and a heterogeneity analysis to the baseline model. These are presented in chapter

[6] Post-reform period

(8) and (9).

7 Results and Findings

In this chapter we present the results from the baseline model. However, before we present our findings we need to make sure that the assumptions behind DiD estimation are upheld. These assumptions are the parallel trend assumption and random assignment assumption.

Parallel Trend

A parallel trend implies that the treatment- and control group follow the same trend in voter participation, in the absence of the reform. To test if this assumption is fulfilled, we apply a visual test and a placebo test. There is no perfect way to test the parallel trend assumption. Therefore, the results only indicate whether there was a trend before the reform was implemented between the treatment- and control group.

Figure (4) is a visual test which illustrates the trend in average voter participation for the treatment- and control group. The blue line represents the treatment group and the red line represents the control group. We see that voter participation is higher in the treatment group than the control group on average, but that the trend in average voter participation in the pre- reform period between the groups is similar. This indicates that there are no substantial differences in the voter participation trend before the implementation of the reform.

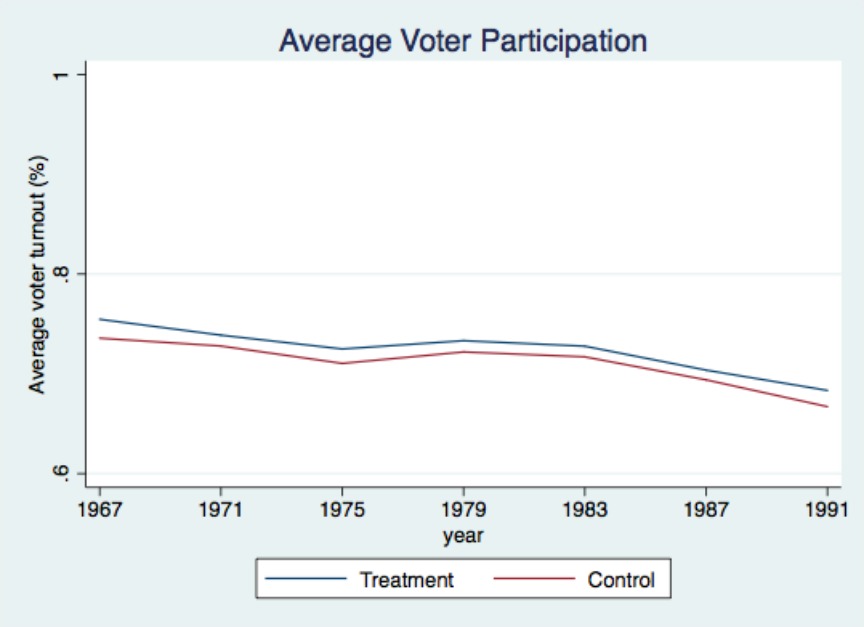

Figure 4: Visual test

To further strengthen the case for parallel trends we perform a placebo test, as shown in table (3). This is done by performing a DiD where we compare differ-

ent points in time in the 'before' period to see if voter participation between the treatment- and control group changes. If we obtain insignificant results for the DiD estimator, it means that voter participation does not change between the groups, and that there is a parallel trend. Columns (1) and (2) compare 1967 and 1975. Columns (3) and (4) compares 1971 and 1975. Columns (5) and (6) compares 1967 and 1971 with 1975. Columns (1), (3) and (5) look at overall voter participation and columns (2), (4) and (6) look at female voter participation.

The placebo test produces ambiguous results. Columns (1), (2), (5) and (6) in table 5 suggest that there is no breach of the parallel trend assumption and columns (3) and (4) raise doubts about the parallel trend assumption. We assume that the estimates in (1) (2), (5) and (6) are more trustworthy as they analyse trends over a longer time period than (3) and (4). We therefore operate as if the parallel trend assumption is not breached.

	1967-1975		**1971-1975**		**1967,71-1975**	
Variables	**VP**	**Female VP**	**VP**	**Female VP**	**VP**	**Female VP**
	(1)	(2)	(3)	(4)	(5)	(6)
Treat	0.016**	0.012	0.005	0.003	0.011**	0.008
	(0.007)	(0.008)	(0.006)	(0.007)	(0.004)	(0.005)
After	-0.025***	-0.012	-0.012**	-0.013**	-0.015***	-0.013**
	(0.009)	(0.010)	(0.006)	(0.007)	(0.006)	(0.006)
$Treat \cdot After$	-0.005	-0.003	-0.012**	-0.013**	-0.001	0.001
	(0.009)	(0.010)	(0.006)	(0.007)	(0.007)	(0.008)
Constant	0.116	0.194*	0.335***	0.393***	0.165*	0.199*
	(0.097)	(0.111)	(0.122)	(0.145)	(0.091)	(0.106)
Individual Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Observations	833	833	833	833	1,250	1,250
R-squared	0.179	0.125	0.135	0.112	0.161	0.122

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Placebo test

Random Assignment

In most political interventions, the municipalities that receive treatment are most likely not receiving treatment randomly. An example is that rich municipalities with a high share of children in kindergarten age, might be more likely to expand child care coverage faster compared to municipalities with less resources and a low share of kids in kindergarten age. The intuition behind this is that more resourceful municipalities would have a higher demand for child care coverage, as well as the means to implement it faster. If this is the case, then the distribution with respect to which municipalities that receive treatment can be said to be non-random. In our case, the municipalities that expanded child care coverage fast and the municipalities which expanded slow must be randomly distributed. The intuition is that if municipalities are statistically similar on variables such as unemployment rate or

various expenditures, the likelihood that the expansion speed of child care coverage is random. By checking the mean of the pre-reform observations for both groups, we get an indication of whether the random assumption is upheld. Table (4) shows average values for both individual and municipality specific characteristics, for the treatment and control group in the pre-reform period.

As we can see from table (4), we observe significant differences with respect to several of the variables. As an example, there is a significant difference in the share of women in the treatment- and control group. One reason why this difference is significant is due to the fact that the composition of males and females usually is very stable across municipalities. Therefore, small differences can yield significance, as the degree of significance is defined on the basis of the underlying variance. Said in another way, significant differences between treatment and control on observable variables, do not necessarily indicate that the assumption of random assignment is not upheld.

