**Title**

Birth Order and Voter Turnout[†]

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# Introduction

Understanding why citizens choose to vote in elections is one of the most studied questions in political science. While a myriad of individual- and institutional-level factors are known to be related to voting throughout one's life, scholars of political behavior have pinpointed adolescence and early adulthood as a formative period of political development (**??**). In particular, a child's family environment has been shown to influence their long-term political engagement (**??????**).

Family is an important source for political socialization; children learn about politics from, and observe the political behavior of, their parents. Exposure to political discussion in the home has been consistently demonstrated to be one of the strongest predictors of whether or not a child votes as an adult (**???**). In addition to teaching children about politics, parents also provide non-political resources that help to foster a child's later political engagement. While scholars of political behavior have firmly established the importance of the family in shaping adult political participation, this research has not taken into account that growing up in a specific family can be a different experience for children of different birth order. In this paper, we test whether the order in which a child is born into a family influences their likelihood of voting as an adult. There are, at least, three prevailing theories linking birth order to adult outcomes.

The first two focus on how birth order affects the cognitive development process. The confluence theory, based on the work of **?**, maintains that earlier born siblings are advantaged because average family intellectual environment declines with each successive birth as children are less intellectually developed than adults. That is, whereas first-borns exclusively receive intellectual stimulation from their parents during their initial years of life, later-borns must also interact with their older siblings, which hampers their development relative to first-borns. The resource dilution theory formulated by **?** makes a similar prediction about the relationship between birth order and cognitive development, but stresses the access to household resources. As the size of the family grows, the share of parental attention and resources each later child receives is smaller since it must be

distributed among all children.[1] In support of this resource mechanism, **?** found that parents spent less time discussing school work with later-born children.

A third theory, posited by **?**, focuses instead on interactions between siblings and argues that children sort themselves into distinct "family niches" in order to successfully compete with one another for parental resources. First-borns develop traits, such as conscientiousness, that allow them to preserve their dominant status in the sibling hierarchy, whereas younger siblings try and differentiate themselves from their siblings by being unconventional and more sociable. **?** provide empirical evidence that birth order is correlated with different personality traits and that first-born children are more likely to choose occupations requiring leadership ability and conscientiousness.

To the extent that birth order is related to cognitive development and personality it could also be expected to affect political participation. There is strong and compelling evidence that both cognitive ability (**?**) and various personality traits, such as the Big-Five factors, (**??**) constitute important determinants of political activity. Yet, while a handful of descriptive studies have investigated whether first-borns are overly represented among elected officials (**??????**), the importance of birth order has been of greater interest to economists, sociologists, and psychologists than political scientists. The dearth of research on political outcomes is likely due to the type of data necessary to cleanly separate the influence of birth order from confounding factors like family size and birth cohort. Recent work on birth order in other domains have utilized large population registries containing data on family structure, allowing researchers to examine within-family differences in adult outcomes to convincingly identify the effect of birth order (e.g. Black et al. 2005).

We use population-wide data from Sweden and Norway to study the importance of birth order for voter turnout. Our within-family estimates show that the probability of voting is monotonically and strongly decreasing in birth order. The results also suggest that the birth order differential is greater the lower the average turnout rate. We show that these results are externally valid by investigating the link between birth order and turnout in a number of samples from four other, non-Nordic countries. Finally, we shed

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[1]Although parental economic resources are likely to increase over time, this increase is unlikely to be large enough to fully compensate for the effect of additional children.

light on possible mechanisms by showing that birth order relates to attitudinal factors known to predict voter turnout and also the part of the birth order influence on political participation which is accounted for by socioeconomic status.

## Institutional setting and data

To study the relationship between birth order and voter turnout, we use administrative data on validated turnout from four recent elections in Norway and Sweden. In Norway, we study the national parliamentary election in 2013 and the local level elections in 2015, and in Sweden, the European parliamentary election in 2009 as well as the election to the national parliament in 2010.

