Meet the Press: How Voters and Politicians Respond to Newspaper Entry and Exit

Online Appendix[*]

Francesco Drago[†] Tommaso Nannicini[‡] Francesco Sobbrio[§]

August 2013

Abstract

This Appendix provides additional materials that are also discussed in the paper. In particular, Appendix A presents a vast array of descriptive statistics on our data and of robustness checks on the validity of our identification strategy. Appendix B provides a theoretical framing of our empirical results by developing a retrospective voting model that links newspapers, voters, and politicians.

JEL classification: L82, D72, H70.
Keywords: newspapers, media competition, turnout, political selection, accountability.

[*]We are grateful to Elena Argentesi, Fabrizio Germano, Valentino Larcinese, Stephan Litschig, Maria Petrova, Mauro Sylos Labini, David Strömberg, and Ekaterina Zhuravskaya for useful insights on an earlier version of the paper. We would also like to thank seminar participants at ISNIE 2013; the 2012 Scientific Seminar "Communications & Media Markets: Emerging Trends & Policy Issues," European University Institute; the 9th Workshop on Media Economics, Moscow; the 2011 Petralia Workshop in Applied Economics; Catholic University of Milan; University of Bologna; University of Florence; and Universidad del Rosario, Bogotá. Maria Chiara Cavalleri, Giovanni Marin, Ilaria Petrarca, and Nicola Pierri provided excellent research assistance. The usual disclaimers apply.

[†]University of Naples, Federico II; CSEF and IZA. E-mail: francesco.drago@unina.it.
[‡]Bocconi University; IGIER and IZA. E-mail: tommaso.nannicini@unibocconi.it.
[§]European University Institute. E-mail: francesco.sobbrio@eui.eu (corresponding author).

Appendix A

Table A1 reports the relevant effects of newspaper entry and exit if the creation of an online edition contemporaneous to the creation of a print edition is not considered as an entry.

[Table A1 here]

Table A2 further decomposes the effects of local and national newspapers by print vs. online editions. Similarly, the table presents the effects of existing newspapers decomposed by print vs. online editions.

[Table A2 here]

Tables A3a through A3f present the market structure transition matrices for each newspaper type (print and online, local and national, existing and new).

[Tables A3a-A3f here]

Tables A4, A5, and A6 further test for the absence of differential pretrends between treated and control muncipalities in turnout, reelection, and government efficiency, respectively. The test is performed by estimating the equation in footnote 29 in the paper. Results confirm that changes in the current number of newspapers are not correlated with previous outcomes, as point estimates are never statistically different from zero.

[Tables A4-A6 here]

Figure A1 illustrates the evolution of the average (per municipality) number of (print) newspaper local editions per capita along with the average readership per capita.

[Figure A1 here]

Figure A2 shows the geographical distribution of the number of local news provided by newspapers at the beginning of our sample period (i.e, 1993) and the net change in this number between 1993 and 2010, controlling for the size of provincial population.

[Figure A2 here]

Figure A3 illustrates the geographical distribution of newspaper readership per capita at the beginning of our sample period (i.e, 1993) and the net change in readership between 1993 and 2010. Note that, as shown by the right above, the net change in readership per capita over the sample period is negative in almost every province (i.e., only 16 percent of provinces experience a positive change in readership per capita between 1993 and 2010).

[Figure A3 here]

Figure A4 shows that the pattern observed in Figure 4 in the paper is robust to focusing only on the limited set of newspapers having certified provincial readership data. That is, it shows the on-impact change in newspaper readership per capita relative to a positive change in the number of newspaper local editions only for newspapers whose provincial readership data are certified by *Accertamenti Diffusione Stampa* (ADS).

[Figure A4 here]

Figures A5a and A5b show the number of entry and exit events occurring in electoral years and in the years immediately before and after for the subsample of freshman mayors (Figure A5a) and for the one of incumbent mayors (Figure A5b). The comparison between the two graphs points out that the presence of an incumbent mayor does not imply any relevant change in newspaper entries in the year of the election or in the years before.

[Figures A5a-A5b here]

Figure A6 shows the evolution over time in the average number of newspaper local editions per municipality for all newspapers and for each newspaper category.

[Figure A6 here]

Figure A7 reports the distribution of municipalities holding an election in a given year for all municipality (black), for the subsample of municipalities whose mayor does not face a binding term limit (dark grey), and for the subsample of municipalities whose mayor faces a binding term limit (light grey).

[Figure A7 here]

Figure A8 reports the estimated coefficients (and 95-percent confidence intervals) of equation (4) in the paper for all relevant outcomes. Coefficients on the left of zero test for the existence of any pretrend between treated and control municipalities; coefficients on the right of zero detect dynamic effects in future terms (if any).

[Figure A8 here]

Figure A9 reports the estimated coefficients (and 95-percent confidence intervals) of equation (4) in the paper for all relevant outcomes, but—unlike Figure A8—exploiting the variation by year (within the term) as opposed to the variation by term. Coefficients on the left of zero test for the existence of any (yearly) pretrend between treated and control municipalities; coefficients on the right of zero detect heterogeneous effects (if any) due to newspaper entry or exit happening 1, 2, or 3 years before the election year.

