Online APPENDIX to:

# The Zero-Rent Society

## Evidence from Hydropower and Petroleum Windfalls in Norwegian Local Governments

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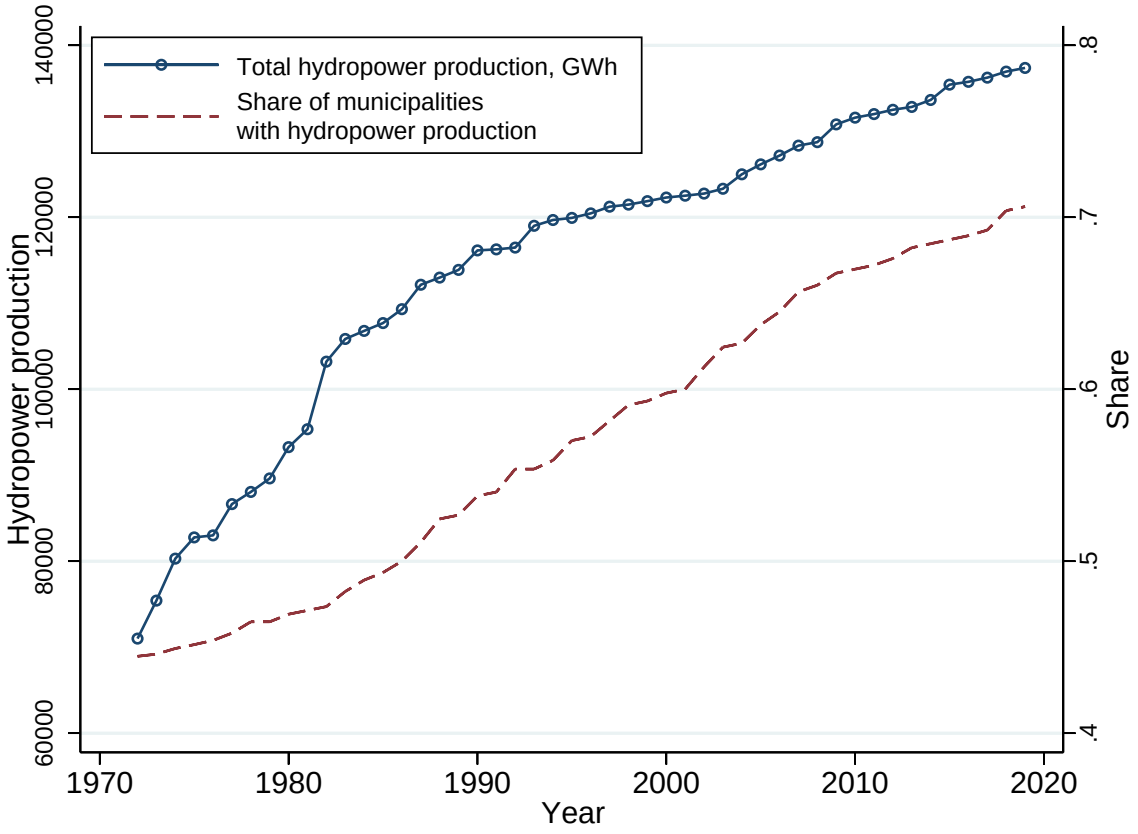


Figure A.1. Hydropower production 1972-2019

Notes. The diagram displays annual hydropower production measured in GWh (left vertical axis), and the share of municipalities with hydropower plants (right vertical axis).

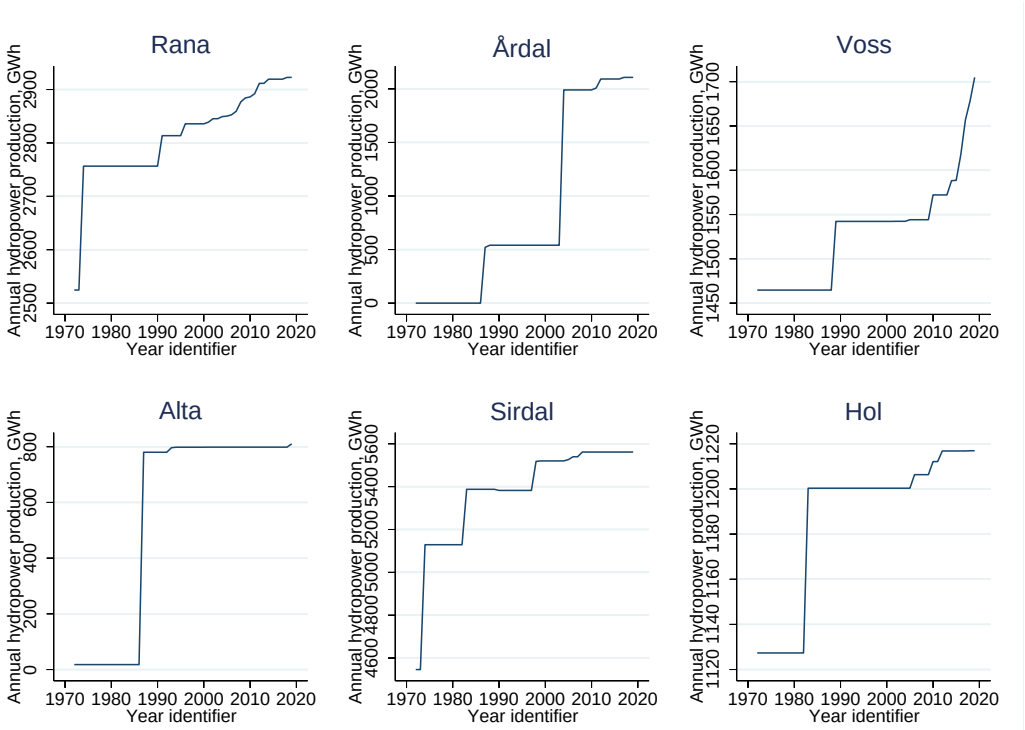


Figure A.2a. Hydropower production in selected municipalities

Notes. The diagram shows developments in hydropower production (GWh) in selected municipalities.

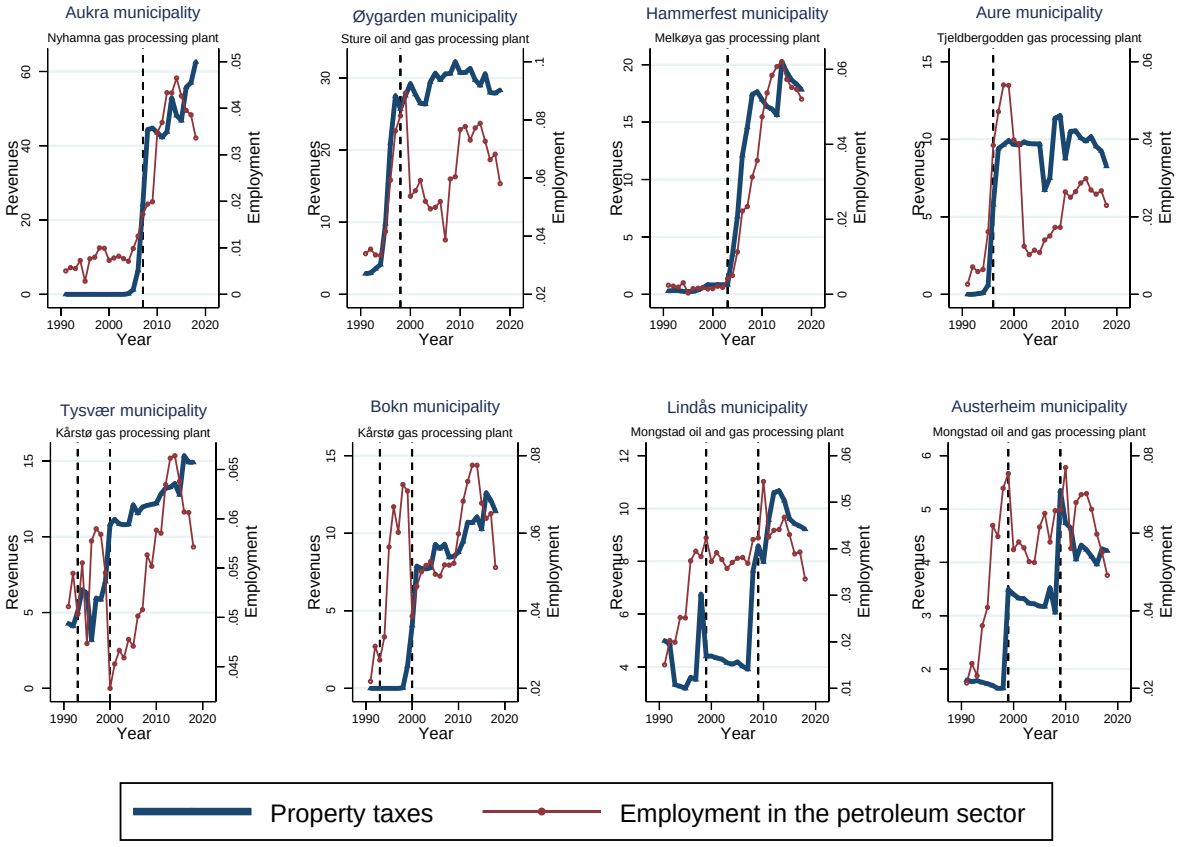


Figure A.2b. Property taxes in Municipalities with petroleum processing facilities

Notes. The diagram shows developments in per capita property taxes (thick blue lines) and share of employees working in the petroleum sector (thin red lines) in the 8 municipalities with petroleum processing facilities. The dashed vertical lines indicate the timing of plant openings.

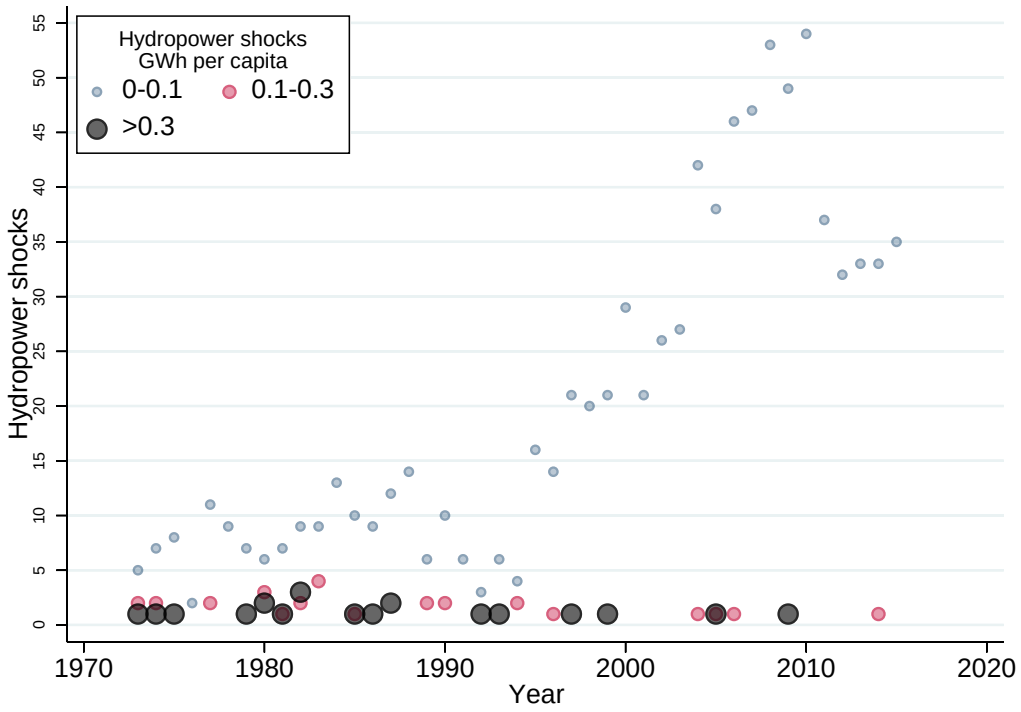


Figure A.3. Hydropower shocks: Small, medium and large

The diagram displays number of hydropower shocks per year. Individual dots may represent several shocks. The shocks are defined by per capita production increases in the intervals 0-0.01, 0.1-0.3, and 0.3 - GWh per capita.

