


LETTER

# The Causal Effect of Affluence on Voter Turnout: New Evidence from Lottery Winnings

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## Abstract

Affluent citizens commonly record higher election turnout than less affluent citizens. Yet, the *causal* effect of affluence on voter turnout remains poorly understood. In this article, we rely on Norwegian administrative data to estimate the impact of random, exogenous shocks in (unearned) income on individual-level voter turnout. Exploiting the random timing and size of lottery wins for identification, our main findings suggest that a lottery windfall in the years just before an election boosts individuals' turnout probability by 1.6 to 1.9 percentage points. Crucially, these point estimates reflect only a small share of turnout differences observed across the income distribution. Hence, our findings strongly suggest that most of the commonly observed positive income–turnout associations do *not* reflect a causal relationship.

**Keywords:** voter turnout; lottery; prosperity; register data; Norway

## Introduction

Dating back at least to Verba and Nie's (1972) work on the importance of socio-economic status and Brady et al.'s (1995) resources model of participation, research suggests that affluent citizens are generally more likely to use their voting rights (Smets and Van Ham 2013; Kasara and Suryanarayan 2015). This can have important implications for public policy, as it might tempt vote-maximizing politicians to skew policy decisions in favour of the more affluent (Gilens 2012; Mathisen 2023). Although such a scenario challenges the ideal of democratic equality (Lijphart 1997), improving the financial prosperity of the less affluent can only be effective at rectifying such inequality *if* the affluence–turnout relationship is causal rather than correlational. Theoretically, there are several reasons to expect such a causal link even in a short-term perspective. First, higher affluence can raise the perceived importance of political participation since the affluent contribute a large share of government revenues – thus creating policy constituents that seek to affect, for instance, fiscal policy (Markovich and White 2022). Second, affluence may impact voter turnout via the information, opportunity, and shoe-leather costs of voting (Brady et al. 1995; Markovich and White 2022; Loeffler 2023; James et al. 2024).<sup>1</sup>

<sup>1</sup>Income may have further effects on voter turnout that play out over the longer term, potentially influenced by other mediating factors. For instance, income may engender 'investments in education, skills, and health that make it easier for one to participate in politics' (Akee et al. 2020, 610; Markovich and White 2022). Moreover, income can enhance one's social network and status, which may strengthen socialization into a norm of voting (Wolfinger and Rosenstone 1980; Akee et al. 2020).

Existing evidence on the causal nature of the affluence–turnout relationship leverages a variety of income shocks. Finseraas (2017) studies how economic booms experienced in early childhood affect voter turnout later in life. Akee et al. (2020), Loeffler (2023), and James et al. (2024) explore the impact of unconditional cash payments on turnout, while De La O (2013) exploits income shocks deriving from conditional cash transfer programmes. Schaub (2021) studies the impact of acute financial hardship due to payday variations. Finally, Markovich and White (2022) assess increases in the minimum wage, while Schafer et al. (2022) look into the effect of economic downturns on turnout. A common feature of these existing studies is the use of shocks that affect a large group of individuals, rather than individual-specific income shocks. This could bias inferences whenever shocks affecting large parts of individuals’ social environment influence their political decision-making (Bagues and Esteve-Volart 2016; Jöst 2023). Furthermore, the studied events often have implications beyond individuals’ income. Such compounded treatments make it challenging to isolate any causal effect of income (Finseraas 2017). Finally, most existing research relies on survey data to measure turnout. This makes the analysis susceptible to social desirability bias (Karp and Brockington 2005) and, more problematically, non-response bias from individuals’ self-selection out of the sample (Dahlgaard et al. 2019).