[Figure A9 here]

Figures A10, A11, A12, and A13 report the permutation-based placebo tests discussed in the paper for turnout, reelection, speed of revenue collection in the all sample, and speed of revenue collection for mayors with non-binding term limit, respectively. Specifically, the figures show the cumulative distribution function of 10,000 placebo estimates of the impact of false entries and exits on the relevant outcome.

[Figures A10-A13 here]

For turnout, only 0.02 percent of the false effects are above 100 (i.e., larger than the baseline estimate on turnout of 0.45 percentage points), and none of them is below -100. For reelection, only 0.32 percent of the false effects are above the normalized value of 100 and 0.1 percent are below -100. For government efficiency in the all sample, only 0.08 percent of the false effects are above the normalized value of 100 and 0.1 percent are below -100. For government efficiency in the case of mayors who can be reelected, none of the false effects is outside the interval from -100 and 100.

Table A1 – Robustness: Newspapers and relevant outcomes.
Dropping online entries contemporaneous to the creation of print editions

	(1) Readership	(2) Turnout	(3) Reelected	(4) Speed of collection	(5) Speed of collection
Newspapers	0.057***	0.0047***	0.0977*	2.3700**	5.0852***
	(0.013)	(0.0017)	(0.0520)	(1.0847)	(1.5013)
Number of province×years	1,712				
Number of provinces	110				
Number of city×years		2,014	546	964	559
Number of cities		658	486	574	478
R-squared	0.116	0.620	0.222	0.565	0.547

Notes. Models are estimated in first differences—see model (3) in the text—after dropping online entries contemporaneous to the creation of print editions. All specifications include macro-region-by-year and ownership fixed effects, log of population, log of changes in the number of new and ceased firms in the commercial and financial sector, and log of the unemployment rate. Robust standard errors in parentheses are clustered by province for column (1) and by city for column (2)-(5). Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table A2 – Relevant effects by newspaper type.
Decomposing subcategories by print vs. online

	(1) Readership	(2) Turnout	(3) Reelected	(4) Speed of collection	(5) Speed of collection
Local newspapers – print editions	0.1140***	0.0057***	0.0891*	0.5845	3.6636**
	(0.0221)	(0.0016)	(0.0505)	(1.1322)	(1.5004)
Local newspapers – online editions	0.0159	0.0021	0.0482	2.3439*	2.8745*
	(0.0133)	(0.0024)	(0.0639)	(1.2741)	(1.6984)
National newspapers – print editions	0.0728***	-0.0083	-0.0687	5.1486*	2.3623
	(0.0272)	(0.0058)	(0.1559)	(2.9806)	(4.1166)
National newspapers – online editions	-0.0283	0.0029	0.0275	1.0367	0.6358
	(0.0216)	(0.0040)	(0.1103)	(1.7237)	(2.2085)
R-squared	0.1238	0.6208	0.2226	0.5663	0.5445
New newspapers	0.0909***	0.0040**	0.0514	0.4209	3.7737*
	(0.0228)	(0.0018)	(0.0684)	(1.5569)	(2.1296)
Existing newspapers – print editions	0.1354***	0.0056***	0.0642	2.0821	4.6883***
	(0.0321)	(0.0021)	(0.0589)	(1.3603)	(1.7727)
Existing newspapers – online edition	0.0117	0.0016	0.0793	3.3350***	3.8725**
	(0.0112)	(0.0023)	(0.0635)	(1.1500)	(1.5191)
R-squared	0.124	0.6204	0.2214	0.5676	0.5508
Number of province×years	1,712				
Number of provinces	110				
Number of city×years		2,014	546	964	559
Number of cities		658	486	574	478

Notes. Models are estimated in first differences—see equation (3) in the text. The effects are estimated by decomposing the entry/exit variable (Δn_{it}) in different categories/subcategories. All specifications include macro-region-by-year and ownership fixed effects, log of population, log of changes in the number of new and ceased firms in the commercial and financial sector, and log of the unemployment rate. Robust standard errors in parentheses are clustered by province for column (1) and by city for column (2)-(5). Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table A3a – Market structure transition matrix:
Offline editions (print newspapers)

Newspapers	Newspapers at t				
at $(t-1)$	1	2	3	4	5+
1	375	141	45	3	0
2	37	746	198	48	0
3	1	26	308	85	9
4	0	1	15	98	10
5+	0	0	0	7	9

Notes. The table refers to the total number of newspapers in the market for local news and shows the number of city×years in the sample that experienced a given transition between consecutive electoral years, i.e., at time t vs. time $(t-1)$.

Table A3b – Market structure transition matrix:
Online editions (newspapers' websites)

Newspapers	Newspapers at t			
at $(t-1)$	0	1	2	3
0	1,010	352	135	16
1	16	209	151	6
2	0	5	215	29
3	0	0	1	12

Notes. The table refers to the total number of newspapers in the market for local news and shows the number of city×years in the sample that experienced a given transition between consecutive electoral years, i.e., at time t vs. time $(t-1)$.

Table A3c – Market structure transition matrix:
Local newspapers

Newspapers	Newspapers at t					
at $(t-1)$	0	1	2	3	4	5+
0	248	10	4	0	0	0
1	27	119	115	67	15	0
2	0	8	333	200	143	0
3	0	1	10	197	183	47
4	0	0	1	16	245	76
5+	0	0	0	0	3	78

Notes. The table refers to the total number of newspapers in the market for local news and shows the number of city×years in the sample that experienced a given transition between consecutive electoral years, i.e., at time t vs. time $(t-1)$.