In Norway, the turnout data have been obtained from electronic voter records for all municipalities that had computerized their systems. The number of Norwegian municipalities using electronic records is increasing over time. Consequently, our data cover 43 percent of all eligible voters in 2015 compared to 28 percent in the 2013 election.[2]

In Sweden, electronic voting records are not used. Since this is the case, the turnout data have instead been gathered by scanning and digitizing the complete election rolls for the 2009 and 2010 elections. For these two elections, we have access to validated individual-level turnout information for 95 percent of the electorate and the reliability of the digitized data has been shown to be very high (**?**).

For both the Swedish and Norwegian samples, the turnout data is merged with various administrative registers using unique personal identifiers. The linked datasets contain detailed information on family relations, including birth order, as well as various demographic and socioeconomic characteristics (see the Appendix for a more detailed description of the data and the institutional context).

We have invoked a number of sample restrictions in order to ensure consistency across countries, elections, and model specifications. Most importantly, we restrict our analyses to individuals who have at least one and at most four siblings.[3] Moreover, the samples

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[2]The levels of turnout in the Norwegian samples are representative of the turnout levels in the full population.

[3]In both Norway and Sweden, less than 3 percent of all individuals come from families with more

are restricted to families where all siblings are aged 20-65 at the time of the elections. To reduce measurement error in the birth order variable, we further restrict the samples to native-born children of two native-born parents and exclude individuals who have grown up in families with twins. With these restrictions, the sizes of the samples used for the empirical analyses range from about 300,000 (Norway 2013) to 2,580,000 individuals (Sweden 2010).

## Empirical estimation

Figure **??** shows that voter turnout is markedly lower among individuals of higher birth order in each of the four elections under study. The strength of the relationship appears to be inversely related to the overall turnout rate. For the election with the highest turnout (Sweden 2010), first-born siblings have a 6 percentage points higher vote propensity than that of fifth-born siblings, whereas the corresponding figure for the election with the lowest turnout (Sweden 2009) is almost twice as large (11.5 percentage points).

It would, however, be a mistake to interpret these raw correlations causally because the relationship between birth order and turnout is likely to be confounded by a number of factors varying across and within families. One such factor is family size, since it is only larger families that have children of higher birth order (**?**). Moreover, children of higher birth order belong to more recent cohorts than their older siblings and therefore the relationship between birth order and turnout may also be confounded by age or secular trends in turnout. Similarly, higher order children have older parents which may also bias the birth order estimates if not adjusted for (**?**).

To handle these challenges, we rely on a within-family regression model of the following type:

$$y_{ij} = \alpha + \sum_{k=2}^{m} \beta_k I(BO_{ij} = k) + \mathbf{\Gamma}' \mathbf{X}_{ij} + \mu_j + \epsilon_{ij}, \tag{1}$$

where $y_{ij}$ denotes the outcome of interest (here voting) for individual $i$ in family $j$, $BO_{ij}$
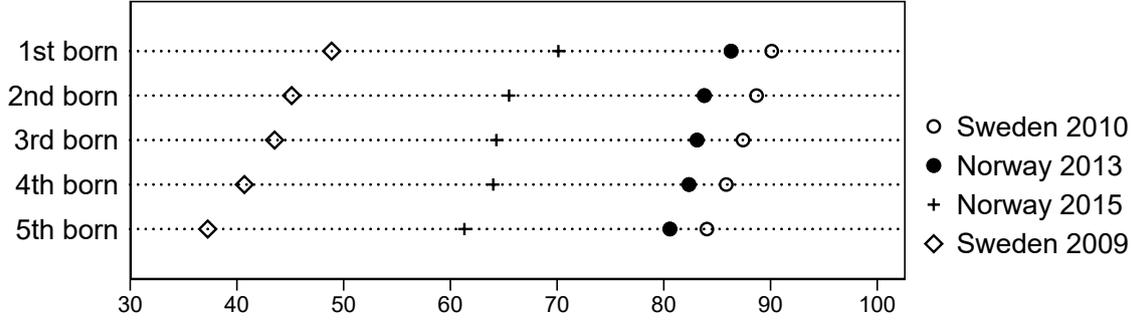
than five children.