This article addresses these shortcomings by using Norwegian population-wide register data on electoral participation in the 2015–2021 period, combined with detailed individual-level data on lottery wins (1993–2021). This provides a key opportunity to exploit the random nature of lottery wins (Imbens et al. 2001; Doherty et al. 2006) for identifying the causal effect of individual-level (unearned) income shocks on voter turnout. Our main results illustrate that even very large lottery windfalls have at best a small causal impact on voter turnout, and then only when the windfall happens in close proximity to the election year. Since lottery windfalls are an unusual form of income and may trigger external validity concerns (Doherty et al. 2006; Peterson 2016), we also explore individual-level changes in total annual earned income. These results are consistent with those obtained using lottery wins, which strengthens the (external) validity of our analysis. Overall, our findings suggest that simply boosting individuals’ affluence may *not* be a very cost-effective policy tool to raise electoral participation. While one can expect some modest increase in turnout from policies aimed at boosting individuals’ affluence, it would likely be exceedingly costly to generate substantively meaningful changes in turnout via such policies.

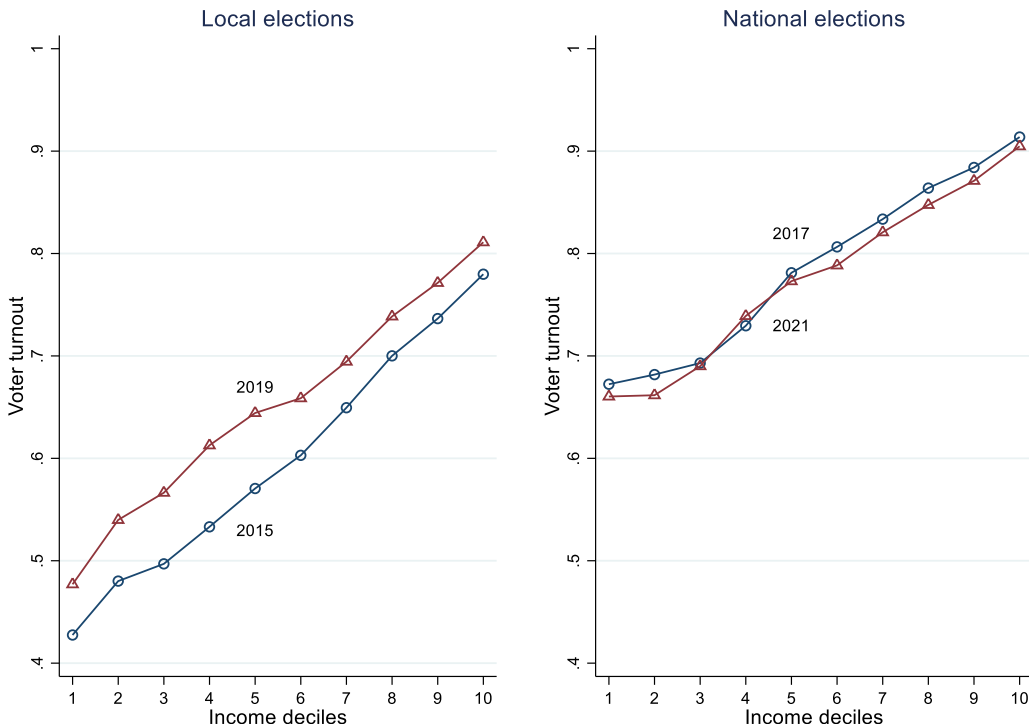
## Institutional Setting and Data

### *Voter Turnout*

In Norway, elections take place every four years at the national and local (that is, county and municipal) levels of government, separated in time by two years. All Norwegian nationals aged eighteen years or older are eligible to vote (with few exceptions), and they become automatically included in the Election Roll upon reaching this age threshold.<sup>2</sup> Municipal governments are responsible for all organizational aspects related to the elections. They also compile the election results and report them to the Election Directorate via an electronic system.

Using the information from the electronic voting systems, Statistics Norway collects individual-level data on electoral participation since 2013. We obtained access to these data for the 2015 and 2019 local elections as well as the 2017 and 2021 national elections. The data cover the complete Election Roll in 27 Norwegian municipalities in 2015, 255 municipalities in 2017, and all municipalities starting with the 2019 elections. As can be seen from Online Appendix Table A.1, this implies that our dataset covers register-based voter turnout for 49–100 per cent of the Norwegian population over the time period of our analysis.

<sup>2</sup>For further details, see: <https://www.regjeringen.no/en/topics/elections-and-democracy/den-norske-valgordningen/the-nowegian-electoral-system/id456636>.