Table A3d – Market structure transition matrix:
National newspapers

Newspapers	Newspapers at t			
at $(t-1)$	0	1	2	3
0	1,701	36	22	1
1	1	141	109	0
2	0	14	119	4
3	0	0	0	4

Notes. The table refers to the total number of newspapers in the market for local news and shows the number of city×years in the sample that experienced a given transition between consecutive electoral years, i.e., at time t vs. time $(t-1)$.

Table A3e – Market structure transition matrix:
New newspapers

Newspapers	Newspapers at t			
at $(t-1)$	0	1	2	3
0	1,464	246	15	2
1	15	215	85	15
2	0	2	68	24
3	0	0	3	14

Notes. The table refers to the total number of newspapers in the market for local news and shows the number of city×years in the sample that experienced a given transition between consecutive electoral years, i.e., at time t vs. time $(t-1)$.

Table A3f – Market structure transition matrix:
Existing newspapers

Newspapers	Newspapers at t				
at $(t-1)$	1	2	3	4	5+
1	257	243	41	14	0
2	61	578	185	94	17
3	1	13	168	122	44
4	0	0	15	185	50
5+	0	0	0	3	69

Notes. The table refers to the total number of newspapers in the market for local news and shows the number of city×years in the sample that experienced a given transition between consecutive electoral years, i.e., at time t vs. time $(t-1)$.

Table A4 – Newspapers and electoral participation, diagnostics

	(1) Newspapers	(2) Newspapers	(3) Newspapers
Turnout at *(t-1)*	0.0538	-0.5573	-2.6384
	(0.8823)	(1.3159)	(5.2819)
Turnout at *(t-2)*		-0.8653	-3.2912
		(1.3189)	(6.6811)
Turnout at *(t-3)*			2.9646
			(5.7961)
Number of city×years	2,104	1,423	768
Number of cities	663	655	601
R-squared	0.8984	0.9331	0.9787

Notes. Models are estimated in levels—see the equation in footnote 29 in the paper. All specifications include city fixed effects, macro-region-by-year and ownership fixed effects, log of population, log changes in the number of new and ceased firms in the commercial and financial sector, and log of the unemployment rate. Robust standard errors clustered at the city level are in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table A5 – Newspapers and incumbent's reelection, diagnostics

	(1) Newspapers	(2) Newspapers	(3) Newspapers	(4) Newspapers
Reelected at $(t-1)$	-0.0853	0.0922	0.0217	0.0748
	(0.2093)	(0.2315)	(1.0353)	(2.3488)
Reelected at $(t-2)$		0.0255	0.0198	
		(0.1223)	(0.8456)	
Reelected at $(t-3)$			0.1278	
			(0.4759)	
Number of city×years	1,387	1,055	565	557
Number of cities	662	648	466	493
R-squared	0.9293	0.9572	0.9848	0.9954

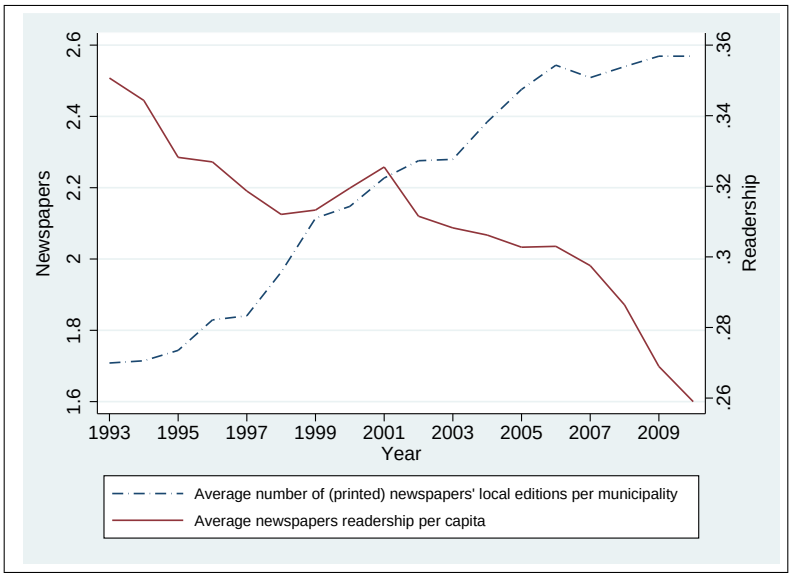
Notes. Models are estimated in levels—see the equation in footnote 29 in the paper. All specifications include city fixed effects, macro-region-by-year and ownership fixed effects, log of population, log changes in the number of new and ceased firms in the commercial and financial sector, and log of the unemployment rate. Columns (1)-(3) report the results of the model estimated by using all the electoral terms. Column (4) reports the results of the model estimated by conditioning the regressions on electoral terms where the incumbent mayor's term limit is not binding. Robust standard errors clustered at the city level are in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table A6 – Newspapers and government efficiency, diagnostics

	(1) Newspapers	(2) Newspapers	(3) Newspapers
Speed of collection at $(t-1)$	0.0007	-0.0059	-0.0032
	(0.0028)	(0.0065)	(0.0057)
Speed of collection at $(t-2)$		-0.0044	
		(0.0065)	
Number of city×years	1,718	967	1,050
Number of cities	661	574	629
R-squared	0.9068	0.9549	0.9453