	Pre-reform period:			
Variables	**Mean Treatment**	**Mean Control**	**Difference**	**STD**
Voter Participation	0.739	0.723	0.015	0.003***
Female Voter Participation	0.721	0.708	0.013	0.004***
Age2035	0.173	0.182	-0.010	0.002***
Age3665	0.345	0.336	0.009	0.001***
Age older	0.139	0.125	0.014	0.002***
Women	0.487	0.489	-0.003	0.001***
Unemployment	0.008	0.008	0.000	0.001
C.E education	6.811	6.641	0.170	0.173
C.E Elederlycare	1.997	1.594	0.403	0.320***
C.E Healthsocial	3.364	3.566	-0.202	0.209
C.E Culture	0.696	0.714	-0.018	0.067
C.E Transport	0.744	0.530	0.213	0.084**
C.E Central admin	1.241	1.178	0.062	0.119
Children	0.113	0.121	-0.008	0.001***

Table 4: Pre-reform descriptive statistics

Results

Table 5 presents the estimated effect of the expansion in child care coverage on our two dependent variables. We estimate the effect of the Kindergarten Act on overall voter participation in column (1)-(3), and look exclusively at the effect on female voter participation in column (4)-(6). Columns (1) and (4) are our base line models in which we do not control for individual- or municipality characteristics. In columns (2) and (5) we control for the effect of individual characteristics on overall and female voter participation. In columns (3) and (6), we additionally control for municipality characteristics.

In column (1), the estimated coefficient for $Treat$ indicates that the treatment group had a 1.5 percentage point higher average share of voter participation than the control group. The estimated coefficient for $After$ indicates that voter participation decreased by 2.3 percentage points after the reform was implemented. Both coefficients are significant at 1%. The estimated coefficient for the interaction $Treat \cdot After$ is our estimate of main interest, and gives the average change in voter participation in the treatment group after the child care reform was implemented. This estimated coefficient implies that the average change in voter participation has decreased with 0.3 percentage points in the treatment group compared to the control group. This result however, is statistically non-significant.

In column (2), we add a set of individual characteristics as control variables to the baseline model. The estimated coefficient for the $Treat$ variable says that on average, municipalities in the treatment group have a 1.2 percentage point higher voter participation than the control group, when controlling for individual characteristics. The estimated coefficient for $After$ indicates that voter participation

decreased by 1.4 percentage points after the reform was implemented. These estimated coefficients are still significant to 1%. The estimated coefficient for the interaction $Treat \cdot After$ still yields a statistically non-significant result. Hence, even when controlling for individual characteristics, we find no significant change in voter participation between the two groups. That is, we find no evidence to support the claim that voter participation changed as a result of the implementation of the reform.

Estimated coefficients for individual characteristics have the following interpretation. Firstly, if the share of citizens between the age of 20 and 35 increases by 1%, voter participation decreases by 0.279 percentage points. If the share of citizens between the age of 36 and 65 increases by 1%, voter participation increase by 0.188 percentage points. If the share of older citizens increases by 1%, voter participation decreases by 0.005 percentage points. A 1% increase in the share of women, increases voter participation by 0.419 percentage points. All estimated coefficients are significant at 1%, with the exception of a non-significant result for the estimated coefficient for the share of older citizens.

In column (3) we add an additional set of municipality characteristics as control variables. The estimated coefficient for the $Treat$ variable says that on average, municipalities in the treatment group have a 1 percentage point higher voter participation than the control group, when controlling for both individual characteristics and municipality characteristics. This result is significant at 10%. The estimated coefficient for $After$ indicates that voter participation increased by 1.1 percentage points after the reform was implemented, significant at 5%. Estimated coefficient for the interaction ($Treat \cdot After$) is statistically non-significant when controlling for both individual characteristics and municipality characteristics.

When controlling for both individual and municipality characteristics, estimated coefficients for the individual characteristic variables change slightly. If the share of citizens between the age of 20 and 35 increases by 1%, voter participation decreases by 0.388 percentage points. This result is still significant at 1%. A 1% increase in the share of citizens between the age of 36 and 65 ceases to have a statistically significant effect on voter participation, when adding municipality characteristics as control variables to the baseline model . A 1% increase in the share of citizens older than 65 causes voter participation to increase by 0.102 percentage points. This result is significant to 10%, compared to a non-significant result in column (2). When adding municipality characteristics to the baseline model, a 1% increase in the share of women ceases to have a statistically significant effect voter participation.

The estimated coefficients for the municipality characteristics have the following

interpretation. A 1% increase in the unemployment rate causes voter participation to decrease by 1.1 percentage points. In addition, a 1% increase in the amount invested in education, elderly care and other health and social services, decreases voter participation by 0.003 percentage points. These results are all significant to 1%. A 1% increase in the amount invested in culture has a non-significant effect on voter participation. The effect from investments in transport and infrastructure is less significant than investments in education, elderly care and health and social services. A 1% increase in the amount invested on transport reduces voter participation by 0.003 percentage points. This result is significant at 10%. Lastly, a 1% increase in central administration costs, increases voter participation by 0.012 percentage points, significant to 1%.

In columns (4)-(6) we perform the same analysis, looking exclusively at the effect on female voter participation.

Column (4) shows the estimated results from the baseline model, where female voter participation is used as our dependent variable. The estimated coefficient for $Treat$ indicates that women in the treatment group on average had a voter turnout that was 1.3 percentage points higher than women in the control group. The estimated coefficient for $After$ implies that women on average increased voter participation by 1.7 percentage points after the reform was implemented. Both these results are significant at 1%. Comparing the baseline models in column (1) with column (4), we see that while overall voter participation decreased after implementation of the reform, female voter participation increased. The estimated coefficient for the interaction ($Treat \cdot After$) is statistically non-significant also when looking at female voter participation.

Column (5) shows the estimated results from the baseline model with individual characteristics included as control variables. We see that the women in the treatment group on average had a 0.7 percentage point higher voter participation than the women in the control group. After the implementation of the child care reform, female voter participation increased by an average of 0.3 percentage points. Both results significant at 1%. There were no significant difference in how female voter participation changed in the treatment group and in control group after the implementation.