**Figure 1.** Income and voter turnout.

Note: The diagrams show the average voter turnout in the election years 2015–2021 for local and national elections conditional on gross personal income. Income is calculated in annual deciles for the entire eligible population.

Voter turnout in recent Norwegian elections hovers around 78 per cent for national elections and 59–65 per cent for local elections. Consistent with a vast academic literature (see above), Fig. 1 shows that turnout in Norway is considerably higher among affluent citizens compared to less affluent citizens in both local and national elections (Online Appendix Fig. A.6 confirms a similar pattern for distinct education levels). Clearly, however, these substantial differences in turnout along the income distribution may reflect several confounding factors (Doherty et al. 2006; Peterson 2016). Hence, our analysis exploits random, exogenous income windfalls arising from lottery wins to identify the *causal* relationship of interest.

### State-Owned Lottery Monopoly

Two state-owned companies – Norsk Tipping and Norsk Rikstoto – hold exclusive rights to provide lottery and gambling services in Norway. Prizes won in any of the games they offer (henceforth ‘lotteries’) are tax exempt, even though wins exceeding 10,000 NOK up to 2006 and exceeding 100,000 NOK since 2007 are automatically reported to the tax authorities.<sup>3</sup> Our register data provided by Statistics Norway offer full coverage of all lottery wins exceeding the applicable legal threshold for the period 1993–2021. Panel A in Table 1 presents descriptive statistics for the 2009–2021 period, which covers up to six years before the first election where we have turnout data (that is, the 2015 local elections). Although the vast majority of Norwegians engage in lottery games at least sometimes (estimated at up to 70 per cent in our dataset), Panel A reveals some

<sup>3</sup>The tax exemption relates to income taxation. To the extent that lottery wins increase winners’ net assets (Geys and Sørensen 2024), they may become subject to Norway’s wealth tax. Observe also that 10,000 NOK is roughly equal to 1,000 USD (EUR) in the period of our analysis.

**Table 1.** Summary statistics

	Panel A: Complete dataset					
	Non-winners 2009–2021			Winners 2009–2021		
	Mean	Median	N	Mean	Median	N
Vote (= 1)	0.72	1	12,809,968	0.82	1	45,365
Income (NOK)	446,245	378,541	52,768,595	529,963	434,716	186,752
Age	48	47	52,768,595	54	55	186,752
Female (= 1)	0.5	0	52,768,595	0.41	0	186,752
Higher educ. (= 1)	0.35	0	52,768,595	0.27	0	186,752

	Panel B: ‘Participants’ (1993–2006 and 2009–2021)					
	Non-winners 2009–2021			Winners 2009–2021		
	Mean	Median	N	Mean	Median	N
Vote (= 1)	0.82	1	229,935	0.82	1	45,365
Income (NOK)	497,271	400,180	996,558	529,963	434,716	186,752
Age	61	61	996,558	54	55	186,752
Female (= 1)	0.38	0	996,558	0.41	0	186,752
Higher educ. (= 1)	0.23	0	996,558	0.27	0	186,752

Note: The table displays summary statistics for person-years observed in the years 2009–2021. *Non-winners* and *winners* differ in (the lack of) a lottery win in the period under analysis. Panel A shows descriptive statistics for the entire population aged eighteen years or more. Panel B displays statistics for individuals winning a prize of NOK 10,000 or more at least once in the period 1993–2006 and those winning one NOK 100,000 prize in the period 2009–2021. Observe that the number of observations in the top row of each panel is lower due to the four-year election cycle and the incomplete coverage for the 2015 and 2017 elections.

notable differences between winners and non-winners. Those who won typically have lower educational attainment and are more likely to be older and male.<sup>4</sup> This suggests that there may exist systematic differences between lottery participants and non-participants (including, potentially, unobservable factors such as preferences for gambling).