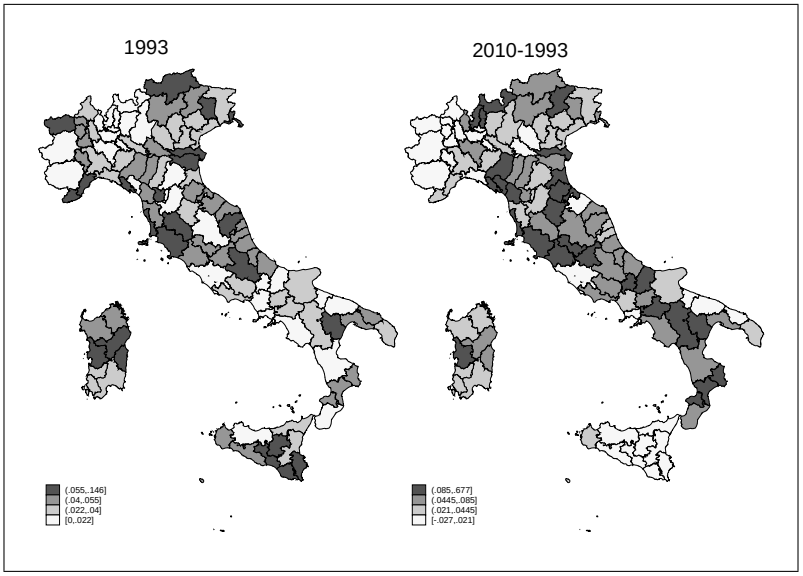
Notes. Models are estimated in levels—see the equation in footnote 29 in the paper. All specifications include city fixed effects, macro-region-by-year and ownership fixed effects, log of population, log changes in the number of new and ceased firms in the commercial and financial sector, and log of the unemployment rate. Columns (1)-(2) report the results of the model estimated by using all the electoral terms. Column (3) reports the results of the model estimated by conditioning the regressions on electoral terms where the incumbent mayor's term limit is not binding. Robust standard errors clustered at the city level are in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Figure A1 — Evolution of newspaper local editions and per-capita readership



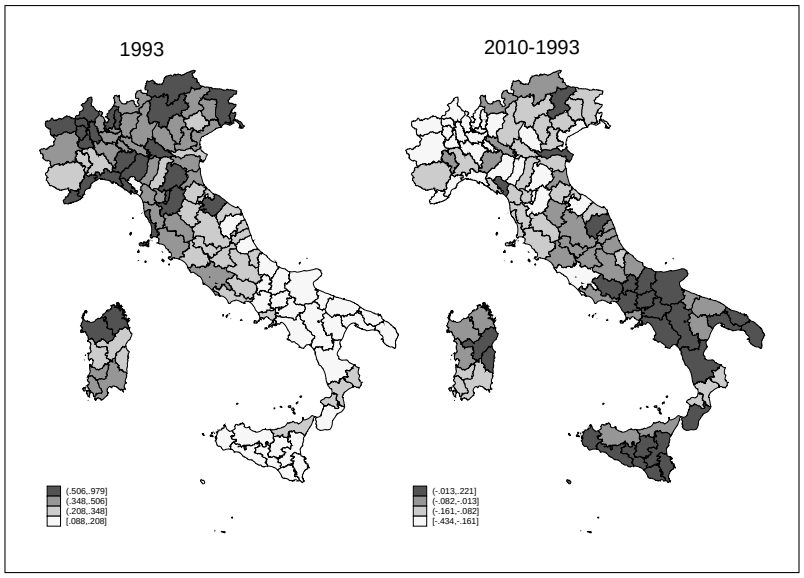
Notes. The graph shows the evolution over time of the average number of (print) newspaper local editions per municipality (measured along the left-side axis) and the evolution over time of the average readership per capita (measured along the right-side axis).

Figure A2 – Geographical distribution of newspaper local editions (per 1,000 inhabitants)



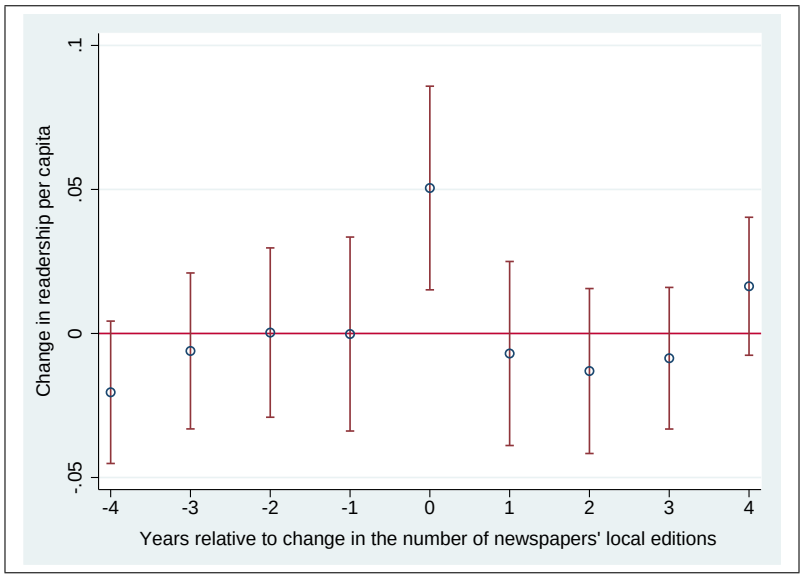
Notes. The graph shows the geographical distribution per province of the number of newspaper local editions per 1,000 inhabitants at the beginning of the sample period (left panel) and the geographical distribution per province of the net change in the number of newspaper local editions per 1,000 inhabitants over the sample period (right panel).