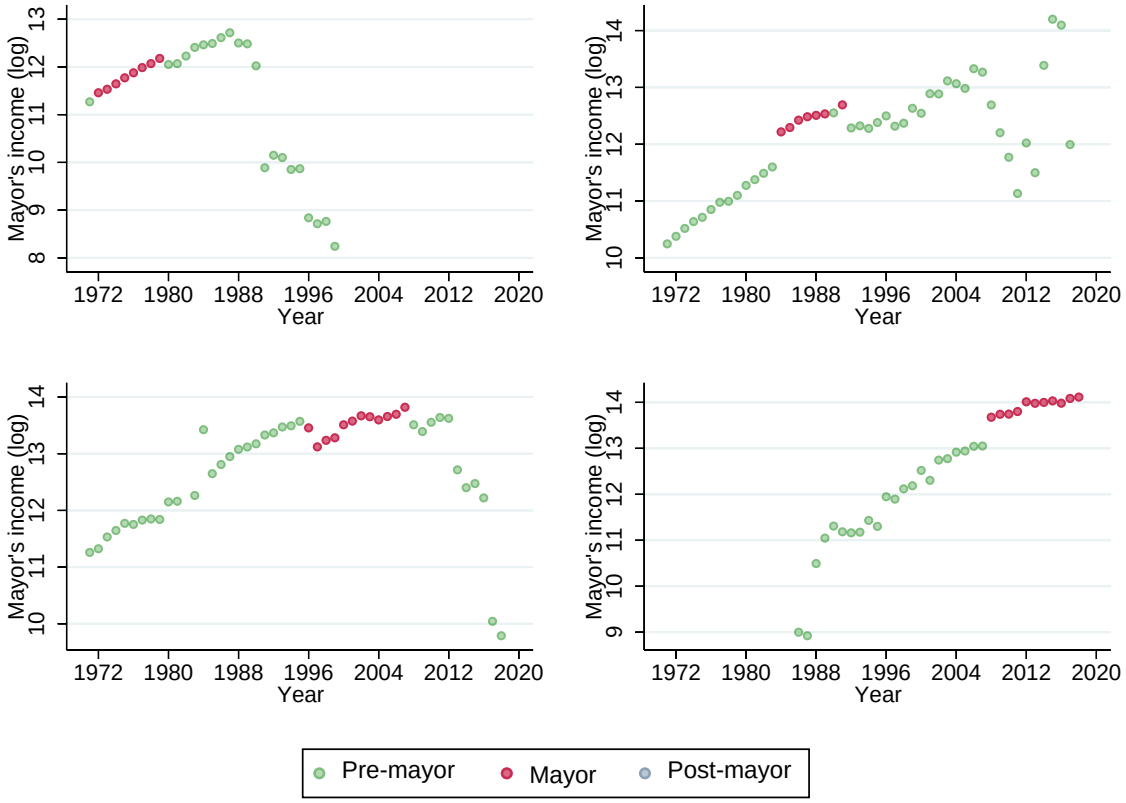


Figure A.4. Example of data structure for mayors in one selected municipality

Notes. The graphs display the incomes of four different mayors that hold office at different points in time within one selected municipality, in the respective mayors' pre-mayor years, in the years as elected mayor and in the post-mayor years. The income levels are measured on a log-scale.

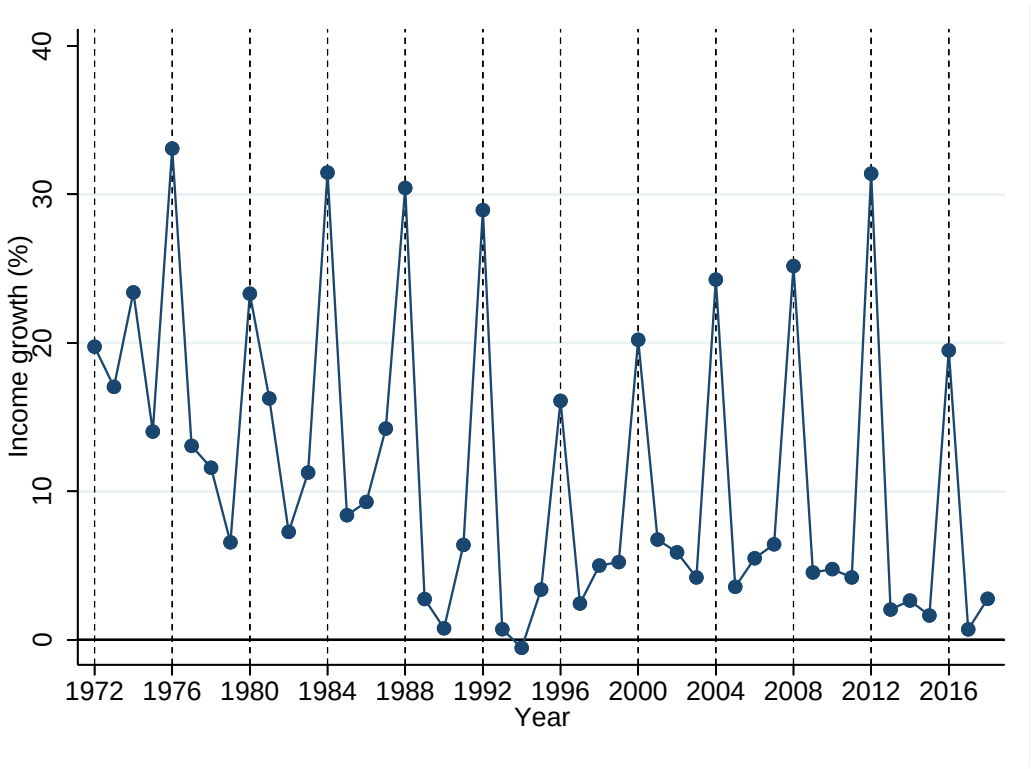


Figure A.5. Mayors' average income growth over time

Notes. The diagram shows the mayors' income growth in mayoral positions by year. Income growth (%) is measured in current prices. The dashed, vertical lines indicate years following election years.

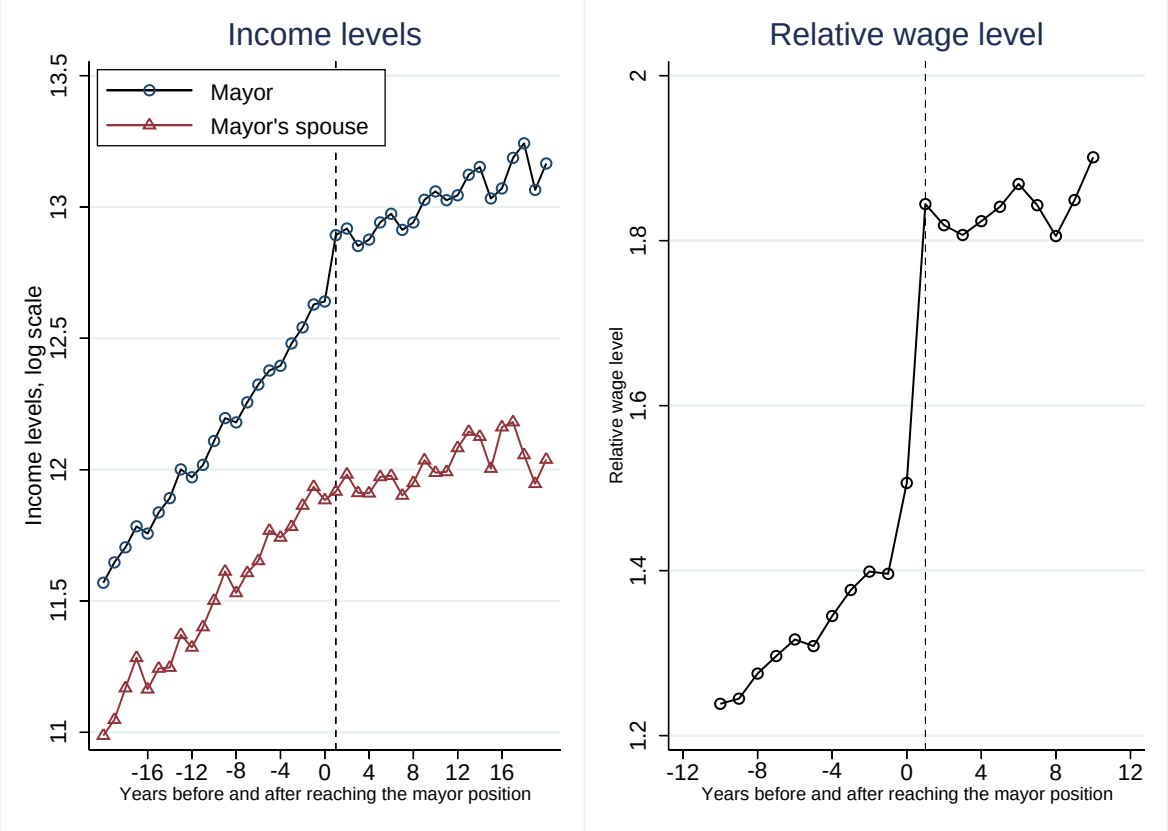


Figure A.6. The life-cycle earnings of mayors and their spouses

Notes. The left diagram displays income levels of the mayor and the mayor's spouse, measured on a log-scale. The right diagram shows the ratio of the mayor's wage to the average wage level in local government. The horizontal axes show years before and after reaching the mayor position, 1 indicating the first, full year as mayor.