Our data unfortunately do not include a direct way to distinguish lottery participants from non-participants since we only observe that individuals win in any given year. Still, winning *must* imply participation. Hence, we can exploit the time dimension of our dataset to develop a proxy for current participants (that is, in the 2009–2021 period of our main analysis) based on who won at least once also in an earlier period (that is, in the 1993–2006 period, where we observe any win above 10,000 NOK). As we have full coverage of the Norwegian adult population, most of these historical winners remain observable in the 2009–2021 period of our main analysis. Under the assumption that they continued to participate in lotteries during the 2009–2021 period, this offers ‘counterfactual’ outcomes from individuals who won in one or more years during the 1993–2006 period but did not register a large win in the 2009–2021 period. Similarly, assuming that all individuals winning in 2009–2021 also participated in the years they did not win, these non-winning years further help identify counterfactual outcomes. Panel B of Table 1 highlights that zooming in on these ‘participants’ brings us closer to a most-similar research design (Doherty et al. 2006; Peterson 2016; Geys and Sørensen 2024). That is, the characteristics of winners and non-winners in the period 2009–2021 are now much more evenly matched in terms of income, gender, and education level. People experiencing a lottery windfall also look no different on average from non-winners in terms of turnout levels (even when the income windfall is very large; see Online Appendix Fig. A.5). The subsample in Panel B will therefore be at the heart of our main analysis.

Finally, it is important to note that the average income windfall when winning a prize of at least 100,000 NOK in the 2009–2021 period equals 1,206,540 NOK. As this is pulled up by several extremely large wins (see the Online Appendix Fig. A.8), it appears more meaningful to look at the

<sup>4</sup>The gender disparity appears linked to distinct gambling preferences across men and women (see Online Appendix Fig. A.1), and we return to this below.

median win size. Conditional on winning, this equals 250,000 NOK (that is, roughly 60 per cent of the median income in our sample period). As this involves a jump of three to four deciles in the income distribution, it reflects a very considerable boost in individuals' affluence.

### Model Specification

To identify the causal impact of unearned income windfalls on voter turnout, we estimate the following linear probability regression model (with subscript  $i$  for individuals and  $t$  for time):

$$V_{i,t} = \sum_{l=0}^6 \beta_l W_{i,t-l} + \theta_t + [\varphi_i] + \varepsilon_{i,t} \quad (1)$$

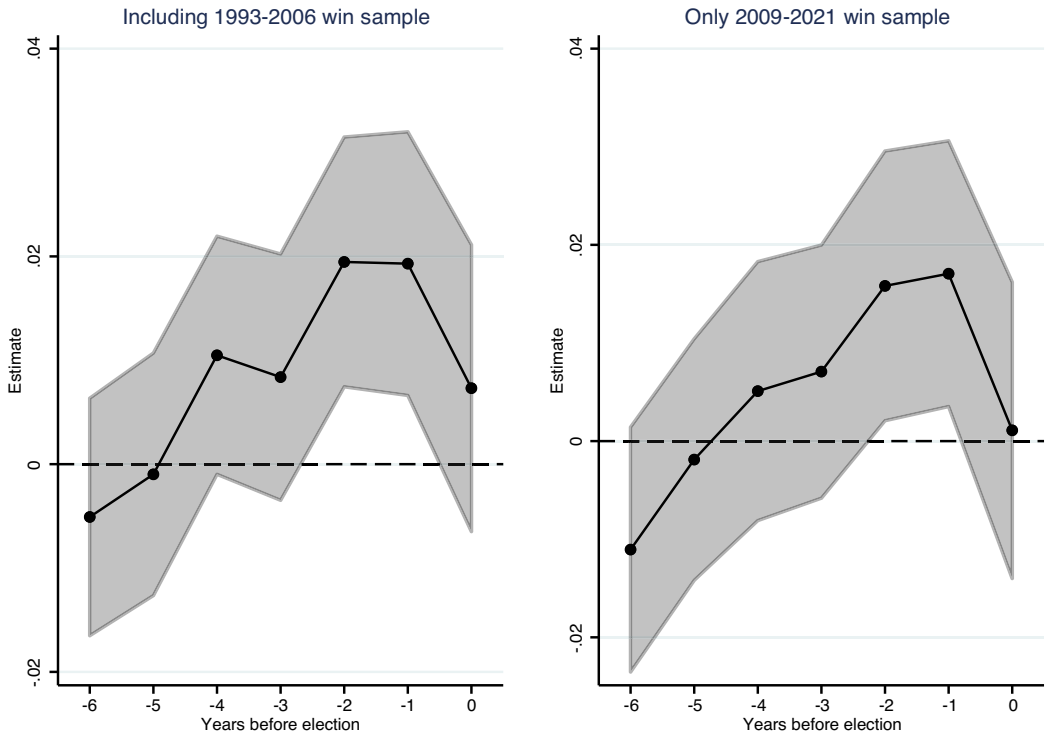
where the dependent variable –  $V_{i,t}$  – is a dummy variable indicating the electoral turnout of individual  $i$  in year  $t$  (1 for voting, 0 otherwise). Since our dataset includes all lottery wins exceeding 100,000 NOK for the 2009–2021 period, the main independent variable  $W_{i,t-l}$  equals 1 if individual  $i$  had a lottery income windfall exceeding 100,000 NOK in year  $t-l$  (0 otherwise).<sup>5</sup> With  $l = 0, \dots, 6$ , we capture both the immediate impact ( $l = 0$ ) and the longer-term effects of income windfalls up to six years before an election takes place (for example, lottery wins dating back to 2009 for the 2015 election).