From column (5) we see that if the number of people between the age of 20 and 35 increase by 1 %, female voter participation increase by 0.530 percentage points. This is opposite of the effect found when looking at overall voter participation. Similarly, if we increase the number of people between the age of 36 and 65 by 1 %, female voter participation increased by 0.746 percentage points. A 1 % increase in the number of people above the age of 65 would increase female voter participation

by 0.332 percentage points. All these results are significant at 1%. A 1% increase in the share of women, increases female voter participation with 0.258 percentage points, significant at 5%.

Column (6) shows the estimated results from the baseline model with individual and municipality characteristics included as controls. The estimated coefficient for $Treat$ shows that female voter participation had an average increase of 1.1 percentage points after the implementation of the child care reform, when controlling for both individual- and municipality characteristics. There were no significant average difference between the the treatment- and control group or significant differences between these groups after the implementation.

Estimated coefficients for the individual characteristics yields a similar result to the estimated coefficients in column (5). When additionally controlling for municipality specific effects, we see that a 1% increase in the share of citizens between the age of 20 and 35 cause female voter participation to increase by 0.297 percentage points. In the age group between 36 and 65, a 1% increase in the share of citizens between the age of 36 and 65, cause female voter participation to increase by 0.520 percentage points. If we increase the share of citizens above the age of 65 by 1%, female voter participation increases by 0.194 percentage points. All these results are significant to 1%. When controlling for both individual and municipality specific characteristics, we find no significant effect on female voter participation, of a 1% increase in the share of women.

In terms of municipality specific characteristics, we see that a 1% increase in the unemployment rate has a non-significant effect on female voter participation. This differs from column (3), where increased unemployment was associated with decreased overall voter participation. A 1% increase in investments in education and elderly care yields similar results with column (3). Both results imply a 0.004 percentage point lower female voter participation, and are significant to 1%. There is a non-significant effect of a 1% increase in investments in health, social and cultural services on female voter participation. A 1% increase in how much is invested in transport and infrastructure decreases female voter participation by 0.006 percentage points. Increasing investments in the central administration causes female voter participation to increase by 0.005 percentage points. Both results are significant to 1%.

The estimated coefficient for the interaction $Treat \cdot After$ is the difference-in-difference estimator. The DiD-estimator is presented as an interaction term of the municipalities in the treatment group and in the time period after the reform was implemented. As Table (5) displays, we find no significant differences. This indicates that the Kindergarten Act led to a neither higher nor lower voter participation in

the treatment municipalities.

	Voter Participation			Female Voter Participation		
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Baseline						
Treat	0.015***	0.012***	0.010*	0.013***	0.007*	0.009
	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.006)
After	-0.023***	-0.014***	0.011**	0.017***	0.003	0.011**
	(0.003)	(0.004)	(0.005)	(0.004)	(0.004)	(0.006)
$Treat \cdot After$	-0.003	-0.001	-0.004	-0.003	0.001	-0.003
	(0.005)	(0.006)	(0.006)	(0.005)	(0.005)	(0.007)
Individual Characteristics						
Age 2035		-0.279***	-0.388***		0.530***	0.297***
		(0.073)	(0.102)		(0.074)	(0.102)
Age 3665		0.188***	-0.050		0.746***	0.520***
		(0.050)	(0.058)		(0.050)	(0.060)
Age older		-0.005	0.102*		0.332***	0.194***
		(0.044)	(0.060)		(0.045)	(0.061)
Women		0.419***	0.072		0.258**	0.043
		(0.119)	(0.139)		(0.126)	(0.136)
Municipality Characteristics						
Unemployment			-1.100***			-0.091
			(0.106)			(0.105)
C.E Education			-0.003***			-0.004***
			(0.001)			(0.001)
C.E Elderlycare			-0.003***			0.004***
			(0.001)			(0.001)
C.E Healthsocial			-0.003***			-0.001
			(0.001)			(0.001)
C.E Culture			-0.002			-0.001
			(0.003)			(0.002)
C.E Transport			-0.003*			-0.006***
			(0.002)			(0.001)
C.E Central admin			0.012***			0.005***
			(0.002)			(0.002)
Constant	0.723***	0.506***	0.788***	0.708***	0.193***	0.446***
	(0.003)	(0.055)	(0.076)	(0.003)	(0.059)	(0.077)
Observations	2,875	2,875	2,040	2,872	2,872	2,037
R-squared	0.051	0.087	0.169	0.022	0.113	0.190

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Main results

8 Robustness checks

In this chapter we perform a series of robustness checks to the baseline model. Results are said to be robust if they do not change significantly to small changes in the model specification. We begin by applying a more flexible DiD-model, allowing for different trends in voter participation between the treatment and control group. Further, we run a trimmed version of the baseline model, by excluding several election years in the pre- and post reform period. This is done to account for uncertainty about the time it takes for a policy change to manifest itself. We also estimate the baseline model, excluding the largest cities from the analysis. Lastly we estimate the models by means of fixed effects to address a concern that there may be unobserved factors that vary between municipalities that also affect voter participation. In the previous chapter we found that many of the control variables were significant, indicating that they have an impact on voter participation. We will therefore use the models in which we control for both individual- and municipal characteristics when checking the robustness of the results.

8.1 Fixed effects

We performed the baseline analysis using a standard DiD framework. In principle, however, we could include municipal- and election year Fixed Effects in addition to the controls in the previous sections. By including municipal Fixed Effects, we control for permanent differences that vary between municipalities that also impact voter participation. This could be distance to the voting station, the quality of the candidates in the election or the amount of money spent on the election (Charles et al., 2013). By including election year fixed effects, we control for shocks and other disturbances specific to the election years. This controls for shocks at a national level that affect voter participation. Examples are the degree of media coverage, other political alternatives or business cycle fluctuations. If these factors correlate with voter participation the model will suffer from omitted variable bias if we fail to control for them.