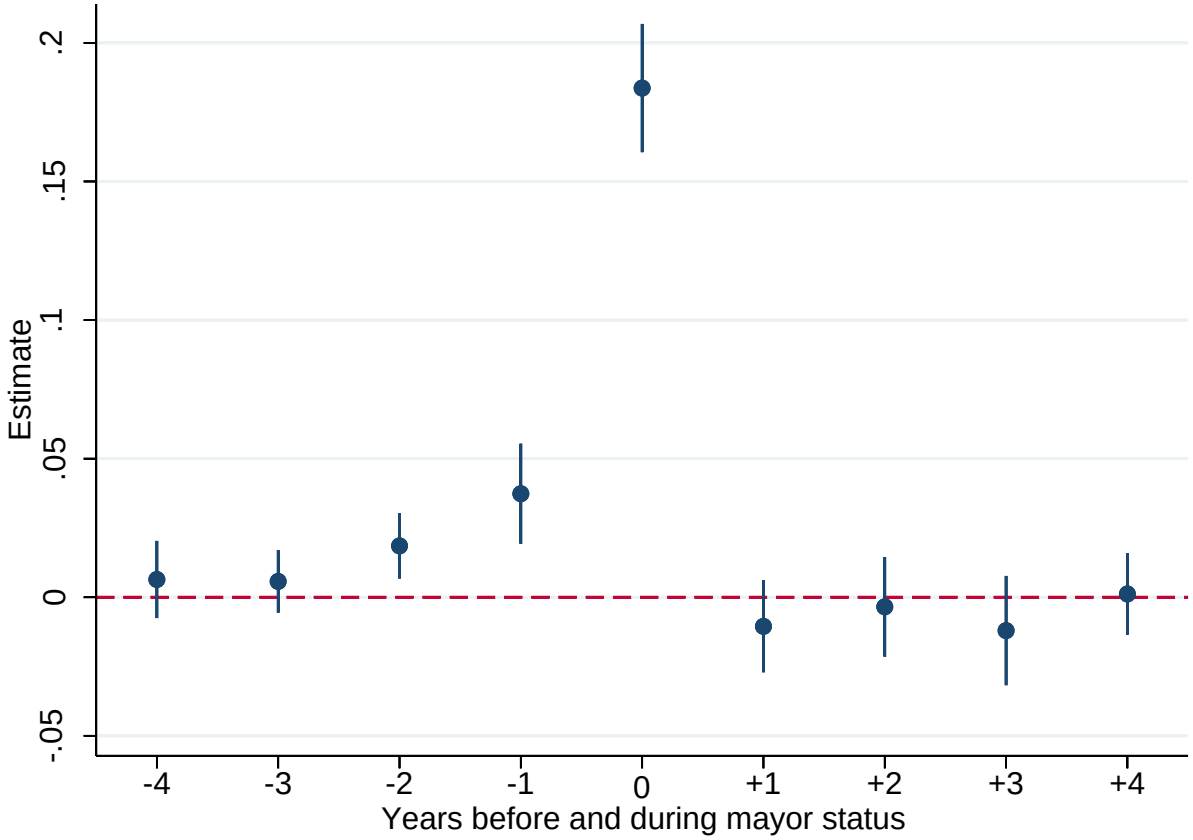


Figure A.7. The returns to office before-after mayor status

Notes. The diagram displays estimated effects on income levels (measured on a log-scale) of mayor status with indicators (=1) for each year, from four years before to four years after "treatment" (becoming mayor, corresponding to t=0 in the diagram). The regression model includes the fixed effects used in Table B.3, column (3), and all lead-lag estimates are hence to be interpreted relative to the levels and trends captured by these fixed effects. The diagram shows confidence intervals using robust standard errors clustered on municipalities.

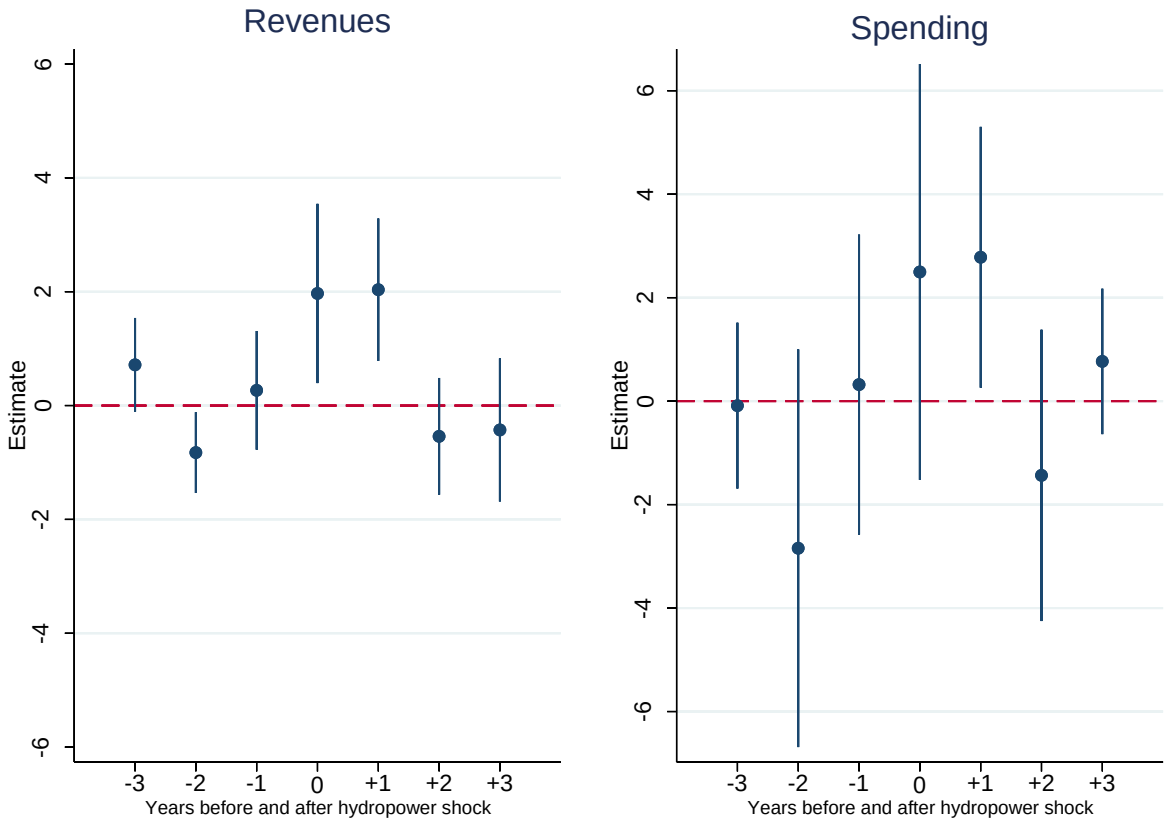


Figure A.8. Local government revenues and spending before-after hydropower shocks.

Notes. The diagrams display the estimated effects of hydropower shocks (=1) on the first differences of per capita local government revenues and spending for each year, from four years before to four years after "treatment" (the time of the hydropower shock, corresponding to t=0 in the diagram). The hydropower shocks (=1) define cases where hydropower production increase (i.e., the first difference) is higher than the overall average of 0.035 GWh per capita (i.e., a doubling relative to the overall mean), and 0 otherwise. The model includes fixed effects for municipality and years, as in Table 1, columns (1) and (3), and all lead-lag estimates are hence to be interpreted relative to the levels and trends captured by these fixed effects. The confidence intervals are based on standard errors clustered on municipalities.

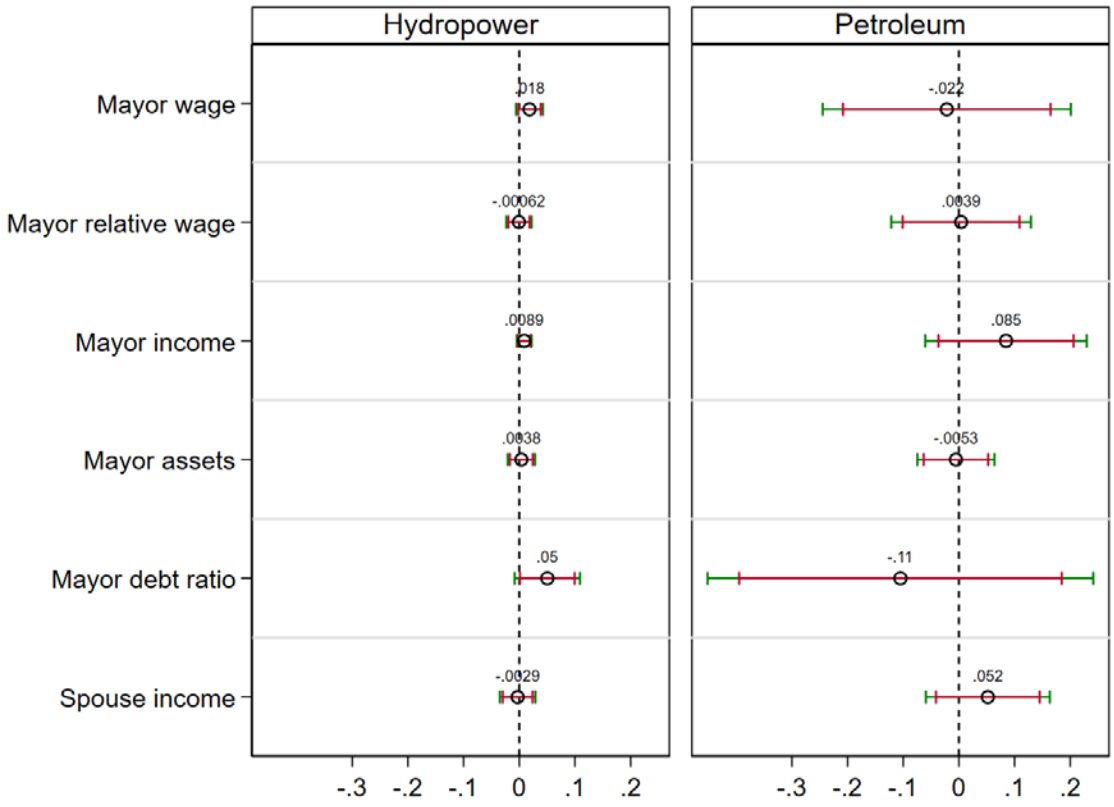


Figure A.9a. Hydropower, petroleum, and the returns to office: municipality-specific linear trends

Notes. The diagram complements Figure 4, showing the effect of hydropower revenue shocks on the mayors' returns to office when *adding municipality-specific linear time trends to the regression model*. The estimates show the effect of a variable indicating whether the mayor is in office interacted with per capita hydropower production. The hydropower and petroleum variables correspond to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The diagram shows the point estimates (indicated in numerical format) as well as 90% and 95% confidence intervals (indicated in red and green colors). The standard errors are clustered on labor market regions.