Our baseline model is rooted in a robust tradition of social science research, which posits that lottery wins are random events for lottery participants (Imbens et al. 2001) – both across different individuals and over time for the same person. In our main analysis, we, therefore, estimate equation (1) without individual fixed effects  $\varphi_i$  using two subsamples. The main estimation sample zooms in on lottery participants identified using winners also from the 1993–2006 period (cf. panel B in Table 1). This effectively assumes that a lottery prize is a random event *within the subsample of lottery participants* (Doherty et al. 2006; Dunning 2012). While this assumption cannot be tested directly, it is reassuring to see that this sample is fairly well balanced across winners and non-winners in the 2009–2021 period (Table 1, Panel B). Our second estimation sample restricts the analysis to individuals winning exactly once in the 2009–2021 period (cf. top-right panel in Table 1).

As a robust check, we also estimate equation (1) extended with individual (and year) fixed effects. Such an event-study model directly controls for any (un)observed individual-specific characteristics that do not change over time (such as gender, education, and gambling preferences). By assuming that the timing of lottery wins is random for each individual, the parallel trends assumption will be satisfied (Schmidheiny and Siegloch 2023).

Before we turn to our main results, two methodological issues require attention. First, one might worry that winners of a prize exceeding 100,000 NOK may also win a smaller prize in addition. This would bias our estimates downwards (upwards) if the smaller prize is won first (last). Crucially, the timing of any such smaller wins is random. Hence, on average, they are unlikely to bias our main estimates. Second, one might worry that some individuals identified in our subsample as non-winners may nonetheless collect lottery wins below 100,000 NOK. If such small wins affect turnout, this could generate a bias toward zero when estimating equation (1). Still, we observe only 90,287 lottery wins between 10,000 and 100,000 NOK in 48,256,701 person-year observations over the 1993–2006 period. Even when (conservatively) assuming that 60 per cent of the population are lottery participants, this leads to a win probability among participants of about 0.31 per cent. Considering that the average win between 10,000 and 100,000 NOK is just over 38,200 NOK (median  $\approx$  31,300 NOK), any presence of small-prize winners among our 'non-winners' is unlikely to have a major impact on our estimates.

<sup>5</sup>Using instead the exact monetary value of the income windfall provides qualitatively similar findings (see Appendix Fig. A.2). Note also that all elections are held in the first half of September. Consequently, lottery wins in the last three months of an election year cannot affect participation in that same year. This may push the estimated effect on voter turnout towards zero in the win year.



**Figure 2.** Lottery windfalls and voter turnout for lottery participants.

*Note:* The diagrams show the estimated effects of lottery income windfalls on voter participation. The right diagram shows effects when only including individuals winning in the period 2009–2021 (cf. top-right panel in Table 1), while the left diagram displays effects for the sample extended with all lottery winners in the years 1993–2006 (cf. Panel B in Table 1). The diagrams illustrate 95 per cent confidence intervals, calculated using standard errors that are clustered at the individual level. For additional details, refer to Appendix Table B.1.