The Fixed Effects model can be presented as:

$$y_{it} = \alpha + \delta Treat_i \cdot After_t + \beta_3 X_{it} + a_i + D_t + u_{it} \tag{8}$$

In column (1) in table (6) we see that $Treat \cdot After$ is insignificant, which means that the reform did not affect voter participation in the treatment group. From column (2) all individual characteristics are insignificant, except the age group 36 to 65. If the number of people between the age of 36 and 65 increase by 1%, average voter participation will decrease by 0.221 percentage points. The estimated coefficient for

$Treat \cdot After$ is more negative compared to table (5), but still insignificant.

In column (3) unemployment and investments in central administration are the only significant variables at 5% and 1%, respectively. If the unemployment rate increases by 1%, voter participation decreases by 0.289 percentage points. A 1% increase in central administration spending increases voter participation by 1.0 percentage point. This is similar to the result in column (3) table (5). The estimated coefficient for $Treat \cdot After$ still shows no effect of the reform on voter participation in the treatment group.

In column (4) $Treat \cdot After$ is still insignificant and similar to the observation in column (4) in table (5).

Compared to table (5) where all individual characteristics were significant, we only obtain significant estimates on the 'older' variable in column (5), at 1% significance level. A 1% increase in the share of older citizens increases female voter participation by 0.437 percentage points. As in table (5) the $Treat \cdot After$ estimate is insignificant.

From column (6) we see that a 1% increase in the number of people between the age of 20 and 35, and 36 to 65, increases female voter participation by 0.301 percentage points and 0.25 percentage points, respectively. These results are significant at 10%. A 1% increase in the amount of elders increases female voter participation by 0.478 percentage points, significant at 1%. In terms of municipal characteristics, we see that a 1% increase in how much is invested in elderly care, health and other social factors increases female voter participation by 0.002 percentage points. Significant at 1% and 5%, respectively. Compared to table (5), the municipal characteristics affect female voter participation less when including fixed effects.

Overall, both the individual and municipal controls are less significant. A loss of significance when employing the FE analysis is not surprising in our case as many of the variables change little over time within municipalities. Our main interest is if there is any change in the $Treat \cdot After$ estimator. Compared to table (5), we see that the results are quite similar. As table (5) also indicates, the $Treat \cdot After$ is insignificant and indicates no treatment effect from the reform on voter participation.

In theory, including Fixed Effects would be the optimal solution to ensure the most valid result [7] However, since our result does not cause any changes in our DiD estimators and $Treat$ and $After$ provides interesting information. We therefore continue performing our robustness checks, based on our main specification.

[7] F test between pooled and FE can be found in appendix. The results indicate that the FE specification is better

	Voter Participation			Female Voter Participation		
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Baseline						
$Treat \cdot After$	-0.003	-0.004	-0.005	-0.002	-0.002	-0.002
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Individual Characteristics						
Age2135		0.014	-0.012		0.241	0.301*
		(0.154)	(0.136)		(0.183)	(0.182)
Age3665		-0.221**	-0.164		0.075	0.250*
		(0.108)	(0.109)		(0.121)	(0.145)
Ageolder		0.056	-0.078		0.437***	0.478***
		(0.091)	(0.107)		(0.115)	(0.148)
Women		0.418	-0.358		0.219	-0.388
		(0.268)	(0.230)		(0.327)	(0.312)
Municipality Characteristics						
Unemployment			-0.289**			-0.078
			(0.133)			(0.177)
C.E Education			0.002			-0.002
			(0.002)			(0.002)
C.E Elderlycare			0.000			0.002***
			(0.001)			(0.001)
C.E Healthsocial			0.001			0.002**
			(0.001)			(0.001)
C.E Culture			0.001			0.003
			(0.003)			(0.004)
C.E Transport			0.000			0.000
			(0.001)			(0.002)
C.E Centraladm			0.010***			0.001
			(0.002)			(0.003)
Constant	0.783***	0.645***	0.928***	0.784***	0.545***	0.760***
	(0.003)	(0.152)	(0.144)	(0.003)	(0.190)	(0.197)
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,875	2,875	2,040	2,872	2,872	2,037
R-squared	0.739	0.744	0.831	0.649	0.655	0.698

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Included Fixed Effects

8.2 Shortening down the time-periods.

The time span of the data is an important factor when observing the implementation of a reform. The effect from a policy change might need time to manifest itself. This is the main argument for including the longer time period in our baseline model. The problem with our data, as figure (2) illustrates, is that the difference between the child care coverage in the treatment and the control group reduces over time. This implies that at some point, all of the municipalities will be in the treated group. Because our post-treatment period extends over three election periods, this may reduce the credibility of our estimation. By gradually reducing the time period with

one and two election years, we check if our main results are robust to this change.

Table (7) shows the estimated results for the model with shortened post-treatment periods. In column (1) and (3), the post-treatment period is reduced with one election year. From column (1), we see that on average the treatment group has 1 percentage points higher voter participation than the control group. We also see that on average, voter participation increases by 0.9 percentage points after implementation of the reform compared to before. Both results are significant at 10%, and show only small deviations from the main results. Column (3) shows that average female voter participation increased with 2.1 percentage points after the implementation of the reform. We see that, even in the case of shortening the post-treatment periods, no significant treatment effect of the reform is found on voter participation. This result is consistent for both overall and female voter participation.

In column (2) and (4), we reduce the post-treatment period with two elections year to 1983. From column (2), we see that on average, voter participation were 1 percentage point higher in the treatment group compared to the control group. This result is significant at 10%. Estimated coefficient for $After$ implies that on average, voter participation increased by 1.7 percentage points after implementation of the reform compared to before. When reducing the post-treatment period with two election years, the model estimates that voter participation increased by 1.7 percentage points after the reform was implemented, compared to before. This result is significant at 10%. From column (4), we see that on average, female voter participation is 2.6 percentage points higher in the post-treatment period, significant at 1%. We see that, even when reducing the post-treatment period with two election years, no significant effect is found for the estimated coefficient for $Treat \cdot After$. This indicates that our main results are not suffering from reduction in credibility.