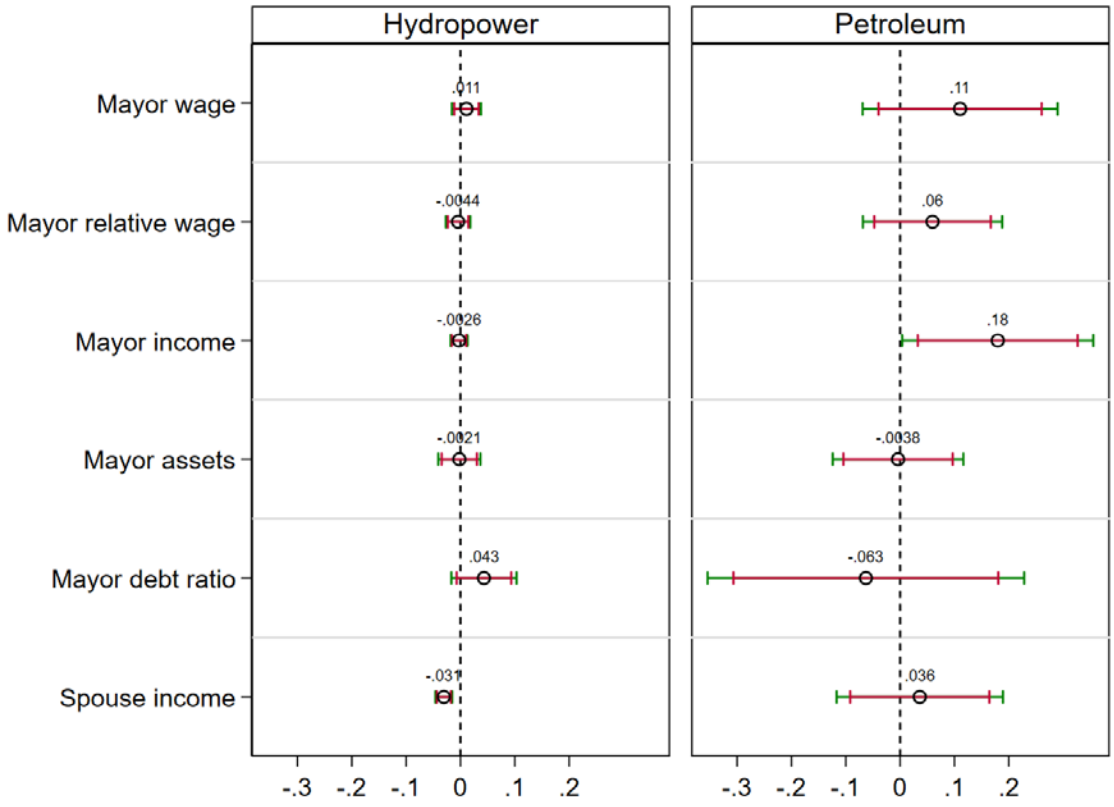


Figure A.9b. Hydropower, petroleum, and the returns to office: removing FEs

Notes. The diagram complements Figure 4, showing the effect of hydropower revenue shocks on the mayors' returns to office when *removing mayor and mayor-spouse fixed effects as well as year*region fixed effects from the regression model*. The estimates show the effect of a variable indicating whether the mayor is in office interacted with per capita hydropower and petroleum production. The hydropower and petroleum variables correspond to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The diagram shows the point estimates (indicated in numerical format) as well as 90% and 95% confidence intervals (indicated in red and green colors). The standard errors are clustered on labor market regions.

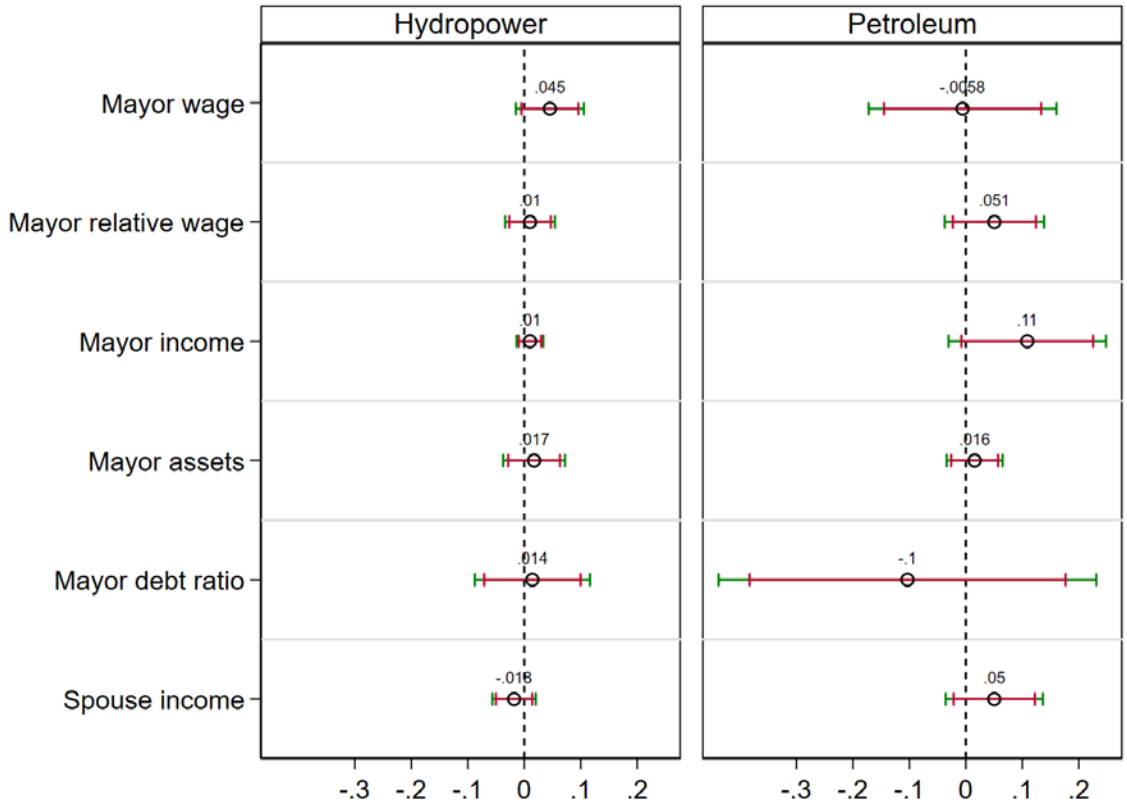


Figure A.9c. Hydropower, petroleum, and the returns to office: excluding outliers

Notes. The diagram complements Figure 4, showing the effect of hydropower revenue shocks on the mayors' returns to office when *excluding municipalities with per capita hydropower production larger than 2 GWh*. We therefore exclude the municipalities Eidfjord, Forsand, Modalen, Sirdal and Suldal (see Figure 1). The estimates show the effect of a variable indicating whether the mayor is in office interacted with per capita hydropower production The hydropower and petroleum variables correspond to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The diagram shows the point estimates (indicated in numerical format) as well as 90% and 95% confidence intervals (indicated in red and green colors). The standard errors are clustered on labor market regions.

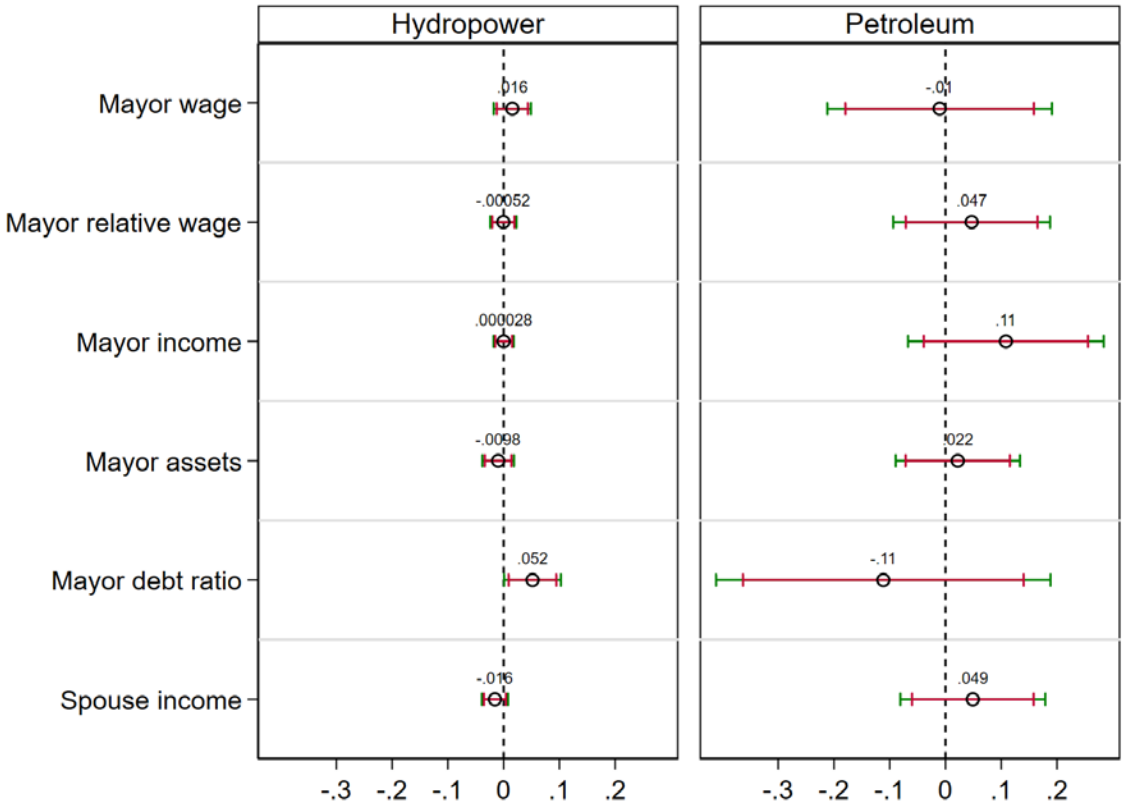


Figure A.9d. Hydropower, petroleum, and the returns to office: clustering on mayors

Notes. The diagram complements Figure 4, showing the effect of hydropower revenue shocks on the mayors' returns to office when *clustering the standard errors on mayors (rather than labor market regions)*. The estimates show the effect of a variable indicating whether the mayor is in office interacted with per capita hydropower and petroleum production. The hydropower and petroleum variables correspond to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The diagram shows the point estimates (indicated in numerical format) as well as 90% and 95% confidence intervals (indicated in red and green colors).