Figure 1: Turnout by birth order

records the birth order of the individual, $\mu_j$ represents family-level (mother) fixed effects, and $\epsilon_{ij}$ is an individual level error term. The fixed effects account for the importance of all family characteristics shared by siblings—including, but not restricted to, sibship size, parental age and socio-economic status—and thereby assure that there are no confounding across-family processes at work. Even with the within-family design it will, however, be necessary to control for potential confounders that vary between siblings. For this reason, we also include the vector $\mathbf{\Gamma}'\mathbf{X}_{ij}$ in the equation with controls for birth cohort and gender.

## Results

We present the results from the within-family regression models in Table **??**. Since we will compare coefficients across models, samples and groups, we employ linear probability models instead of nonlinear models (**?**). However, as the results in Table A3 in the Appendix shows, the overall pattern of effects are similar if we use a conditional logit model instead.

There is clear evidence of a monotonically increasing negative effect of birth order on voter turnout in all four elections. The estimates also support the view that the magnitude of this relationship grows stronger as overall turnout declines. In the two national elections, where voter turnout is above 80 percent, the differences in vote propensity between first- and second-borns are 1.8 percentage points (Norway) and 1.2 percentage points (Sweden) and between first- and fifth-borns 5.1 and 3.3 percentage points (see Columns 1 and 4 of Table **??**). For the Swedish election for European Parliament in 2009, where overall turnout was below 50 percent, the corresponding differences are as high as 4.4 and 10.3 percentage points (Column 3). The turnout differential with respect to birth order for the Norwegian local election, where turnout was about 66 percent, fall in between the lowest and second highest turnout election estimates (Column 2).

Table 1: Birth order and turnout, baseline results

| | Norway | | Sweden | |
| | National election 2013 | Local election 2015 | EP election 2009 | National election 2010 |
|---|---|---|---|---|
| Second child | −0.018*** | −0.034*** | −0.044*** | −0.012*** |
| | (0.002) | (0.002) | (0.001) | (0.001) |
| Third child | −0.025*** | −0.051*** | −0.064*** | −0.018*** |
| | (0.004) | (0.004) | (0.002) | (0.001) |
| Fourth child | −0.033*** | −0.066*** | −0.083*** | −0.024*** |
| | (0.006) | (0.006) | (0.003) | (0.002) |
| Fifth child | −0.051*** | −0.099*** | −0.103*** | −0.033*** |
| | (0.010) | (0.009) | (0.004) | (0.003) |
| Turnout | 0.84 | 0.67 | 0.46 | 0.89 |
| Observations | 305,031 | 532,429 | 2,488,725 | 2,580,650 |

*Notes:* All models include controls for gender, birth year and family (mother) fixed effects. Standard errors, shown in parentheses, allow for clustering at the family level. ***/**/*, indicates significance at the 1/5/10% level.

The magnitude of these turnout differentials is large. For instance, the expected difference in turnout between a first- and fifth-born sibling in the Swedish European Parliament election was almost one fourth of the average turnout in that election. To further put the magnitude of these associations in perspective, Table A1 in the Appendix reports within-family estimates of one of the strongest predictors of voter turnout highlighted in the

literature: having completed a college degree. The differences in turnout rates between first- and fifth-borns amount to about two-thirds of the corresponding college differences.

Our main findings are robust to changes in model specification and sample restrictions. In particular, we show in the Appendix that the results are similar for men and women (Table A2) as well as when not including any restrictions on the individual's age (Table A4). As later-born children are more likely to grow up with divorced parents, we find it reassuring that the results are similar when we restrict the samples to individuals from stable families (Table A5). While somewhat more imprecise in the sample with the fewest observations, we also find that the pattern of estimates seem to be similar in families of different sizes (Tables A6 and A7).

Finally, we test for heterogeneity across age differences between siblings (Table A8) and parental education (Table A9). We find some, although not very strong, evidence that the association between birth order and voter turnout is somewhat more pronounced among siblings who are close in age (at least in Sweden) and in less educated families. These differences are rather small and imprecisely estimated and should therefore not be overstated.