Figure A3 – Geographical distribution of readership per capita



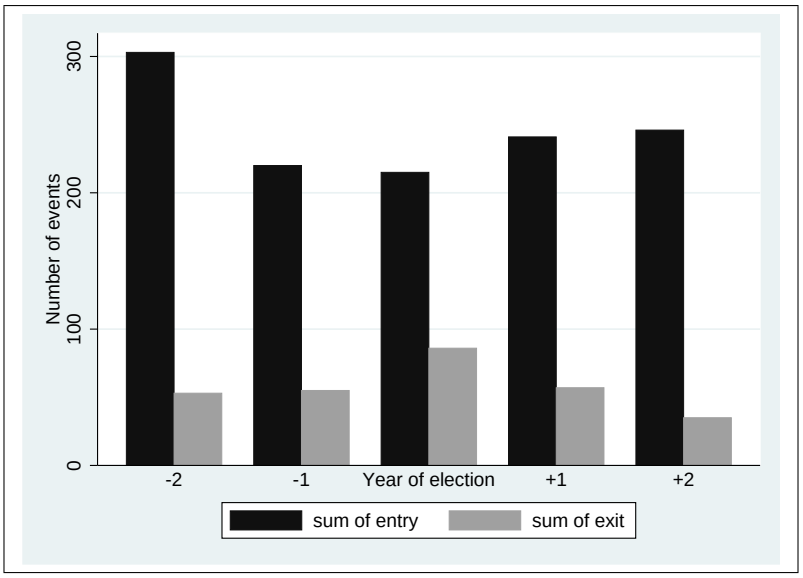
Notes. The graph shows the geographical distribution per province of the readership per capita at the beginning of the sample period (left panel) and the geographical distribution per province of the net change in readership per capita over the sample period (right panel).

Figure A4 – Readership per capita and newspaper entry
(subsample of newspapers with certified provincial readership data)



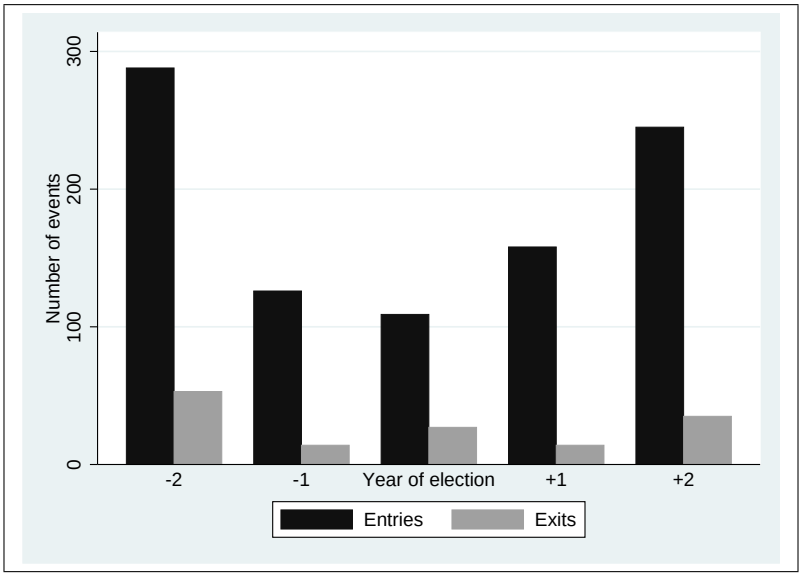
Notes. Same as Figure 4 in the paper, but the data include only the subsample of newspapers whose readership data are certified by ADS. All years from 1993 to 2010.

Figure A5a – Entries/exits with respect to electoral year (freshmen)



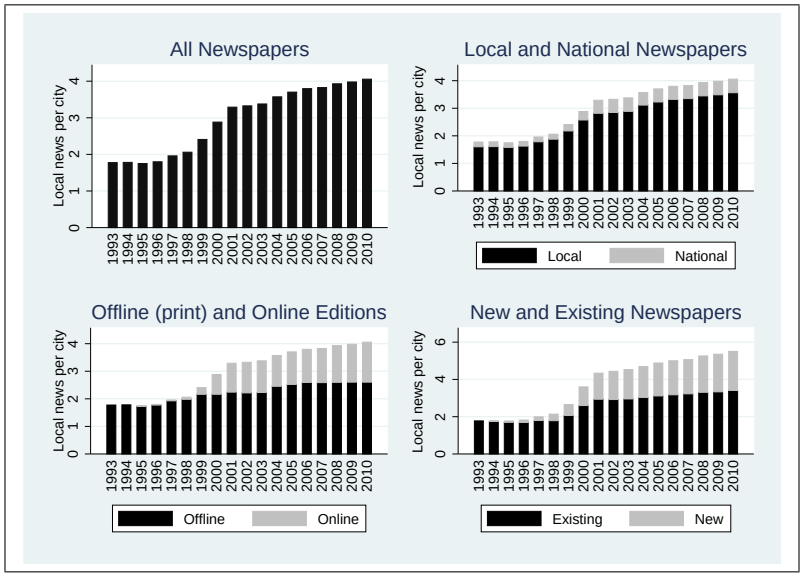
Notes. The graph shows the number of entry and exit events (i.e., municipalities experiencing a net increase or decrease in the number of newspaper local editions) occurring in electoral years and in the years before and after for the subsample of mayors with non-binding term limit (i.e, freshman mayors).