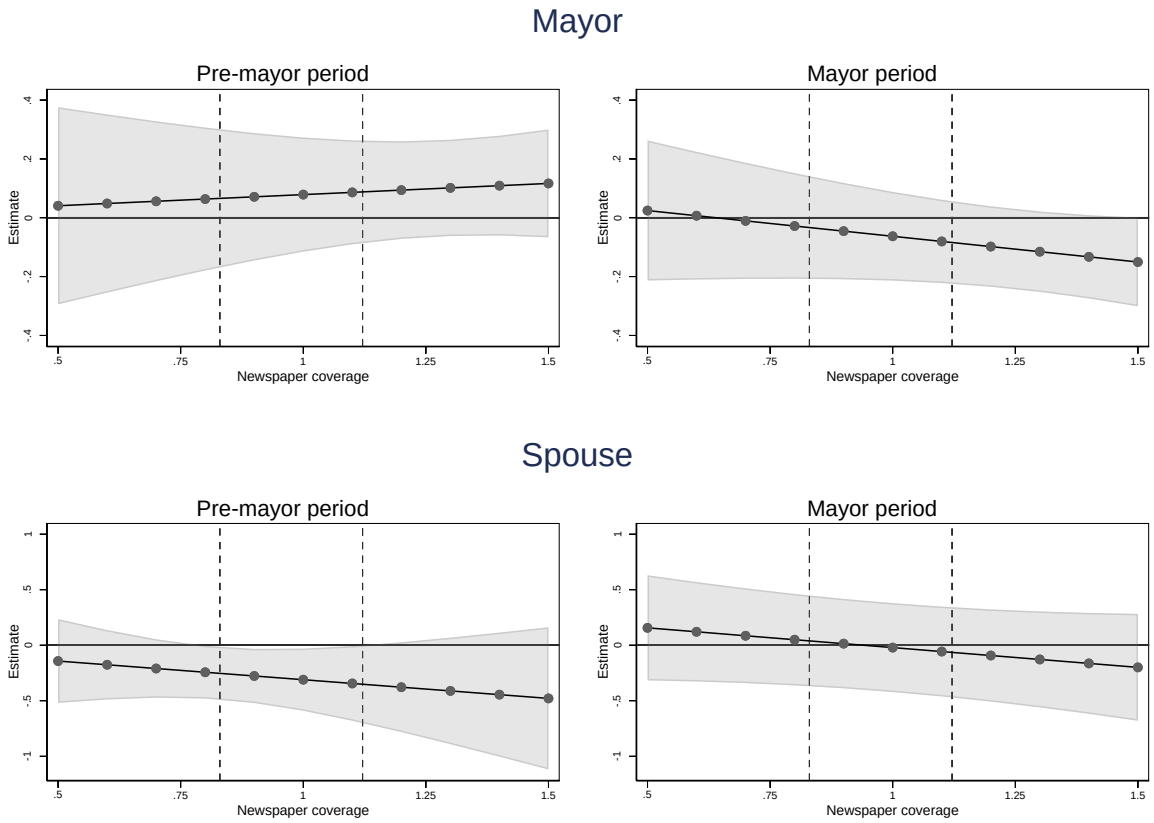


Figure A.10. Hydropower, newspaper coverage and mayor income, post 1995

Notes. The diagrams complement the results presented in Figure 4. They display the marginal effects of hydropower windfalls on personal income level in the period 1996-2018, conditional on newspaper coverage. The hydropower variable corresponds to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). Newspaper coverage has been measured as number of newspaper subscriptions per household in 1972. The upper panel displays effects on mayors' incomes and the lower shows effects on the spouses' income levels, and we estimate the marginal effects for years before the mayor enters office and when she is in office. The estimates derive from regression models with fixed effects for labor market regions*year, and mayors' age. The standard errors are clustered on municipalities, and the diagram shows point estimates and 95% confidence intervals. We display supplementary statistics in Appendix Table B.7.

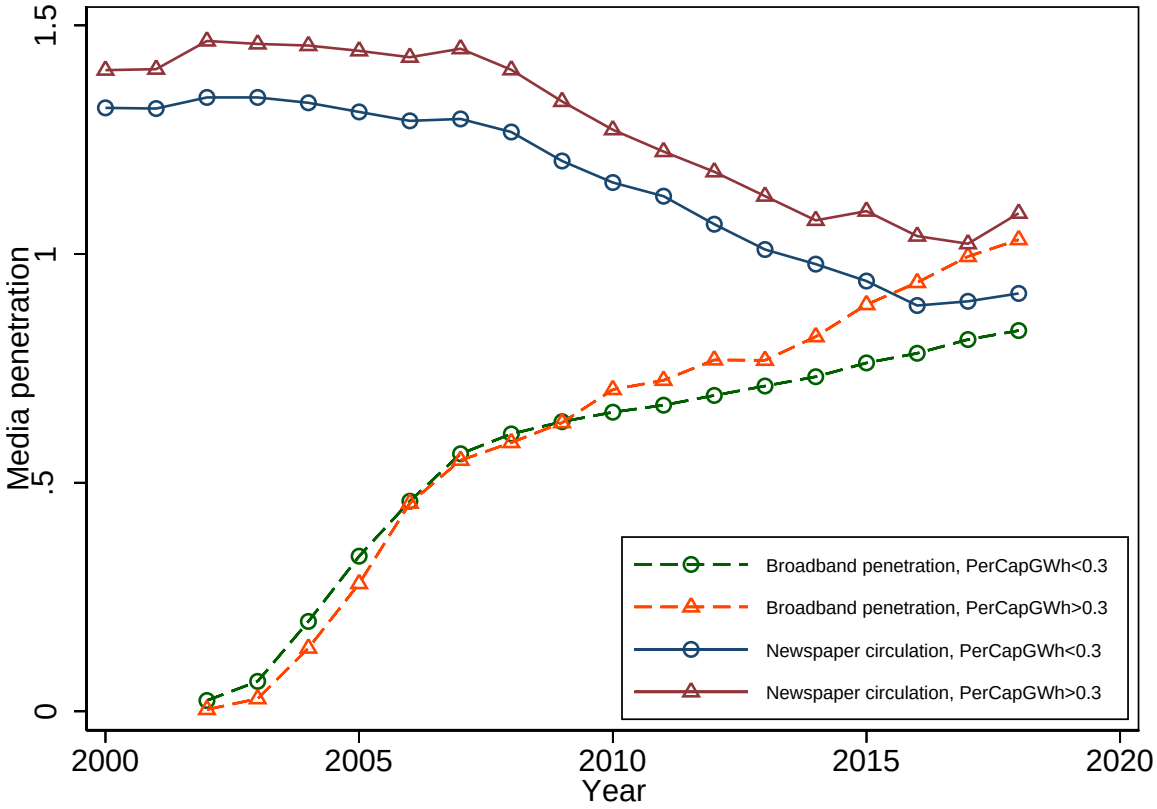


Figure A.11. Newspaper coverage and broadband subscriptions

Notes. Newspapers show developments in newspaper circulation per household measured at the municipality level, defined as a municipality-level average. Broadband indicates number of the share of private broadband subscribers per municipality, defined as a municipality-level average. We display developments separately for municipalities with hydropower production with less and more than 0.3 GWh per capita, defined in 1996.

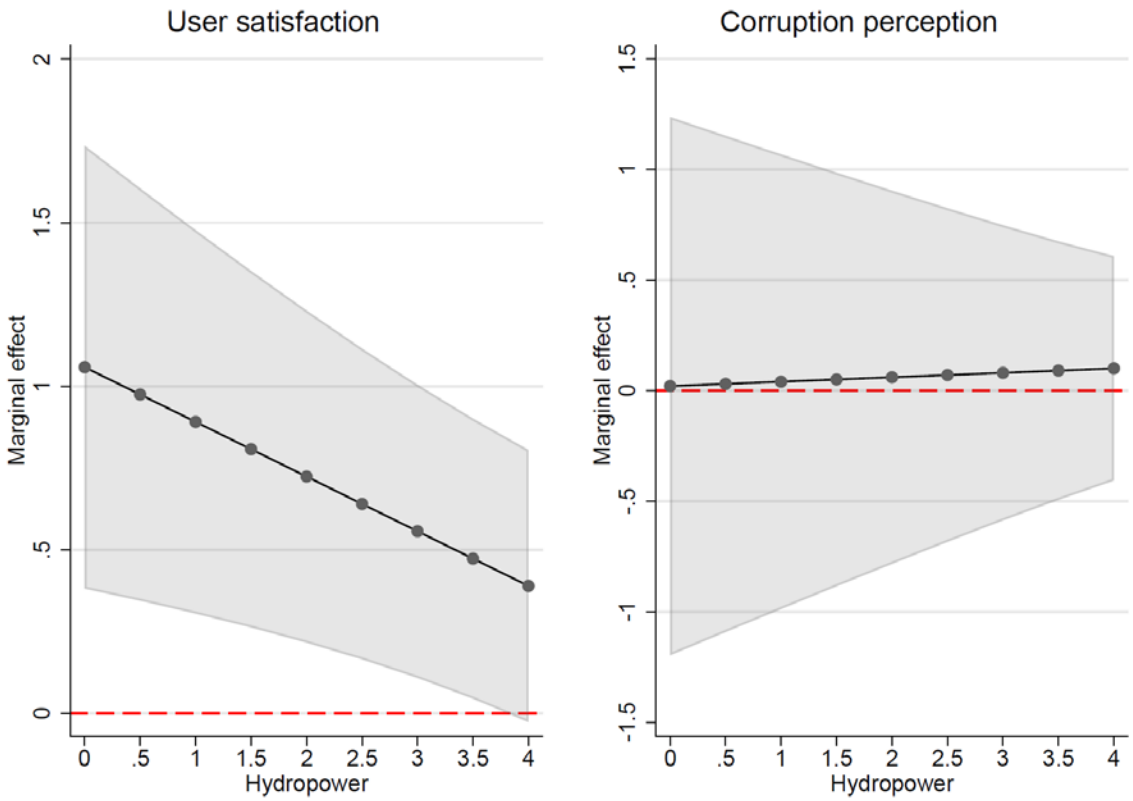


Figure A.12. User satisfaction and hydropower revenue: Nonlinearities

Notes. The diagram displays results from a regression model corresponding to columns (3) and (6) in Table 5, but modified by including a quadratic hydropower term (in addition to the linear), while other parts of the specification is unchanged. The graph may, hence, be interpreted as the estimated marginal effect of hydropower on self-reported user satisfaction with local government services and corruption perceptions.

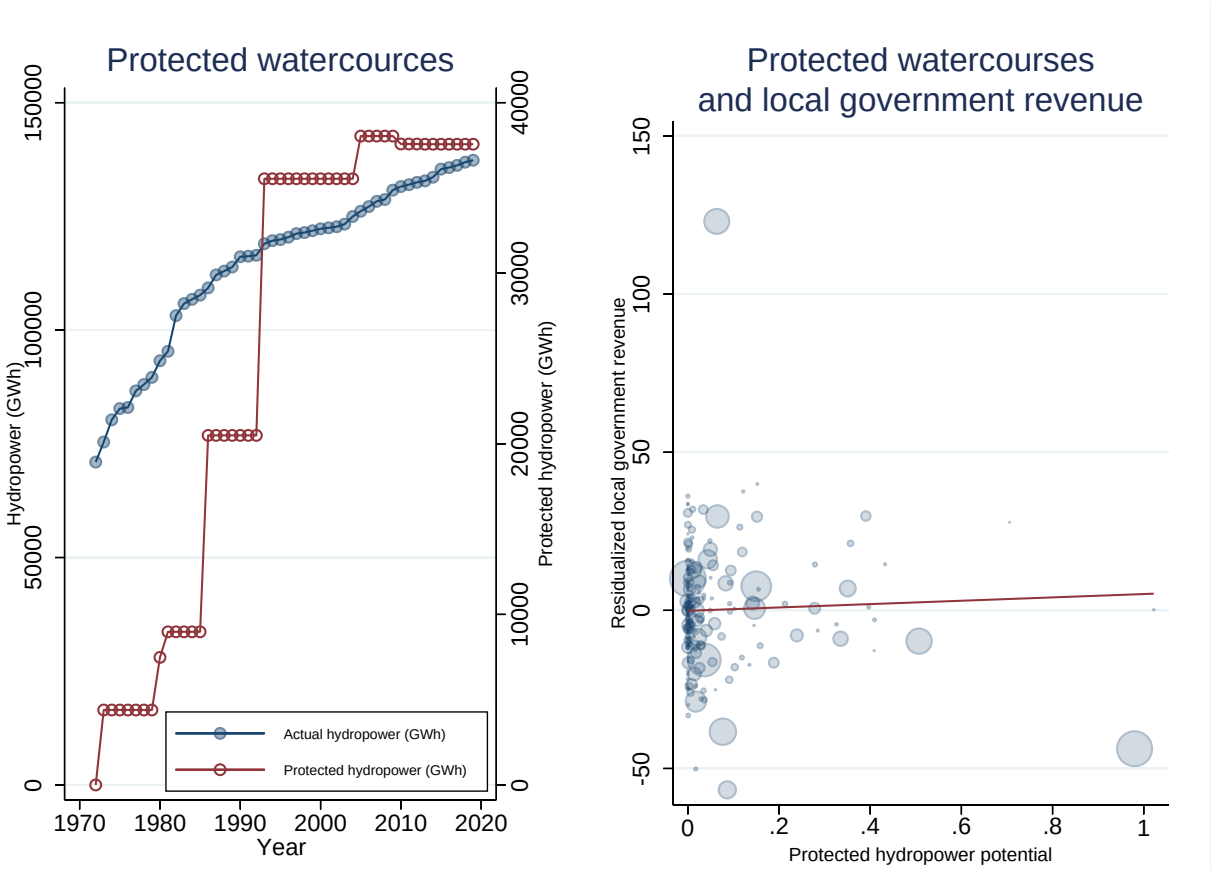


Figure A.13. The effect of protected watercourses

Notes. The left diagram displays the production potential in protected watercourses (right vertical axis), as defined by the national protection plan ("*Verneplan for vassdrag*"). The left diagram shows the effect of protected watercourses as defined by GWh per capita on actual local government revenue in 2019. Since many municipalities with protected watercourses have revenues from hydropower production, local government revenues are residualized using a regression with per capita local government revenue as response variable, per capita hydropower production and fixed effects for labor market regions. The bubbles indicate the actual hydropower production, defined by per capita GWh.