## Empirical Findings

### Main Findings

Figure 2 summarizes our main results. The horizontal axis shows the timing of the lottery win relative to the election (with 0 reflecting a win in the election year, –1 the year before the election, and so on). The vertical axis shows the point estimate from equation (1). The left-hand diagram analyses the subsample that includes winners in the 1993–2006 period (Panel B in Table 1) while the right-hand diagram restricts the sample to those winning one prize exceeding 100,000 NOK in the 2009–2021 period (top-right panel in Table 1). In both cases, the point estimates in Fig. 2 reflect the effect of a lottery-based income windfall at a given moment before an election on the probability of turning out to vote in that election (relative to individuals *not* treated by an income shock).

The results in Fig. 2 indicate that witnessing a random income windfall only has a statistically significant impact on voter turnout when it arises in the near vicinity of an election. The estimated effect size in the two years prior to an election ranges from 1.6 to 1.9 percentage points.<sup>6</sup> Online Appendix Fig. A.3 highlights that our point estimates are somewhat larger for women (2.2 to 3.5 percentage points) compared to men (always below 1.3 percentage points), and only change

<sup>6</sup>Online Appendix Fig. A.9 compares the results from Fig. 2 with those obtained from a model specification including individual fixed effects. Given the comparable range of estimates, overlapping confidence intervals, and a notably similar pattern of lagged effects, the results align closely with those in Fig. 2.

marginally when adding individual-level controls for age, gender, income, and education (1.4 to 2.6 percentage points). Likewise, our small effect size persists when using data from the entire Norwegian population, and adding individual fixed effects to control for any (un)observed individual-specific characteristics (Online Appendix Fig. A.4). Remember that the median income windfall exceeding 100,000 NOK in the 2009–2021 period is 250,000 NOK (see above), which would move people three to four deciles up the income distribution. In Fig. 1, such an income shock would be associated with an increase in voter turnout of 9.2 to 13.4 percentage points. Our causal estimate remains well below that, strongly suggesting that at best a small portion of the positive income–turnout relationship depicted in Fig. 1 – and observed throughout much of the academic literature – is causal.<sup>7</sup>

Our positive point estimates may indicate that winners *increase* their political engagement more than individuals untreated by an income shock, or it may be that non-winners *decrease* their political engagement more than winners. Since electoral participation is sticky and tends to increase over most of the life cycle, we present age-specific estimates in Online Appendix Fig. A.7 to differentiate both interpretations. The results indicate that our findings in Fig. 2 are largely driven by the 66-and-above age group (who document effect sizes between 2.0 and 4.7 percentage points). Assuming that these age-specific estimates represent life-cycle effects, a natural interpretation would be that a positive income shock may make it easier for (some) elderly to sustain their electoral participation.

### Heterogeneous Effects by Income Levels

One might argue that gaining additional income is more important when one is (very) poor, but less relevant when one is already affluent (Schaub 2021; Markovich and White 2022; Schafer et al. 2022). This section therefore extends our analysis by estimating the effects of lottery wins *conditional on income levels*. Let  $Inc_{i,t}^d$  (with  $d = 1, \dots, 10$ ) represent a set of indicator variables equal to 1 if individual  $i$  is in income decile  $d$  in year  $t$ , and 0 otherwise. The extended model then takes the following form:

$$V_{i,t} = \sum_{d=1}^{10} \gamma_{-x} W_{i,t-x} Inc_{i,t-x}^d + \sum_{d=1}^{10} \gamma_{-x} Inc_{i,t-x}^d + \theta_t + \varepsilon_{i,t} \quad \text{with } x = 0, 1, 2 \quad (2)$$