Figure A5b – Entries/exits with respect to electoral year (incumbents)



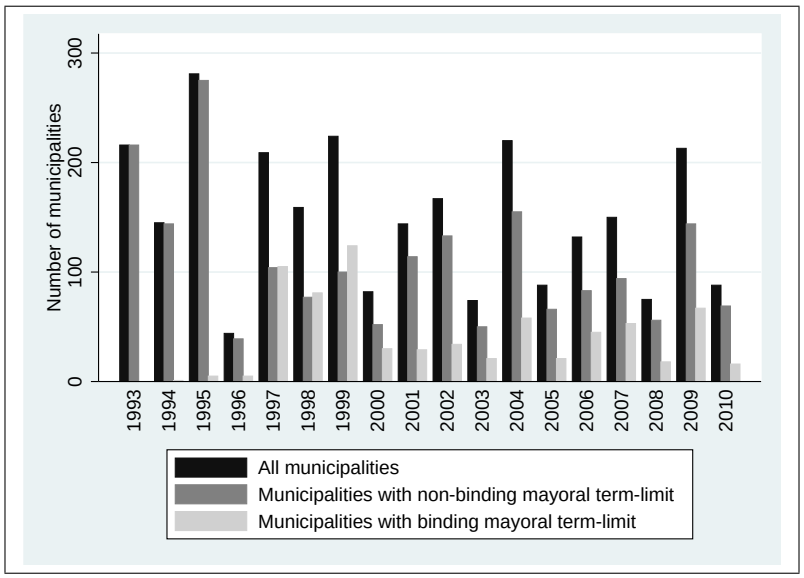
Notes. The graph shows the number of entry and exit events (i.e., municipalities experiencing a net increase or decrease in the number of newspaper local editions) occurring in electoral years and in the years before and after for the subsample of mayors with binding term limit (i.e., reelected incumbent mayors).

Figure A6 – Average number of newspaper local editions per municipality (by type of newspaper)



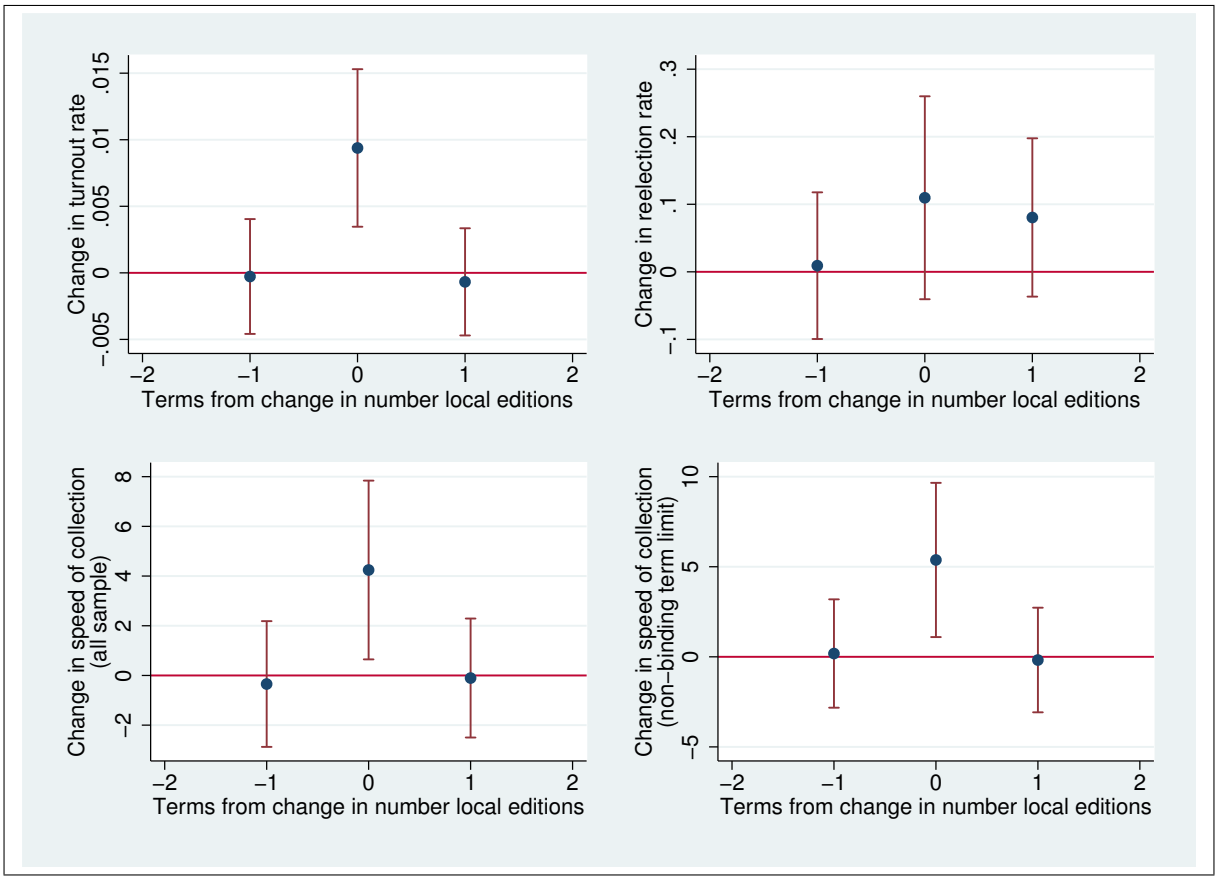
Notes. The graph shows the average number of newspaper local editions per municipality and by type of newspaper (all newspapers, local and national newspapers, print and local editions, incumbent and entrant newspapers).