# TABLE B.1. Summary statistics: Municipality level

| | (1) N | (2) Mean | (3) Sd | (4) Min | (5) Max |
|---|---|---|---|---|---|
| Per capita hydropower production (GWh) | 21,043 | 0.0899 | 0.326 | 0 | 3.934 |
| Per capita protected hydropower potential (GWh) | 21,019 | 0.0209 | 0.0776 | 0 | 0.991 |
| Per capita total current revenues | 20,961 | 41.40 | 34.03 | 2.349 | 335.7 |
| Per capita total spending | 20,503 | 51.72 | 27.77 | 13.44 | 316.1 |
| Per capita spending, administration | 20,503 | 4.238 | 3.662 | 0.0653 | 64.88 |
| Per capita spending, child care | 20,503 | 3.318 | 3.214 | 0 | 49.31 |
| Per capita spending, education | 20,503 | 12.04 | 5.563 | 3.450 | 167.2 |
| Per capita spending, elderly care | 20,503 | 11.88 | 9.573 | 0 | 113.1 |
| Per capita spending, health and social | 20,503 | 6.113 | 4.497 | 0.339 | 58.50 |
| Per capita spending, transportation | 20,503 | 1.770 | 2.045 | 0 | 87.28 |
| Per capita spending, culture | 20,503 | 2.741 | 3.011 | 0.250 | 111.8 |
| Per capita spending, other purposes | 20,503 | 9.614 | 5.869 | 1.124 | 146.2 |
| Revenues from property taxation in NOK 1000 per capita | 12,069 | 2.334 | 5.318 | 0 | 62.63 |
| Annual wage, local government employees | 14,737 | 287.7 | 120.3 | 15.61 | 571.5 |
| Per capita local government work years | 14,738 | 6.155 | 2.602 | 0.863 | 20.44 |
| Turnout (%) | 5,262 | 67.50 | 7.057 | 40.43 | 90.06 |
| Turnout, municipal council less county council turnout (%) | 4,807 | 5.223 | 3.457 | -11.50 | 27.26 |
| Mayor has the same party identity as prime minister og energy minister | 21,289 | 0.354 | 0.478 | 0 | 1 |
| Per capita property taxes petroleum municipalities | 21,289 | 0.116 | 1.667 | 0 | 47.19 |
| *Hydropower25Pct* | 21,043 | 0.360 | 1.304 | 0 | 15.75 |
| *Petroleum25Pct* | 21,289 | 0.0107 | 0.154 | 0 | 4.354 |

Notes. The table shows summary statistics for the municipality-level variables. Data on hydropower production and total local government current revenues are available for the period, 1972-2019. Data on local government spending is available for the period 1972-2018. Data on property taxes is available from 1991, while the time series on local government wages and local government employment start in 1986. Data on work years are measured as percent of the residential population, and do not include teachers for the years 1986-2002. Voter turnout is measured as percent of the eligible population, defined for election years only. The first county council elections were conducted in 1975, and data on turnout difference relative to county turnout is available from that year. Data on the party identity of mayors and energy ministers and prime ministers are available for the entire period. Note that summary statistics for newspaper circulation and survey data are included in Tables 4 and 5.

## TABLE B.2a. Summary statistics: Individual level outcomes

| | Pre-mayor period | | | Mayor period | | | Post-mayor period | | |
|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | Std.dev. | N | Mean | Std.dev. | N | Mean | Std.dev. |
| Mayors' wage | 22,806 | 257,637 | 283,166 | 9,859 | 608,351 | 346,764 | 22,055 | 254,029 | 332,289 |
| Mayors' wage relative to average wage level | 17,314 | 1.289 | 0.923 | 9,759 | 1.863 | 0.665 | 16,650 | 0.993 | 0.962 |
| Mayors' personal income | 49,668 | 184,424 | 219,712 | 14,777 | 476,770 | 356,691 | 26,294 | 266,724 | 331,646 |
| Mayors' assets | 49,668 | 0.436 | 2.162 | 14,777 | 1.181 | 10.30 | 26,294 | 1.490 | 8.641 |
| Mayors' debt/asset ratio | 21,761 | 4.593 | 28.97 | 9,791 | 2.314 | 23.64 | 21,789 | 1.009 | 7.886 |
| Spouses' personal income | 28,109 | 189,375 | 185,230 | 10,678 | 255,509 | 241,954 | 15,598 | 218,540 | 232,874 |
| Mayors' age | 44,168 | 37.01 | 10.84 | 14,776 | 51.78 | 8.527 | 26,288 | 64.35 | 10.68 |

Notes. The table displays summary statistics for mayors' and mayors' spouse. The statistics are classified by years before the mayors entered their mayoral positions, in years when mayors were in office, and in years after mayors have left their positions. The post-mayor period is defined by not reentering office. We display the mayors' wage income (1993-2019), the mayors' wage income relative to the average wage level in local government (1993-2019), the mayors and the spouses' personal income (1972-2019), gross taxable assets, and the debt to assets ratio (1993-2019). Mayor wages and mayor/spouse income levels are measured in thousands, while assets are measured in million NOK (current prices). The debt to asset ratio has been defined for mayors with positive assets only.

## Table B.2b. Summary statistics: Mayor characteristics

| | N | Mean | Min | Max | Std.dev. |
|---|---|---|---|---|---|
| Number of pre-office years | 1,927 | 22.65 | 2 | 44 | 9.910 |
| Number of years in office | 2,119 | 6.974 | 1 | 32 | 4.209 |
| Number of post-office years | 1,663 | 15.81 | 1 | 43 | 10.31 |
| Mayor age | 2,118 | 48.25 | 19 | 76 | 8.498 |
| Women mayor (=1) | 2,118 | 0.167 | 0 | 1 | 0.373 |

Notes. The table displays summary statistics for the mayors in the 1972-2019 period. In shows number of years prior to entering office, number of years in office and number of years in the post-office period. Age is observed in the first year as mayor.

# TABLE B.3. The earnings return to office

| | (1) Mayor wage | (2) Relative mayor income | (3) Mayor income | (4) Mayor assets | (5) Debt/asset ratio | (6) Spouse income |
|---|---|---|---|---|---|---|
| Mayor (=1) | 0.590*** | 0.467*** | 0.353*** | 0.0629** | -0.0509 | -0.0397* |
| | (0.0271) | (0.0187) | (0.0168) | (0.0224) | (0.0317) | (0.0198) |
| Post-mayor (=1) | -0.0436 | -0.0264 | -0.0715** | 0.0449 | -0.0526 | -0.0258 |
| | (0.0306) | (0.0205) | (0.0217) | (0.0419) | (0.0571) | (0.0321) |
| Observations | 43,604 | 43,559 | 78,078 | 48,353 | 39,267 | 50,078 |
| R-squared | 0.716 | 0.700 | 0.735 | 0.696 | 0.677 | 0.683 |
| Municipality FE | Y | Y | Y | Y | Y | Y |
| Region*Year FE | Y | Y | Y | Y | Y | Y |
| Age FE | Y | Y | Y | Y | Y | Y |
| Mayor FE | Y | Y | Y | Y | Y | N |
| Mayor Spouse FE | N | N | N | N | N | Y |

Notes. The table displays estimates of mayor positions on mayors' wage level, the mayors' wage level relative to the average wage level of all local government employees, mayors' income levels and the income levels of mayors' spouses. All response variables are measured on a log scale; see Table B.2a for further details. The reference category is the pre-mayor period, and the table displays estimated effects of entering the mayor period and the post-mayor period. The table shows the fixed effects (FEs) included in the model specifications. The standard errors are robust standard errors, clustered on labor market regions. Significance: *** p<0.001, ** p<0.01, * p<0.05

TABLE B.4. Hydropower, petroleum and local government spending allocation

| | (1) Administration | (2) Childcare | (3) Education | (4) Elderly care |
|---|---|---|---|---|
| *Hydropower25Pct* | 1.082*** | 0.440*** | 0.720*** | 1.788*** |
| | (0.212) | (0.0866) | (0.196) | (0.331) |
| *Petroleum25Pct* | 0.543 | 0.914*** | 2.559*** | 0.688 |
| | (0.554) | (0.174) | (0.734) | (0.391) |
| Observations | 20,398 | 20,398 | 20,398 | 20,398 |
| R-squared | 0.803 | 0.909 | 0.749 | 0.904 |
| Number of mun. | 530 | 530 | 530 | 530 |
| Municipality FE | Y | Y | Y | Y |
| Region*Year FE | Y | Y | Y | Y |

| | (5) Health and social care | (6) Culture | (7) Transport | (8) Other |
|---|---|---|---|---|
| *Hydropower25Pct* | 0.933*** | 1.076*** | 0.489*** | 1.521*** |
| | (0.188) | (0.188) | (0.0993) | (0.444) |
| *Petroleum25Pct* | 0.856** | 0.560** | 0.682*** | 2.718*** |
| | (0.259) | (0.193) | (0.123) | (0.593) |
| Observations | 20,398 | 20,398 | 20,398 | 20,398 |
| R-squared | 0.803 | 0.586 | 0.488 | 0.720 |
| Number of mun. | 530 | 530 | 530 | 530 |
| Municipality FE | Y | Y | Y | Y |
| Region*Year FE | Y | Y | Y | Y |

Notes. The table displays regression estimates on local government spending on the main service sectors. Local government spending is measured in 1000 NOK per capita, in current prices. The hydropower and petroleum variables correspond to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)), or about NOK 10,000 per capita. The table includes fixed effects (FEs) for municipalities and years interacted with labor market regions. The standard errors (in parentheses) are robust standard errors clustered on municipalities. Significance levels: *** p<0.001, ** p<0.01, * p<0.05