Our analysis reveals a strong and robust effect of birth order on voter turnout in both Norway and Sweden, and that the magnitude of these voting differentials seems to be inversely related to overall turnout. Two natural follow-up questions concern external validity and possible mechanisms underlying the link between birth order and voter turnout. In Table A10 in the Appendix, we present results from five samples across four countries (Germany, Switzerland, the UK and the US) that all include information on birth order and voter turnout. Table A10 also displays estimates based on pooling the five survey samples. Although the estimates from each of the non-Nordic samples are all insignificant, the first-borns in the pooled sample are significantly more likely to vote than their siblings. The overall pattern of the estimates in these smaller samples corroborates the findings in the two Nordic countries.

The main results from these analyses are summarized in Figure ??. The figure displays point estimates from within-family models regressing turnout on a dummy indicating first-

born status (as opposed to later-borns) from all samples.[4] Solid squares denote significance at the 5% level. Two patterns stand out in the figure. First, in all samples the first-born turnout premium is positive. Second, the magnitude of the turnout difference between first- and later-borns decreases as the overall turnout rate increases.
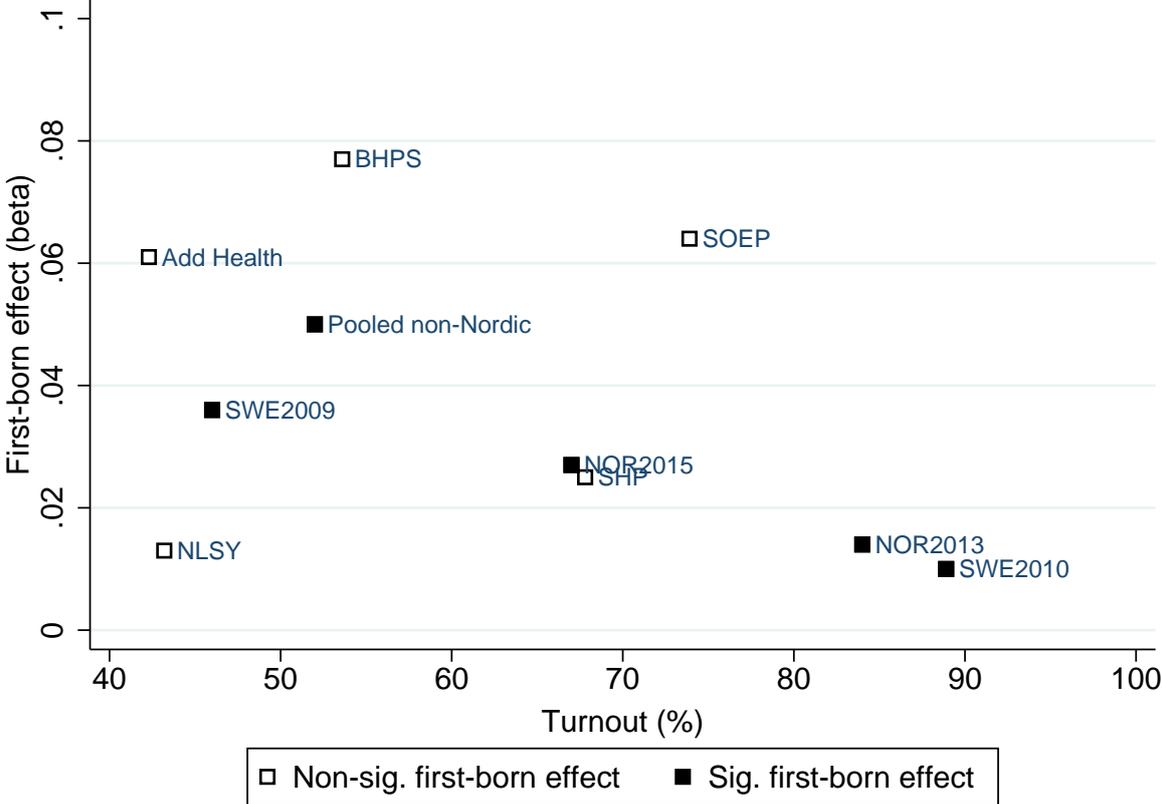