Figure A7 – Number of municipalities holding an election



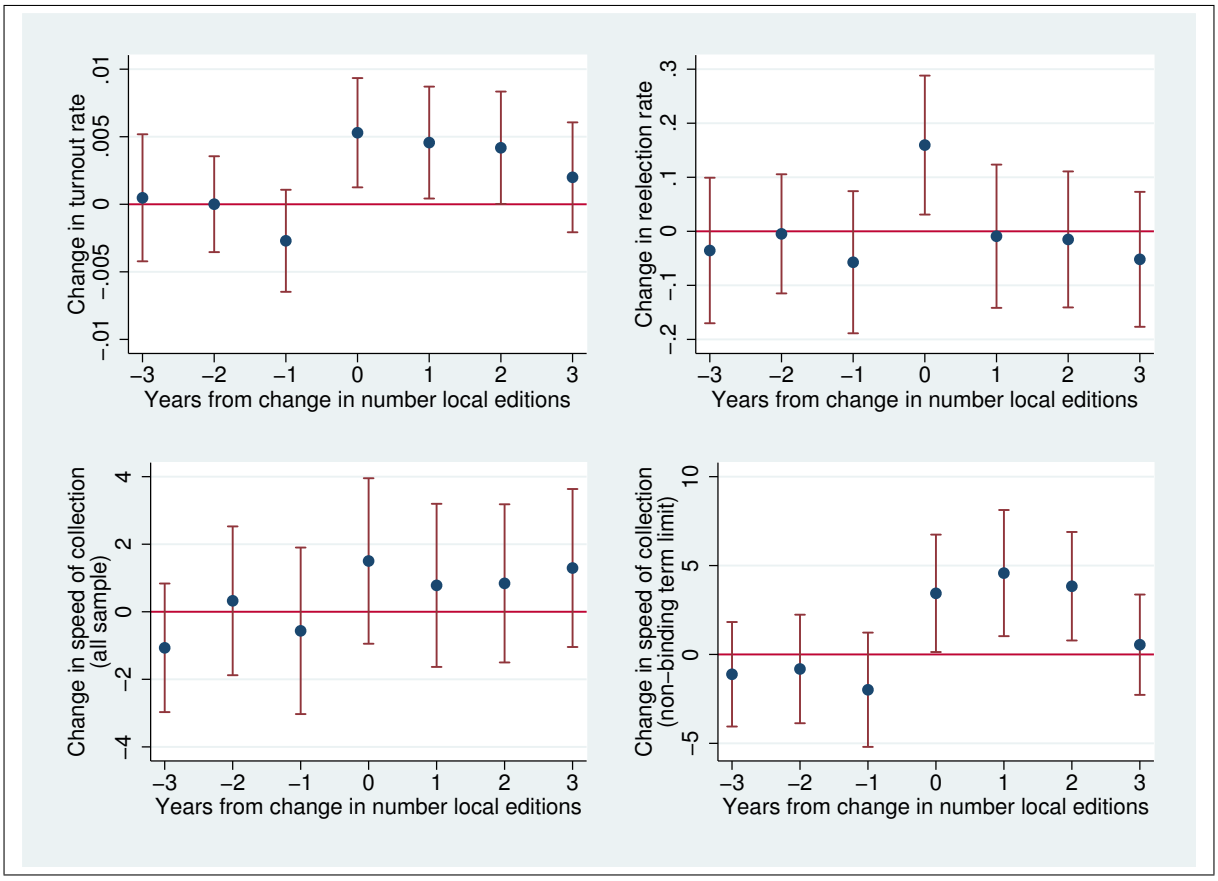
Notes. The graph shows the number of municipalities holding an election in a given year.

Figure A8 – Changes in relevant outcomes around newspaper entry and exit (all sample)