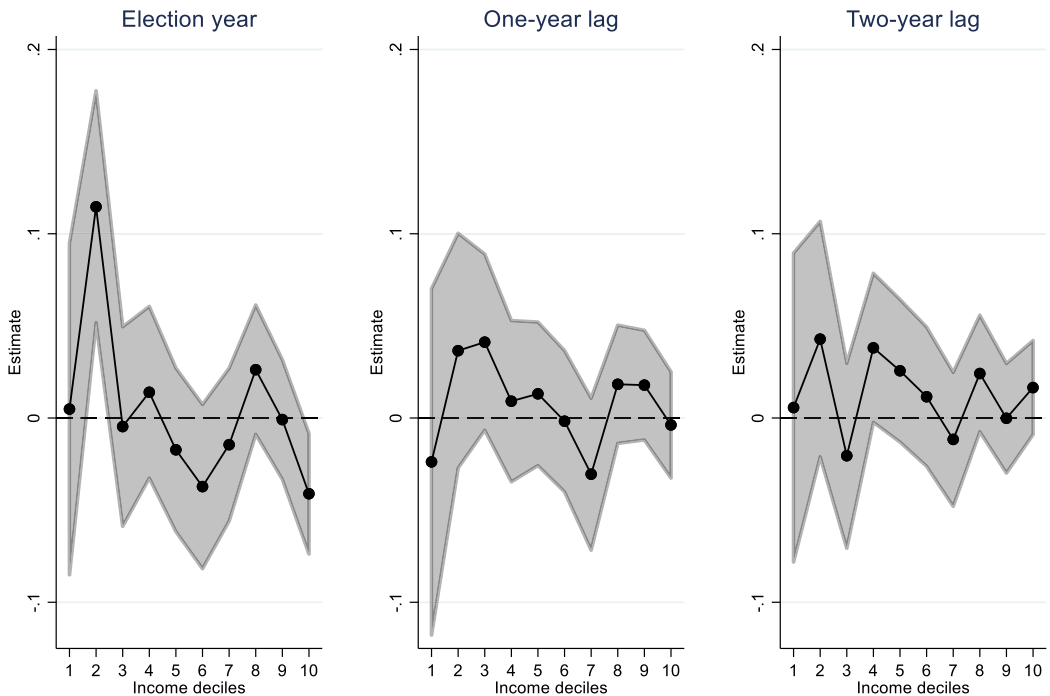
where  $x$  refers to the number of years since the lottery win materialized. Given that the strongest effects in Fig. 2 are observed near-contemporaneously, we focus on lottery wins in years immediately prior to an election (that is,  $x = 0, 1, 2$ ).

The results in Fig. 3 fail to generate a clear pattern. As such, our analysis offers no clear evidence of a meaningfully distinct impact of income windfalls on voter turnout across the income distribution.

### External Validity

Panel B of Table 1 indicates that lottery winners are quite representative of the population of ‘lottery players’. Even so, as mentioned, lottery windfalls are an unusual form of income, and one might wonder whether *unearned* income shocks from lottery windfalls yield different effects on electoral participation compared to changes in *earned* income (Doherty et al. 2006; Peterson 2016). We address this external validity concern by exploiting population-wide data across four election years (2015, 2017, 2019, and 2021) on individual-level variation in total annual earned income (measured in income deciles). We estimate the effect of individuals moving up from decile

<sup>7</sup>Our small effect size is consistent with *aggregate*-level findings in Bagues and Esteve-Volart (2016), who find no turnout effect of the Spanish Christmas Lottery. By contrast, studies exploiting (un)conditional cash transfer schemes have tended to observe larger positive effects (e.g., De La O 2013; Loeffler 2023; James et al. 2024), which could reflect the origin of such income shocks in government policy.



**Figure 3.** The effect of lottery wins on voter turnout, by income levels.

*Note:* The diagrams display the effect of lotto wins conditional on income, defined by annual deciles. The analyses employ a sample of lottery participants that also includes winners in the years 1993–2006 (cf. Panel B in Table 1). We estimate effects with zero, one- and two-year lags for income and the lottery win variables. The diagrams illustrate 95 per cent confidence intervals, calculated using standard errors that are clustered at the individual level. For additional details, refer to Appendix Table B.2.