	Voter Participation		**Female Voter Participation**	
Variables	1987	1983	1987	1983
	(1)	(2)	(3)	(4)
Treat	0.010*	0.010*	0.009	0.009
	(0.006)	(0.005)	(0.006)	(0.006)
After	0.009*	0.017***	0.021***	0.026***
	(0.005)	(0.006)	(0.006)	(0.007)
$Treat \cdot After$	-0.004	-0.005	-0.002	-0.004
	(0.006)	(0.006)	(0.007)	(0.007)
Constant	0.657***	0.471***	0.669***	0.512***
	(0.084)	(0.095)	(0.091)	(0.107)
Individual Characteristics	Yes	Yes	Yes	Yes
Municipality Characteristics	Yes	Yes	Yes	Yes
Observations	1,637	1,230	1,637	1,230
R-squared	0.098	0.152	0.096	0.133
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 7: Shortening the time period

8.3 Excluding the biggest cities

The provision of child care slots related to the reform varied between rural and urban areas in Norway. To assure that our findings from our main specification are not driven by consistent differences between these areas prior the child care reform, we exclude the five biggest cities. These are Oslo, Trondheim, Stavanger, Bergen and Bærum, motivated by Havnes et al. (2011). The results from this analysis are presented in Table (8). As can be seen from table (8), the results are consistent with the main results in Table (5). From column (1), we see that the estimated coefficient for $Treat$ ceases to be significant. Estimated coefficients for $After$ yields similar results to the main results. Even when excluding the five biggest cities, we find that the estimated coefficient for $Treat \cdot After$ are non-significant. These findings strengthen the robustness of our main specification, and indicate that there are not existing consistent differences between rural and urban areas.

Variables	**Voter Participation**	**Female Voter Participation**
	(1)	(2)
Treat	0.009	0.008
	(0.006)	(0.006)
After	0.010**	0.011*
	(0.005)	(0.006)
$Treat \cdot After$	-0.004	-0.003
	(0.006)	(0.007)
Constant	0.860***	0.473***
	(0.076)	(0.079)
Individual Characteristics	Yes	Yes
Municipality Characteristics	Yes	Yes
Observations	2,020	2,017
R-squared	0.179	0.188
Robust standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Table 8: Excluding the 5 biggest cities

8.4 Flexible difference-in-difference model

The suspicion of a breach of the parallel trend assumption arises due to the results in column (3) and (4) in table (3). We therefore extend our analysis by using a more flexible diff-in-diff approach. This approach allows for different trends in voter participation before the implementation of the reform, between the treatment and the control group.

The more flexible DiD approach can be written as:

$$y_{it} = \alpha + \beta_1 Treat_i + \beta_2 After_t + \delta Treat_i \cdot After_t + \beta_3 X_{it} + \tau \cdot T_i + \lambda(T_i \cdot Treat_i) + u_{it} \quad (9)$$

This equation is similar to equation (7), but in addition we include a continuous time trend variable T=1,...,7. T = 1 for observations on voter participation in 1967, and 2 for observations on voter participation in 1971, up to 7 for observations on voter participation in 1991. The inclusion of a continuous trend will not solve the problem, but give us an idea of the robustness of the results in the simple diff-in-diff model (Green et al., 2014).

Table (9) shows the estimated results for the flexible DiD-model. The results in column (1) indicate that average voter participation was 0.6 percentage points higher in the treatment group compared to the control group, significant at 5%. The estimated coefficient for the interaction $Treat \cdot After$ is negative and significant at 5%. This implies that that the average change in voter participation decreased by 0.6 percentage point in the treatment group relative to the control group.

From column (2), we see that $Treat$ indicates that the average female voter participation were 0.5 percentage point higher in the treatment group relatively to the control group, significant at 5%. Accordingly, female voter participation was 2.0 percentage points higher after the reform was implemented, significant at 1%. The estimated coefficient for $Treat \cdot After$ indicates that the average change in female voter participation decreased by 0.6 percentage points in the treatment group relative to the control group. This result is significant at 5%.

Variables	**Voter Participation**	**Female Voter Participation**
	(1)	(2)
Treat	0.006**	0.005**
	(0.002)	(0.003)
After	0.003	0.020***
	(0.002)	(0.002)
$Treat \cdot After$	-0.006**	-0.006**
	(0.003)	(0.003)
Constant	0.642***	0.748***
	(0.021)	(0.022)
Linear Trend	Yes	Yes
Individual Characteristics	Yes	Yes
Municipality Characteristics	Yes	Yes
Observations	2,040	2,037
R-squared	0.931	0.935
Robust standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Table 9: Flexible Difference-in-difference model

Given that the parallel trend assumption holds, estimated coefficients for $Treat \cdot After$ from the baseline models in table (5) will be efficient and unbiased. If, however, the parallel trend assumption does not hold, the $Treat \cdot After$ estimator in the main specification is biased, and the $Treat \cdot After$ estimators given in table (9) will be more trustworthy. However, the estimated dif- in- dif coefficient in table (9), albeit statistically significant, is economically small.

9 Sensitivity analysis

As noted in chapter 4, previous research have shown that people may act in self-interest in terms of policy changes implemented by the government. This implies that people are likely to be more supportive towards policies that affect them directly. For younger adults this could be child care implementations. For older people, benefits regarding elderly care (Pettersen, 2001). Based on this, we have reason to believe that parents with small children will be more supportive towards child care reforms than other cohorts in society. As a proxy for parents with small children, we use the share of citizens between the age of 20 and 35. In the following, this variable will be referred to as "share of citizens in family age". Further, we include a variable for the number of children between the age 0-6 as a share of all citizens in the municipality. This variable is collected from NSD, and will in the following be referred to as "share of children". The reason for including this variable is to study whether municipalities with a higher amount of children increases people's political engagement, and by extension, their incentive to vote.

Motivated by a statement in A. L. Campbell (2003), that individuals directly affected by policy changes may vote more, we investigate whether the Kindergarten Act had a greater impact on different subgroups in the treatment group. More specifically, we investigate voter participation for two subgroups within the original treatment municipalities. Firstly, we look at treatment municipalities with a share of citizens in family age above and below the mean. The control groups in this case are control municipalities with a share of citizens in family age above and below the mean, respectively. Secondly, we look at treatment municipalities where the share of children between 0-6 above and below the mean. Similarly, the control group in this case are control municipalities with a share of children between 0-6, above and below the mean, respectively.