# TABLE B.5a. Hydropower, and mayor and spouse earnings

| | Mayor wage | Mayor relative wage | Mayor Income | Mayor assets | Debt/asset ratio | Spouse income |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Mayor (=1) | 0.585*** | 0.467*** | 0.353*** | 0.0672** | -0.0717* | -0.0337 |
| | (0.0274) | (0.0190) | (0.0168) | (0.0237) | (0.0340) | (0.0212) |
| Post-mayor (=1) | -0.0310 | -0.0258 | -0.0548* | 0.0574 | -0.0848 | -0.0347 |
| | (0.0321) | (0.0220) | (0.0226) | (0.0444) | (0.0602) | (0.0374) |
| Mayor (=1) * *Hydropower25Pct* | 0.0156 | -0.000523 | 2.77e-05 | -0.00980 | 0.0518 | -0.0156 |
| | (0.0123) | (0.0113) | (0.00923) | (0.0131) | (0.0275) | (0.0110) |
| Post-mayor (=1) * *Hydropower25Pct* | -0.0342* | -0.00162 | -0.0513*** | -0.0335* | 0.0885* | 0.0275 |
| | (0.0154) | (0.0106) | (0.0139) | (0.0161) | (0.0348) | (0.0310) |
| *Hydropower25Pct* | 0.0106 | 0.0353 | 0.00660 | -0.0680 | 0.0592 | 0.0752* |
| | (0.111) | (0.0593) | (0.0153) | (0.131) | (0.150) | (0.0372) |
| Observations | 43,604 | 43,559 | 78,078 | 48,353 | 39,267 | 50,078 |
| R-squared | 0.716 | 0.700 | 0.735 | 0.696 | 0.677 | 0.683 |
| Municipality FE | Y | Y | Y | Y | Y | Y |
| Region*Year FE | Y | Y | Y | Y | Y | Y |
| Age FE | Y | Y | Y | Y | Y | Y |
| Mayor FE | Y | Y | Y | Y | Y | N |
| Mayor Spouse FE | N | N | N | N | N | Y |

Notes. The table displays estimates on the effect of hydropower production on mayors' wages and income levels, measured on a log-scale. The hydropower variable corresponds to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The table shows the fixed effects (FEs) included in the model specifications. The standard errors are robust standard errors, clustered on labor market regions. Significance: *** p<0.001, ** p<0.01, * p<0.05

TABLE B.5a (cont.) Petroleum, and mayor and spouse earnings

| | Mayor wage | Mayor relative wage | Mayor Income | Mayor assets | Debt/asset ratio | Spouse income |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Mayor (=1) | 0.590*** | 0.466*** | 0.351*** | 0.0630** | -0.0478 | -0.0406* |
| | (0.0264) | (0.0182) | (0.0166) | (0.0226) | (0.0328) | (0.0200) |
| Post-mayor (=1) | -0.0449 | -0.0269 | -0.0717** | 0.0422 | -0.0537 | -0.0251 |
| | (0.0309) | (0.0206) | (0.0218) | (0.0423) | (0.0570) | (0.0321) |
| Mayor(=1)* *Petroleum25Pct* | -0.0105 | 0.0470 | 0.108 | 0.0221 | -0.111 | 0.0490 |
| | (0.0840) | (0.0441) | (0.0699) | (0.0290) | (0.164) | (0.0410) |
| Post-mayor (=1) * *Petroleum25Pct* | 0.0822* | 0.0290 | 0.0425 | 0.176 | 0.156* | 0.00170 |
| | (0.0332) | (0.0287) | (0.0229) | (0.148) | (0.0676) | (0.0549) |
| *Petroleum25Pct* | 0.0736 | 0.0630 | 0.0206 | 0.0869*** | 0.183** | 0.0831 |
| | (0.0545) | (0.0430) | (0.0347) | (0.0205) | (0.0693) | (0.0569) |
| Observations | 43,604 | 43,559 | 78,078 | 48,353 | 39,267 | 50,078 |
| R-squared | 0.716 | 0.700 | 0.735 | 0.696 | 0.677 | 0.683 |
| Municipality FE | Y | Y | Y | Y | Y | Y |
| Region*Year FE | Y | Y | Y | Y | Y | Y |
| Age FE | Y | Y | Y | Y | Y | Y |
| Mayor FE | Y | Y | Y | Y | Y | N |
| Mayor Spouse FE | N | N | N | N | N | Y |

Notes. The table displays estimates on the effect of petroleum production on mayors' wages and income levels, measured on a log-scale. The petroleum variable corresponds to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The table shows the fixed effects (FEs) included in the model specifications. The standard errors are robust standard errors, clustered on labor market regions. Significance: *** p<0.001, ** p<0.01, * p<0.05

# TABLE B.5b Hydropower, and mayor and spouse earnings

Corresponding to TABLE B.5a but with standard errors clustered on mayors/mayor spouses.

| | Mayor wage | Mayor relative wage | Mayor Income | Mayor assets | Debt/asset ratio | Spouse income |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Mayor (=1) | 0.585*** | 0.467*** | 0.353*** | 0.0672* | -0.0717 | -0.0337 |
| | (0.0233) | (0.0171) | (0.0141) | (0.0266) | (0.0366) | (0.0206) |
| Post-mayor (=1) | -0.0310 | -0.0258 | -0.0548* | 0.0574 | -0.0848 | -0.0347 |
| | (0.0318) | (0.0225) | (0.0221) | (0.0423) | (0.0568) | (0.0342) |
| Mayor (=1)**Hydropower25Pct* | 0.0156 | -0.000523 | 2.77e-05 | -0.00980 | 0.0518* | -0.0156 |
| | (0.0170) | (0.0120) | (0.00923) | (0.0145) | (0.0260) | (0.0120) |
| Post-mayor(=1)**Hydropower25Pct* | -0.0342* | -0.00162 | -0.0513*** | -0.0335 | 0.0885* | 0.0275 |
| | (0.0174) | (0.00909) | (0.0144) | (0.0197) | (0.0365) | (0.0251) |
| *Hydropower25Pct* | 0.0106 | 0.0353 | 0.00660 | -0.0680 | 0.0592 | 0.0752 |
| | (0.112) | (0.0557) | (0.0232) | (0.108) | (0.177) | (0.0493) |
| Observations | 43,604 | 43,559 | 78,078 | 48,353 | 39,267 | 50,078 |
| R-squared | 0.716 | 0.700 | 0.735 | 0.696 | 0.677 | 0.683 |
| Municipality FE | Y | Y | Y | Y | Y | Y |
| Region*Year FE | Y | Y | Y | Y | Y | Y |
| Age FE | Y | Y | Y | Y | Y | Y |
| Mayor FE | Y | Y | Y | Y | Y | N |
| Mayor Spouse FE | N | N | N | N | N | Y |

Notes. The table displays estimates on the effect of hydropower production on mayors' wages and income levels, measured on a log-scale. The hydropower variable corresponds to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The table shows the fixed effects (FEs) included in the model specifications. The standard errors are robust standard errors, clustered on mayors (1-5) and mayor spouse (6). Significance: *** p<0.001, ** p<0.01, * p<0.05

# TABLE B.5b cont. Petroleum and mayor and spouse earnings

Corresponding to TABLE B.5a (cont.) but with standard errors clustered on mayors/mayor spouses.

| | Mayor wage | Mayor relative wage | Mayor Income | Mayor assets | Debt/asset ratio | Spouse income |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Mayor (=1) | 0.590*** | 0.466*** | 0.351*** | 0.0630* | -0.0478 | -0.0406* |
| | (0.0225) | (0.0164) | (0.0135) | (0.0254) | (0.0355) | (0.0199) |
| Post-mayor (=1) | -0.0449 | -0.0269 | -0.0717*** | 0.0422 | -0.0537 | -0.0251 |
| | (0.0310) | (0.0218) | (0.0217) | (0.0402) | (0.0550) | (0.0328) |
| Mayor (=1) * *Petroleum25Pct* | -0.0105 | 0.0470 | 0.108 | 0.0221 | -0.111 | 0.0490 |
| | (0.103) | (0.0717) | (0.0895) | (0.0568) | (0.153) | (0.0663) |
| Post-mayor (=1) * *Petroleum25Pct* | 0.0822 | 0.0290 | 0.0425 | 0.176 | 0.156 | 0.00170 |
| | (0.0728) | (0.0547) | (0.0546) | (0.137) | (0.162) | (0.0945) |
| *Petroleum25Pct* | 0.0736 | 0.0630 | 0.0206 | 0.0869 | 0.183 | 0.0831 |
| | (0.0705) | (0.0588) | (0.0426) | (0.0903) | (0.130) | (0.0779) |
| Observations | 43,604 | 43,559 | 78,078 | 48,353 | 39,267 | 50,078 |
| R-squared | 0.716 | 0.700 | 0.735 | 0.696 | 0.677 | 0.683 |
| Municipality FE | Y | Y | Y | Y | Y | Y |
| Region*Year FE | Y | Y | Y | Y | Y | Y |
| Age FE | Y | Y | Y | Y | Y | Y |
| Mayor FE | Y | Y | Y | Y | Y | N |
| Mayor Spouse FE | N | N | N | N | N | Y |

Notes. The table displays estimates on the effect of petroleum production on mayors' wages and income levels, measured on a log-scale. The petroleum variable corresponds to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The table shows the fixed effects (FEs) included in the model specifications. The standard errors are robust standard errors, clustered on clustered on mayors (1-5) and mayor spouse (6). Significance: *** p<0.001, ** p<0.01, * p<0.05

Table B.5c The effect of hydropower and petroleum production on the chief municipal official's income

| | (1) | (2) |
|---|---|---|
| In office (=1) | 0.543*** | 0.543*** |
| | (0.0250) | (0.0265) |
| Post office (=1) | -0.403*** | -0.391*** |
| | (0.0369) | (0.0363) |
| In office(=1)* *Hydropower25Pct* | | 0.000988 |
| | | (0.0337) |
| In office(=1)* *Petroleum25Pct* | | -0.347*** |
| | | (0.0724) |
| Post office(=1)* *Hydropower25Pct* | | -0.00333 |
| | | (0.0226) |
| Post office(=1)* *Petroleum25Pct* | | -0.813*** |
| | | (0.110) |
| *Hydropower25Pct* | | -0.0996 |
| | | (0.102) |
| *Petroleum25Pct* | | 0.418*** |
| | | (0.0908) |
| Observations | 44,955 | 44,955 |
| R-squared | 0.473 | 0.475 |
| Numb. mun. | 90 | 90 |

Notes. The table displays estimates on CMO income levels measured on a log scale. It shows the effects of CMOs entering office (In office) and leaving office (Post office) using the pre-office period as reference category. These effects are estimated conditional on levels of hydropower and petroleum production. The hydropower and petroleum variables correspond to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The standard errors are robust standard errors clustered on municipalities in parentheses. Significance: *** p<0.001, ** p<0.01, * p<0.05.