Figure 2: First-born turnout premium in nine samples (within-family estimates)

Turning next to potential mechanisms, in Figure **??** we examine to what extent the observed relationship between birth order and turnout is accounted for by socio-economic position. The light grey bars in the figure show the unmediated turnout effects reported above, and the dark grey bars indicate the corresponding estimates when controlling for (percentile ranked) education and earnings. Admittedly, mediation analyses are complicated and we do not control for all the variables that are correlated with the mediators and turnout. Thus, the conditional coefficients should not be given a causal interpre-

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[4]Our main reason for using a dummy variable differentiating first-borns from those born later in these analyses is the loss of precision due to the much smaller sample sizes in the five survey studies. However, in the Appendix we show that estimates from models in which the full birth order specification is used are reasonably similar to the much more precise pattern of results obtained when using the Norwegian and Swedish data.

tation (e.g., **?**). Nevertheless, the regression results indicate that there are birth order mechanisms affecting voter turnout that are orthogonal to those influencing earnings and education as there are still sizable turnout differentials with respect to birth order. To judge from these results, better education and earnings outcomes of earlier born siblings can, at most, account for between one third and one half of the overall turnout effect. As can be seen from the error bars, which represent 95 percent confidence intervals, the reduction in the birth order coefficients when controlling for socio-economic status is usually statistically significant. The confidence intervals do not overlap except for some of the higher order effects in the Norwegian sample where we have fewer observations.
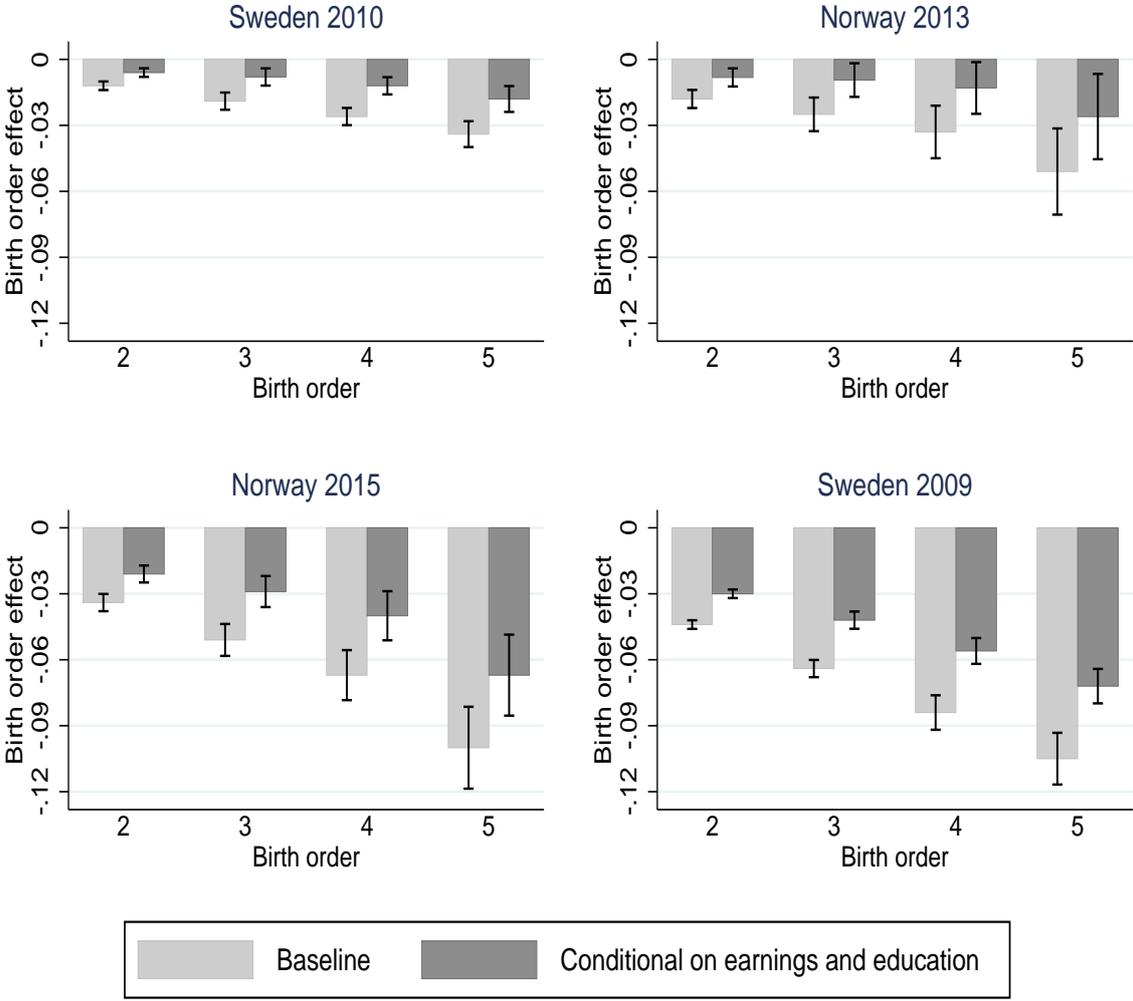