Table (10) and (11) present the estimated results on overall voter participation and female voter participation, respectively. For both tables, column (1) shows the estimated results for treatment municipalities with a share of citizens in family age, above the mean. Column (2), where the share of citizens in family age is below the mean. Column (3) presents the results for treatment municipalities with share of children between 0-6 above the mean, while column (4) presents the results where the share of children between 0-6 is below the mean.

From column (1) in table (10), the estimated coefficient for the $Treat$ variable is significant at 1%. This result indicates that on average, municipalities in the treatment group with a share of citizens in family age above the mean, have 2.3 percentage points higher voter participation compared to the control group. The estimated coefficient for $After$ is positive, but non-significant. The interaction term

$Treat \cdot After$ indicates that the average change in voter participation decreased with 1.4 percentage points in the treatment group, compared to the control group. This result is significant at 10%. This result implies that, when isolating the treated municipalities with a share of citizens in family age above the mean, it gives a significant effect of the child care reform. Since previous result indicate insignificant results for the interaction term, it is impossible to state if the decreased results in voter participation have declined less for this group compared to other groups in the society.

In column (3) table (11), estimated coefficient for $Treat$ indicates that on average, municipalities in the treatment group with a share of children above the mean have 1.6 percentage points higher voter participation than the control group. This result is significant at 5%. Estimated coefficient for $After$ indicates that voter participation increased with 1.3 percentage points in both groups, after the reform was implemented. This result is significant at 10%. Estimated coefficient for $Treat \cdot After$ is non-significant. This implies that on average, there is no differences between the treatment and control group with the share of children above mean after the reform was implemented.

Column (2) and (4) show the estimated results for treatment municipalities where the share of citizens in family age and share of children, are below the mean, respectively. For these columns, no significant differences are found between the treatment and control group, after the reform compared to before nor for the estimated coefficient for the interaction $Treat \cdot After$.

Table (11) presents the results for female voter participation. From column (1), estimated coefficient for $Treat$ indicates that on average, the treatment municipalities with a share of citizens in family age above the mean, had a 2 percentage point higher female voter participation than the control group. This result significant at 5%. Estimated coefficient for $After$ indicates that female voter participation increased with 1.3 percentage points in both groups, after the reform was implemented. This result is significant at 1%. Estimated coefficient for $Treat \cdot After$ is non-significant.

From column (3), estimated coefficient for $Treat$ implies that on average, the municipalities in the treatment group with a share of children above the mean 1.6 percentage points higher voter participation than the control group. This result is significant at 5% and identical to the estimated result from column (3) in table (10). Estimated coefficient indicates that on average, female voter participation was 3.2 percentage point higher after the reform was implemented, significant at 1%. $Treat \cdot After$ implies that the average change in female voter participation has decreases with 1.6 percentage points in the treatment group compared to the control

group. This result is significant at 10%.

Column (2) shows the estimated results for treatment municipalities where the share of citizens in family age is below the mean. Similar to column (2) in table (10), no significant difference is found between the treatment and control group, after the reform compared to before nor for the estimated coefficient for the interaction $Treat \cdot After$. From column (4), the estimated coefficient for $Treat \cdot After$ implies that the average change in female voter participation has increased with 1.7 percentage points in the treatment group compared to the control group. That is, treatment municipalities with a share of children below the mean, compared to control municipalities with a share of children below the mean.

Variables	**Family above**	**Family below**	**Children above**	**Children below**
	(1)	(2)	(3)	(4)
Treat	0.023***	0.000	0.016**	-0.008
	(0.008)	(0.007)	(0.007)	(0.009)
After	0.009	0.002	0.013*	0.000
	(0.006)	(0.008)	(0.008)	(0.009)
$Treat \cdot After$	-0.014*	0.002	-0.009	0.014
	(0.009)	(0.009)	(0.009)	(0.010)
Constant	0.650***	0.590***	0.572***	0.767***
	(0.080)	(0.112)	(0.147)	(0.087)
Individual Characteristics	Yes	Yes	Yes	Yes
Municipality Characteristics	Yes	Yes	Yes	Yes
Observations	1,348	692	634	1,406
R-squared	0.186	0.102	0.100	0.223
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 10: Heterogeneity test: Voter Participation

Variables	**Family above**	**Family below**	**Children above**	**Children below**
	(1)	(2)	(3)	(4)
Treat	0.020**	0.000	0.016**	-0.010
	(0.008)	(0.008)	(0.007)	(0.010)
After	0.024***	0.000	0.032***	-0.003
	(0.006)	(0.009)	(0.008)	(0.009)
$Treat \cdot After$	-0.014	0.008	-0.016*	0.017*
	(0.009)	(0.010)	(0.009)	(0.010)
Constant	0.590***	0.471***	0.531***	0.243***
	(0.083)	(0.120)	(0.158)	(0.088)
Individual Characteristics	Yes	Yes	Yes	Yes
Municipality Characteristics	Yes	Yes	Yes	Yes
Observations	1,347	690	634	1,403
R-squared	0.218	0.152	0.108	0.231
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 11: Heterogeneity test: Female Voter Participation

10 Discussion

Up until now we have estimated the additional effect on voter participation in municipalities that were quick to implement the reform, relative to municipalities that were slow. To test the robustness of the results in the baseline model, we performed a series of robustness checks. To check whether the implementation of the reform affected voter participation differently for different subgroups of the population we performed two sensitivity analysis‘. In this chapter we will discuss the results we obtained in the previous chapters.

From the baseline model we see that the implementation of the Kindergarten Act did not affect overall voting participation more in municipalities that were quick to implement the reform compared to municipalities that were slow to implement the reform. The same is true for female voter participation. These results survive extending the model to control for individual- and municipality specific characteristics. The DiD estimator yield identical results when controlling for both individual- and municipality specific characteristics, and when performing further robustness checks.

It is worth noticing the $After$ variable and that it changes when we include individual- and municipal controls. Since we deem the estimated effect on the $After$ variable to be most trustworthy when we control for both individual and municipal controls we chose to perform the additional robustness checks on those models. In terms of interpreting the $After$ variable, we should treat with caution. This variable only says how voter participation has been after the implementation of the reform compared to before. General increases in voter participation is not accounted for. One should therefore be careful in inferring any affect on general voting participation from the reform in the $after$ variable, as this effect may stem from other factors. Even though it is a flawed measure, it does provide an indication of how voter participation was affected by the reform. We will therefore comment on it in the discussion.