1 (the reference group) to any of the other nine income deciles between two election years. The results are summarized in Online Appendix Table C.5. Model (A) estimates the key parameters of interest controlling for election years alongside individual fixed effects. Model (B) furthermore includes municipality fixed effects as well as linear municipality-specific time trends to capture regional (income) growth differences.

Remember that the median lottery windfall reflects moving three to four deciles up the income distribution. Both models in Appendix Table C.5 indicate that an *equivalent* four-decile jump in earned income would raise turnout by 0.6 to 4.1 percentage points depending on the individual's initial position in income distribution. This again constitutes a small part of the turnout differences across the income distribution observed in Fig. 1. Overall, and keeping in mind potential omitted-variable bias in these models, we conclude that the turnout effects from *earned* income changes are broadly consistent with our main results using lottery wins.

## Conclusion

While extant research shows that the rich display higher rates of voter turnout than the poor (Smets and Van Ham 2013; Kasara and Suryanarayan 2015), it remains unclear whether affluence has a *causal* effect on turnout. Previous studies addressing the causal nature of this relationship have primarily relied on survey data as well as natural experiments with compounded treatments, which may lead to biased inferences. By contrast, our combination of register-based voting records and data on lottery winnings offers *both* better-quality data *and* a stronger identification strategy.



Our main results show that a random (unearned) income windfall causes a small boost in the likelihood of voting when the windfall takes place close enough to an election. The much larger positive association between income and turnout observed in previous work – and in our data – thus must be predominantly attributed to deeper-rooted factors causing both income and turnout to increase (such as innate traits, family and peer influences, or investments in education). Our results therefore suggest that, for instance, the historically rising participation rates of women may not be caused primarily by reductions over time in the gender income gap. Likewise, policies that increase individuals' affluence (either in general or within certain population groups) by increasing, for instance, work participation or minimum wage levels are unlikely to be a cost-effective tool to raise electoral participation. Our results suggest that such policies may well cause a modest increase in turnout, but large income increases would be required to boost turnout substantially. All in all, therefore, our findings indicate that Lijphart's (1997) unequal participation challenge is a hard nut to crack, potentially strengthening the case for institutional reforms (such as holding local and national elections concurrently, or, more radically, introducing compulsory voting).

As usual, our analysis also raises new questions. First, our analysis focuses on one specific form of political participation, and it would be useful to apply similar research designs to see whether income affects other types of political influence; for example, campaign contributions, lobbying, or media activities. Furthermore, it would be interesting to assess whether income causally affects individuals' broader political attitudes and ideological leaning (Doherty et al. 2006; Peterson 2016; Andersen et al. 2023). Second, Norway has a relatively high level of voter turnout due to its highly educated population, easily accessible voting booths, high level of political trust, and so on. Extending our analysis to arguably less privileged settings would be beneficial to achieve a more encompassing picture. Next, our data lack information about individuals' membership in specific households (we only observe *family* relationships), which precluded an analysis of potential intra-household spillover effects. We consider this an important avenue for further research. Finally, reductions and increases in affluence need not have symmetric impacts due to, for instance, differences in evaluation baseline, negativity biases, and so on. Unfortunately, our data did not allow us to explore such potential asymmetries. Future work could therefore explore the effect of sudden unemployment shocks (see, for example, Österman and Lindgren 2023) or income drops due to, for instance, the unexpected death of a spouse.

**Supplementary material.** To view supplementary material for this article, please visit <https://doi.org/10.1017/S0007123424001005>

**Data availability statement.** The analysis utilizes registry data owned by Statistics Norway and regulated by the Norwegian Statistics Act. Due to the Act's provisions, we cannot share individual-level data on voter turnout and lottery winnings publicly. However, researchers affiliated with accredited institutions may request access to this detailed data from Statistics Norway, as outlined at cf. <https://www.ssb.no/en/data-til-forskning/utlan-av-data-til-forskere>. Applicants must ensure compliance with the General Data Protection Regulation (GDPR) by demonstrating adequate confidentiality measures and submitting a Data Protection Impact Assessment (DPIA). We are committed to supporting researchers in replicating our analysis (including the provision of our Stata do files) and facilitating their access to the data from Statistics Norway.

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**Competing interests.** The authors declare none.

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