Figure 3: Conditional Birth Order Effects

Another possibility is that part of the influence of birth order is mediated by different

attitudinal factors shown to predict voter turnout in earlier studies. In Table A10 in the Appendix, we provide some evidence along these lines based on the five smaller samples. Once again, the estimates are somewhat imprecise but they consistently show that being first-born is positively related to interest in politics (**?**), internal as well as external political efficacy (**?**), and support for the norm of voting as a civic duty (**?**).

## Concluding remarks

We test whether the exogenously determined order in which children are born into a family is related to whether they vote as adults. To convincingly identify the effect of birth order, we utilize population registers from two similar Scandinavian countries, Sweden and Norway, that allow us to provide precise estimates from within-family models.

Across four separate elections, we consistently observe a negative relationship between birth order and voting. Moreover, the fact that the (absolute) size of the coefficients are monotonically increasing in birth order shows that there is more to this relationship than a simple difference between first-borns and younger siblings. Interestingly, in line with **?**'s (1937) 'law of dispersion,' the birth order differentials in turnout are larger in low turnout second-order elections. Since these elections are generally considered by voters, parties, and the media to be less important than first-order elections (**?**), they tend to take place in a more information-poor environment, thus making it more challenging for voters to participate. As is the case with education (**?**), factors related to birth order appear to help enable individuals to overcome the challenges of second-order elections.

Our investigation of birth order and voting is based on theories that point to the differential access to resources resulting from the timing a child is born into a family. While we do provide evidence that the relationship between birth order and turnout is partly mediated by socio-economic position as well as attitudinal predispositions, future research should more comprehensively explore other possible mechanisms.

Substantively, the relationship we find between birth order and voting is important for several reasons. First, our findings suggest a more nuanced picture of how parents influence the political participation of their children. We show that siblings with the same

parents develop different voting behavior. Later-born children, even in a high socioeconomic status home, are less likely to vote than their older siblings. Therefore, measures such as parental socioeconomic status provide an incomplete picture of access to resources important for political development. Second, our study demonstrates how non-political factors outside of one's control, like when they were born (**?**), are important predictors of one's likelihood to cast a vote. Finally, participation differences are particularly important if siblings have different policy preferences. **?** argued that first-borns are more politically conservative than later-borns, but **?** failed to find any evidence of this based on the General Social Survey. However, since birth order has been shown to influence outcomes such as health (**?**), and educational (**?**) and occupational status (**?**), siblings may have different preferences for specific policies. One important avenue for future research is thus to investigate whether or not this is the case. Another one is to examine whether the pattern found here also generalizes to other forms of political participation. In particular, it would be interesting to use the methodology employed here to examine whether younger siblings are in fact more likely, as the family-niche theory suggests, to partake in more non-conventional forms of political participation such as boycotting or public protesting. Although the between-family study of **?** do not find this to be the case, it still remains an open question whether these results hold up if we were to compare siblings growing up within the same families.