A discussion about Fixed Effects

In the first robustness check we estimated the models by means of a fixed effects specification. We did this to check whether controlling for unobserved heterogeneity would change the estimated effect of the DiD estimator. By controlling for municipality- and election year specific effects we did not obtain different estimates for the DiD than in the baseline model.

In this analysis we are dealing with data from 451 different Norwegian municipalities. Most economists who try to make statistical inference from a data set with a unit dimension that wide would employ a Fixed Effects specification without thinking twice. However, the peculiar definition of treatment- and control group in our

case made us reconsider using that specification in the baseline analysis. Typically you would analyse differences between one group that received treatment and one that did not. However, the Kindergarten Act was implemented in all municipalities, and the separation into treatment-and control group was done on the basis of the speed of implementation, not whether the reform was implemented or not. It is also interesting to look at how the reform affected voter participation as a whole. Since the Act was implemented in all the municipalities, the $After$ variable is of interest to us, despite its weaknesses. If we had decided to use the FE specification in the baseline analysis and continued to perform robustness checks on the basis of that specification, we would not have been able to analyse the general effect on voter participation from the reform. The reason is that the $After$ variable disappears when using the FE specification due to collinearity. Another concern with FE is that in the event of too little within variation, a FE specification will yield inefficient results. Since changes over time within municipalities are generally small, this is a concern that made us lean against using the FE specification as a baseline model. Given that the DiD is our main variable of interest, one could make the argument that the information contained in the $After$ variable should not be considered too much when deciding how to proceed with the econometric analysis. However, since we did not obtain different estimates in the DiD in when employing the FE specification in the first robustness check, we decided that it was worth keeping the original model as this would allow us to discuss the $After$ variable as it does provide information regarding our research question. Therefore, a potential weakness to our analysis is that we did not perform the rest of the robustness checks on the FE specification. It is however something we are aware of and have considered. On the other hand, as we consistently found a zero effect of the implementation of the reform on voter participation, we see that our conclusion is not substantially affected by the use of fixed effects.

Observations from the robustness checks

As mentioned, the DiD estimators yield insignificant effects in the baseline model and the robustness checks.

We observe that the $After$ variable yields almost identical results to the baseline model when we exclude the municipalities containing the biggest cities. This implies that implementing the Kindergarten Act did not change voting behaviour in the bigger cities any more- or less than in the smaller ones. If we extrapolate this logic to a more general argument we can say that this indicates that rural- and urban areas react similarly in terms of voting behaviour to receiving public goods.

When we shorten down the time periods we see from comparing the $After$ variable in columns (1) and (2) to the $After$ variable in columns (3) and (4), that

the increase in overall voter participation is reduced more then female voter participation when excluding only one election year compared to two. This tells us that the increase in female voter participation from the reform has been more stable. The effect on female voter participation was also generally stronger in this analysis compared to overall voter participation.

Observations from the sensitivity analysis

The results from the sensitivity analysis tell us that overall voter participation in municipalities where the share of people in the 'family' cohort was above the mean, in which the implementation was slow, increased relative to municipalities where the speed of implementation was high. We observe a similar dynamic in female voter participation in municipalities where the share of small children was above the mean. These are weak effects one should be careful making general arguments from. Also, the reduction of the sample size when performing the sensitivity analysis may have caused the DiD estimator to be less precise. They are however interesting as they are opposite of what we expected. Theoretically speaking we would expect to observe a positive diff-in-diff estimator. This due to the benefit of the child care expansion, which should in theory increase the voters psychological utility and lead to higher voter participation. As these results do not correspond to the theory model or earlier research, it is hard to exactly point out why we observe negative values. In terms of explaining the negative observations, we would only be able to rely on speculations.

When we compare the $After$ variable in table 10 to table 11 we observe that female voter participation in general is more affected than overall voter participation. One can argue that when men is included into the mix of voters, the effect from the reform on voter participation is somewhat watered out. The observation that the effect is biggest in municipalities with the highest share of individuals in the $family$ cohort and where the share of young children is highest, helps to emphasize the point made by Pettersen (2001). This article states that Norwegian citizens are more supportive towards a child care reform if they are directly affected by it. It was the increased presence of women in the workplace that created the demand which ultimately led to the implementation of the Kindergarten Act. It is therefore reasonable to argue that women were more affected by the Act, and that this is the reason why the effect on voter participation is stronger for that cohort of society.

Explanations for non-causal effects

One explanation for insignificant results on our DiD estimator might be that the share of voter participation is already very high in Norway. This can make it difficult for the government to further engage the citizens to vote.

Because the Kindergarten Act was implemented at different times in different

municipalities, we expected that voter participation in the treated municipalities would increase more than the control group. However, our results indicates that voter participation may have increased in all the municipalities, but not that there is a significant difference between fast- and slow implementing municipalities. This indicates that the actual implementation of the reform did not affect voter participation, but rather the psychological aspect of knowing that a reform would happen. The psychological aspect worked on the entire population that got the reform, and the effect did not differ between groups that got it fast and those that got it slow. This is not what we expected.

Comparing to previous findings

Previous research that looks at how voter participation is affected by a welfare reform is scarce. This makes it difficult to compare our findings with previous literature. We were, however, able to find one paper by Corman et al. (2017) which investigated how voter participation amongst low-income women was affected by a welfare reform. In a time where voter turnout was generally on the decline, they found that the welfare reform caused voter participation to decline less amongst low-income women after the reform.

We found no significant effect on how the Kindergarten Act affected voting in fast- implementing municipalities compared to slow- implementing municipalities. We did, however, find an indication the the implementation of the Act increased voter participation. This is similar to the paper by Corman et al. (2017).

It is important to point out that this paper differs from ours in many respects. They are not looking at the same reform that we are. They are also not looking at how voter participation is affected in Norway, but the US. They have also defined the treatment- and control group differently than us. This makes it difficult to compare the differing results.