Table B.6a. The hydropower effect conditional on media coverage, pre 1995

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **Mayor income** | | | **Spouse income** | | |
| VARIABLES | Pre-office | Office | Post-office | Pre-office | Office | Post-office |
| *Hydropower25Pct* | 0.0954 | 0.477** | 0.410 | -0.0423 | -0.739 | -0.126 |
| | (0.0858) | (0.140) | (0.714) | (0.464) | (1.019) | (1.146) |
| *Hydropower25Pct* *News coverage | -0.0276 | -0.639** | -0.671 | 0.121 | 0.837 | 0.980 |
| | (0.101) | (0.196) | (0.951) | (0.599) | (1.280) | (1.188) |
| Observations | 27,973 | 4,798 | 3,663 | 15,372 | 2,988 | 2,500 |
| R-squared | 0.597 | 0.897 | 0.698 | 0.449 | 0.756 | 0.714 |
| Municipality FE | Y | Y | Y | Y | Y | Y |
| Region*Year FE | Y | Y | Y | Y | Y | Y |
| Age FE | Y | Y | Y | Y | Y | Y |

Notes. The table displays the estimated effect of hydropower production on mayors' and spouses' income conditional on 1972 newspaper coverage. We estimate separate models of mayors and spouses in the pre-office, office, and post-office periods. The estimates exploit data on incomes for the period 1972-1995 The hydropower variable corresponds to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The model includes fixed effects (FEs) for municipalities and years interacted with labor market regions. The standard errors (in parentheses) are clustered on labor market regions. Significance: *** p<0.001, ** p<0.01, * p<0.05.

Table B.6b. The hydropower effect conditional on media coverage, post 1995

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **Mayor income** | | | **Spouse income** | | |
| VARIABLES | Pre-mayor | Mayor | Post-mayor | Pre-mayor | Mayor | Post-mayor |
| *Hydropower25Pct* | 0.00295 | 0.112 | 0.289 | 0.0260 | 0.335 | 0.743 |
| | (0.259) | (0.180) | (0.544) | (0.396) | (0.332) | (0.875) |
| *Hydropower25Pct* *News cov. | 0.0758 | -0.175 | -0.100 | -0.336 | -0.356 | 0.295 |
| | (0.192) | (0.133) | (0.400) | (0.454) | (0.265) | (0.644) |
| Observations | 12,122 | 8,251 | 9,277 | 8,481 | 5,915 | 6,973 |
| R-squared | 0.552 | 0.770 | 0.496 | 0.494 | 0.587 | 0.537 |
| Municipality FE | Y | Y | Y | Y | Y | Y |
| Region*Year FE | Y | Y | Y | Y | Y | Y |
| Age FE | Y | Y | Y | Y | Y | Y |

Notes. The table displays the estimated effect of hydropower production on mayors' and spouses' income conditional on 1972 newspaper coverage. We estimate separate models of mayors and spouses in the pre-office, office, and post-office periods. The estimates exploit data on incomes for the period 1996-2018. The hydropower variable corresponds to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The model includes fixed effects (FEs) for municipalities and years interacted with labor market regions. The standard errors (in parentheses) are clustered on labor market regions. Significance: *** p<0.001, ** p<0.01, * p<0.05.

Table B.7. Partisan alliances and hydropower plant openings

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Plant openings (=1) with a minimum GWh per capita production of: | | | |
| | ΔPerCapGWh>0.01 | ΔPerCapGWh>0.05 | ΔPerCapGWh>0.1 | ΔPerCapGWh>0.35 |
| Match (=1) | 0.00193 | 0.000470 | 7.16e-05 | 7.51e-05 |
| | (0.00214) | (0.00103) | (0.000817) | (0.000401) |
| Observations | 19,647 | 19,647 | 19,647 | 19,647 |
| R-squared | 0.574 | 0.819 | 0.889 | 0.951 |
| Number of municipalities | 478 | 478 | 478 | 478 |
| Municipality FE | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y |

Notes. The table displays regression estimates for a dummy variable indicating hydropower plant openings, yielding different levels of per capita hydropower production. Match is a dummy variable indicating situations where the mayors' party affiliation matches the party affiliation of either the prime minister or the energy minister. The table shows estimates for the "match" variable controlling for the party identities of mayors interacted with the party identities of prime ministers and energy ministers. The models include fixed effects (FEs) for municipality and year. The standard errors (in parentheses) are robust standard errors clustered on municipalities. Significance levels: *** p<0.001, ** p<0.01, * p<0.05

TABLE B.8. The impact of mayor status in first and subsequent years as mayor

| | (1) Mayor wage | (2) Mayor relative wage | (3) Mayor Income | (4) Spouse income |
|---|---|---|---|---|
| First-year mayor (=1) | 0.555*** | 0.448*** | 0.307*** | -0.0237 |
| | (0.0274) | (0.0206) | (0.0157) | (0.0238) |
| Other-years mayor (=1) | 0.600*** | 0.468*** | 0.358*** | -0.0433* |
| | (0.0284) | (0.0195) | (0.0181) | (0.0213) |
| Post-mayor (=1) | -0.0394 | -0.0280 | -0.0774*** | -0.0265 |
| | (0.0310) | (0.0202) | (0.0216) | (0.0311) |
| Observations | 43,604 | 43,559 | 78,078 | 50,117 |
| R-squared | 0.698 | 0.681 | 0.717 | 0.650 |
| Municipality FE | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y |
| Age FE | Y | Y | Y | Y |
| Mayor FE | Y | Y | Y | N |
| Mayor Spouse FE | N | N | N | Y |

Notes. The table displays estimates of mayor positions on mayors' wage level, the mayors' wage level relative to the average wage level of all local government employees, mayors' income levels and the income levels of mayors' spouses. The response variables are measured on a log-scale. The reference category is the pre-mayor period, and the table displays estimated effects of entering the first year as mayor, subsequent years as elected mayor, and the post-mayor period. The table shows the fixed effects (FEs) included in the model specifications. The standard errors are robust standard errors (in parentheses) clustered on labor market regions. Significance: *** p<0.001, ** p<0.01, * p<0.05

## Table B.9. The effect of hydropower windfalls on mayoral income
## Estimates using alternative subsamples

| | Panels with one individual per municipality: | | | |
|---|---|---|---|---|
| | 1991 | 1999 | 2007 | 2015 |
| *Hydropower25Pct* | -0.0150 | 0.0248 | -0.0082 | -0.00019 |
| | (0.0221) | (0.0141) | (0.0195) | (0.0221) |
| Observations | 7,582 | 11,771 | 14,895 | 14,715 |
| Number of municipalities | 287 | 363 | 416 | 411 |

Notes. The table displays estimates the estimated effects of mayors entering office, conditional on hydropower production. The hydropower variable corresponds to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The subsamples are identified by mayors elected to office in the 1991, 1999, 2007 and 2015 local elections. Robust standard errors clustered on municipalities in parentheses. Significance: *** p<0.001, ** p<0.01, * p<0.05

## Table B.10. The effect of hydropower windfalls on mayoral income
## Estimates using alternative subsamples

| | (1) Full sample | (2) Always treated excluded | (3) Years after 2006 excluded | (4) Always treated and years after 2006 excluded |
|---|---|---|---|---|
| Mayor (=1) | 0.352*** | 0.343*** | 0.280*** | 0.277*** |
| | (0.017) | (0.0204) | (0.0194) | (0.0231) |
| Post-mayor (=1) | -0.053* | -0.0871** | -0.0339 | -0.0718* |
| | (0.022) | (0.0256) | (0.0249) | (0.0291) |
| Mayor(=1)**Hydropower25Pct* | 0.001 | -0.0495*** | 0.00296 | -0.0443** |
| | (0.009) | (0.0136) | (0.0154) | (0.0146) |
| Post-mayor(=1)* *Hydropower25Pct* | -0.050*** | -0.00326 | -0.0567*** | 0.00986 |
| | (0.014) | (0.0111) | (0.0132) | (0.0324) |
| *Hydropower25Pct* | 0.005 | -0.0108 | 0.0238 | -0.0183 |
| | (0.015) | (0.0227) | (0.0195) | (0.0264) |
| Observations | 77,907 | 41,438 | 59,894 | 31,969 |
| R-squared | 0.736 | 0.745 | 0.740 | 0.748 |
| Number of municipalities | 90 | 75 | 90 | 75 |

Notes. The table displays estimates of mayors entering office, conditional on hydropower production. The hydropower variable corresponds to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). The estimates in column (1) rely on the entire sample, those in column (2) excludes municipalities with hydropower production in the entire sample period, the estimates in column (3) excludes years later than 2007, and in column (4), we present estimates on a sample where both sample restrictions are applied. The standard errors are robust standard errors clustered on municipalities in parentheses. Significance: *** p<0.001, ** p<0.01, * p<0.05

# Table B.11 Hydropower, petroleum and mayor income

Municipality level analysis using Table 2 type of model specification

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *Hydropower25Pct* | 0.0321 | 0.0232 | -0.00770 | 0.0220 | 0.0140 | -0.0101 |
| | (0.0380) | (0.0402) | (0.00577) | (0.0351) | (0.0378) | (0.00559) |
| *Petroleum25Pct* | 0.0656 | 0.0709 | 0.0153 | 0.0635*** | 0.0633** | 0.0255 |
| | (0.0379) | (0.0400) | (0.0131) | (0.0184) | (0.0231) | (0.0224) |
| Observations | 14,713 | 14,095 | 14,100 | 14,694 | 14,077 | 14,082 |
| R-squared | 0.868 | 0.903 | 0.879 | 0.885 | 0.915 | 0.893 |
| Municipality FE | Y | Y | N | Y | Y | N |
| Year FE | Y | Y | Y | Y | Y | Y |
| Year*Region FE | N | Y | Y | N | Y | Y |
| Age*Gender FE | N | N | N | Y | Y | Y |

Notes. The table displays estimates of hydropower and petroleum revenues on mayor income (log-scale, measured at current prices). The analyses are at the municipality level, employing data on mayors in office only, i.e. one observation of mayor earnings for each municipality-year. The hydropower and petroleum variables correspond to windfalls amounting to an estimated 25% increase in local government revenues per capita (i.e., the "Windfall25Pct" variable in Eq. (2)). As in Table 2, we estimate models with municipality and year fixed effects (FEs) (1) as well as municipality and years interacted with labor market regions FEs (2). Column (3) excludes municipality FEs. Columns (4)-(6) offer greater flexibility by adding controls of mayor age (one-year intervals) interacted with gender. The standard errors (in parentheses) are robust standard errors, clustered on municipalities. Significance: *** p<0.001, ** p<0.01, * p<0.05

Table B.12. Placebo test of the petroleum revenue shock

| | (1) | (2) |
|---|---|---|
| *Hydropower* | 40.10*** | 36.39*** |
| | (6.847) | (5.533) |
| *Petroleum* | 0.916*** | 0.980*** |
| | (0.132) | (0.175) |
| Placebo (petroleum) | -1.408* | -0.769 |
| | (0.610) | (1.173) |
| Observations | 20,961 | 20,862 |
| R-squared | 0.943 | 0.969 |
| Municipality FE | Y | Y |
| Year FE | Y | Y |
| Region*Year FE | N | Y |

Notes. The estimates in columns (1) and (2) correspond to the same columns in Table 1, and each column includes an additional variable, a petroleum "Placebo" variable. The Placebo test refers to eight coastal municipalities located in the same counties as the actual petroleum municipalities. The timing of treatments in the Placebo municipalities is identical to the timing in the treated municipalities. The response variable is per capita total local government revenues, measured in 1000 NOK per capita. Hydropower production is measured as annual GWh per capita. Petroleum processing is measured as average per capita property taxes for municipality-years following the opening of the facilities. The regression models include fixed effects (FEs) for municipality and years, in addition to years interacted with labor market regions. The standard errors (in parentheses) are robust standard errors, clustered on municipalities. Significance: *** p<0.001, ** p<0.01, * p<0.05