10.1 Limitations

Selective migration is not accounted for in our analysis, and may affect our results. If citizens moved from the control group to the treated group due to higher child care coverage rates in the treated municipalities, this might overestimate the effect of the Kindergarten Act on the treatment group, if these people are also voting. Families with small children or parents with higher labor marked attachment and higher education level are more likely to choose to move in this period. However, earlier research finds that citizens' location choice is inconsistent which local public goods [8]. Hægeland et al. (2008) provides further confidence, as their findings suggest that quality of school matters little, if anything, when deciding where to locate.

[8] See Rhode et al., 2003

Earlier research highlights education level when estimating voter behavior. However, available data in the time period we analyze only contained observations from 1970 for the pre-reform period. Thus, including the data to our DiD model caused difficulties. If the implementation of the Kindergarten Act somehow increased the education level in the treated municipalities, this could have had an impact on our results. Also, an increase in the education level across all municipalities over time would have affected our results. The municipality- and year Fixed Effect in table (6) controlled for these factors, amongst other things, and indicate that our results did not suffer from biases because the inability to control for education.

Our results could have been different if we had been able to focus on the effect on the parents of children who were affected by the child care expansion. It is reasonable to assume that this cohort was most affected by the expansion. Unfortunately, our data prohibits this analysis due to unavailable micro- data at an individual level. We do not have extensive information about our voters which makes it impossible to investigate if those who were actually parents at the time voted more- or less after the implementation of the Kindergarten Act. Our family variable is just a proxy based on information collected from Statistics Norway (SSB).

11 Conclusion

In this thesis we employed a DiD approach to investigate the effect of the implementation of the Kindergarten Act on voting behavior in Norwegian municipalities. Previous literature on welfare policies skewed our expectations in the directions of a positive effect. However, we found robust evidence contradicted our expectations. Our results show no significant additional effect on voter participation in fast- implementing municipalities compared to slow- implementing municipalities. We also found evidence which indicated an increase in overall voter participation and female voter participation after the implementation. These results are however more uncertain as the $After$ variable fail to account for macro- economic trends. From the sensitivity analysis we found that voting participation increased more in the municipalities with above average shares of the sub groups we see as benefiting most form the reform.

Our thesis contributes to a field in which there is very little previous literature. This makes our results of a zero effect in fast- implementing municipalities compared to slow- implementing municipalities a contribution to a field in which there is limited research. This thesis is also interesting as it looks at voter participation in a country where voter participation is very high to begin with.

It could be interesting to conduct a similar analysis with better micro- data. This would enable us to more effectively isolate those that were affected by the reform and by extension a better analysis on the effect on voter participation on those we wish to look at.

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References

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A Appendix

A.1 Merging of municipalities

	The merge of Municipalities
Sarpsborg (105):	Sarpsborg(102), Varteig(114), Tune(130), Skjeberg(115)
Fredrikstad (106):	Fredrikstad(103), Borge(113), Rolvsøy(131), Kråkerøy (133), Onsøy(134)
Hamar(403):	Hamar(401), Vang (414)
Os (441):	Tolga(435)
Fron (516):	Fron(518)
Ringerike (605):	Ringerike(601)
Horten (701):	Horten(703), Borre (717)
Tønsberg (704):	Tønsberg(705), Sem(721)
Larvik (707):	Larvik(708), Stavern(725), Tjølli(726), Brunla(727), Hedrum(992)
Re (716):	Re(716), Ramnes(718)
Arendal (906):	Arendal(903), Moland(918), Øyestad(920), Tromøy(921), Hisøy(922)
Grimstad (904):	Fjære(923), Landvik(924)
Vindafjord (1160):	Vindafjord (1154)
Bergen (1201):	Bergen(1301), Laksevåg(1248), Fana(1249), Arna(1250), Åsane(1255)
Ullensvang (1231):	Ullensvang(1230)
Stryn (1449):	Stryn(1448)
Ålesund (1504):	Ålesund(1501)
Kristiansund (1505):	Kristiansund(1503), Frei(1556)
Ørskog (1523):	Ørskog(1527)
Aure (1576):	Aure(1569), Tustna(1572)
Brønnøy (1813):	Brønnøy(1814)
Salangen (1923):	Salangen(1921)
Hammerfest (2004):	Hammerfest(2001), Sørøysund(2016)
Vindafjord (1160):	Ølen(1214)
Holtålen (1644):	Haltdal(1645)

F-test

F(417,1608)	=15.07
Prob >F	= 0.000

Table 12: F-test

Voting System In Norway

The Norwegian election system is primarily based on and regulated by the Constitution of Norway and the Election Law. All citizens of Norway who are entitled to vote have automatically been registered in a municipal registration system which municipal officials are in charge of administrating. In accordance with §2-1 in the Constitution, a resident has to meet certain requirements in order to be eligible to vote: The person must have turned 18 years (20 years before 1979) before the end of the election year, to not have lost his/her right to vote and has to be a registered resident in Norway. However, one does not need to be a Norwegian citizen to have the right to vote in municipal elections if the individual can meet one of the following criteria. He/she is registered to have been settled in Norway for the last three years before election day, or the individual is a citizen of another Nordic country and has been registered to have settled in Norway before March 31st in the election year. Lastly, in order to be eligible to vote, all voters have to be registered in a municipal electoral register on the day of voting.

A citizen's choice to participate in an election is dependent on the institutional context, among other important factors. Availability is herein a central aspect, in which availability and an easy access to voting polls can lead to a reduced cost of voting. This can in turn lead to higher participation. Based on this significance, we will further briefly present how the election system takes place in Norway.

In the following, we will briefly explain how the voting process in itself has transpired. The voter had to meet up at one of the polling stations in the municipality where the voter was registered. Before the voter got the ballot paper, an electoral officer had to register his/her name in the electoral system in order to prevent the same person from voting several times. When the registry was in place, the voter could proceed, and enter a voting cubicle where he/she could vote in private, and then fold the ballot paper so the election was anonymous. Lastly, the ballot paper had to be properly stamped before the voter could put it in the sealed ballot box.Stortinget, 2019 In general, as is the case today, it was important that the voters' preferences on the amount of voting polls and the placement of the polling stations should be taken highly into account. It is of special importance and relevance to mention that the voting process has not changed notably after this specific period of time.