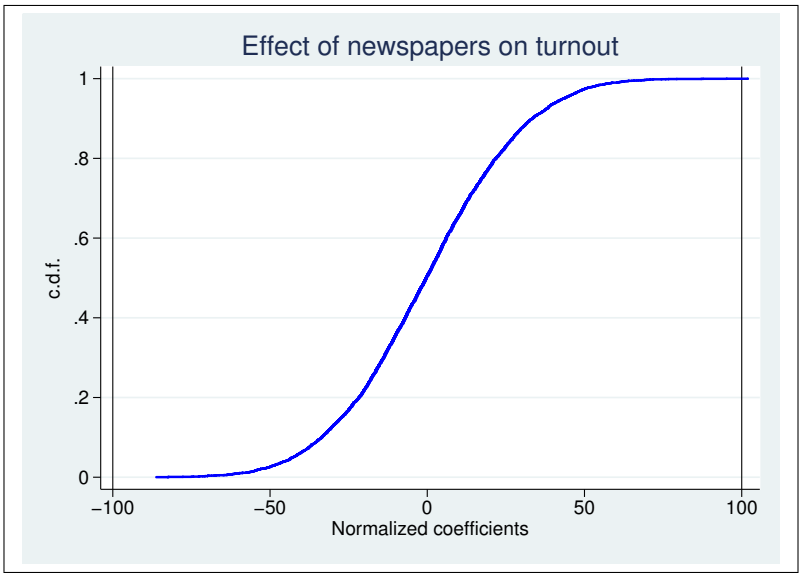
Notes. Dependent variables: turnout rate; reelection rate (mayors who run for reelection only); speed of collection (all sample); speed of collection (mayors with non-binding term limit only). Models are estimated as in equation (4); coefficients β_k reported, with $k = -1, 0, 1$. In other words, the graphs show regression coefficients of 1 leads (by term) and 1 lags (by term) with respect to the electoral term of entry or exit of a (print) newspaper local edition, estimated in the same regression for the all sample. Bars represent 95 percent confidence intervals.

Figure A9 – Changes in relevant outcomes around newspaper entry and exit (within term)



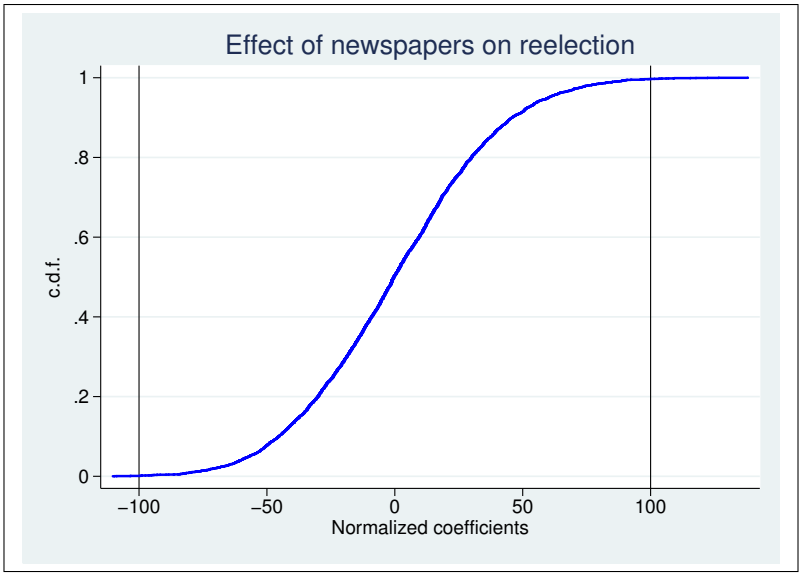
Notes. Dependent variables: turnout rate; reelection rate (mayors who run for reelection only); speed of collection (all sample); speed of collection (mayors with non-binding term limit only). Models are estimated as in equation (4), but exploiting variation by year (within the term) as opposed to variation by term; coefficients β_k reported, with $k = -1, 0, 1$. In other words, the graphs show regression coefficients of 3 leads (by year) and 3 lags (by year) with respect to the electoral year of entry or exit of a (print) newspaper local edition, i.e., within the term preceding and the term following the entry/exit episode. Bars represent 95 percent confidence intervals.

Figure A10 – Placebo tests for turnout



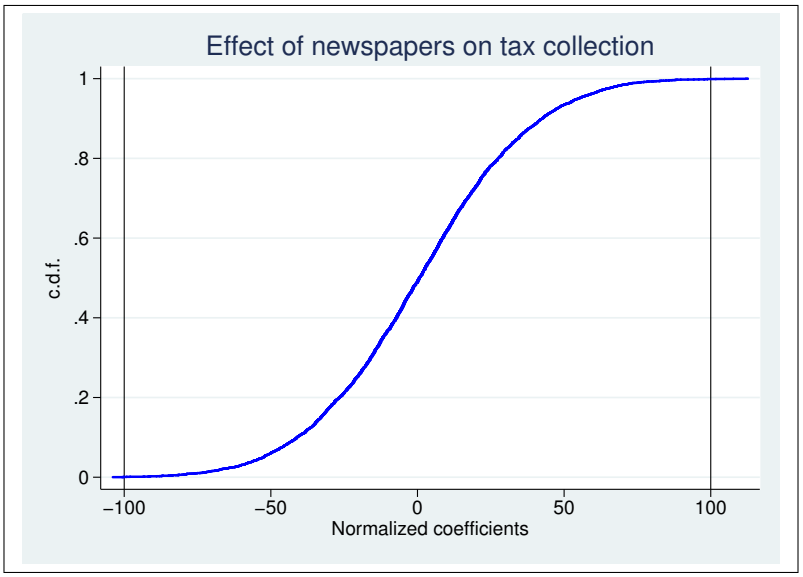
Notes. The graph reports 10,000 placebo estimates of false newspaper entries and exits. For each simulation, in the subsample of municipalities that never experienced either newspaper entry or exit, we randomly assigned false entries or exits, according to the shares of true entries and exits observed in the other municipalities. The graph reports the cumulative distribution function of the 10,000 average treatment effects, normalized over the true baseline effect on turnout.

Figure A11 – Placebo tests for reelection



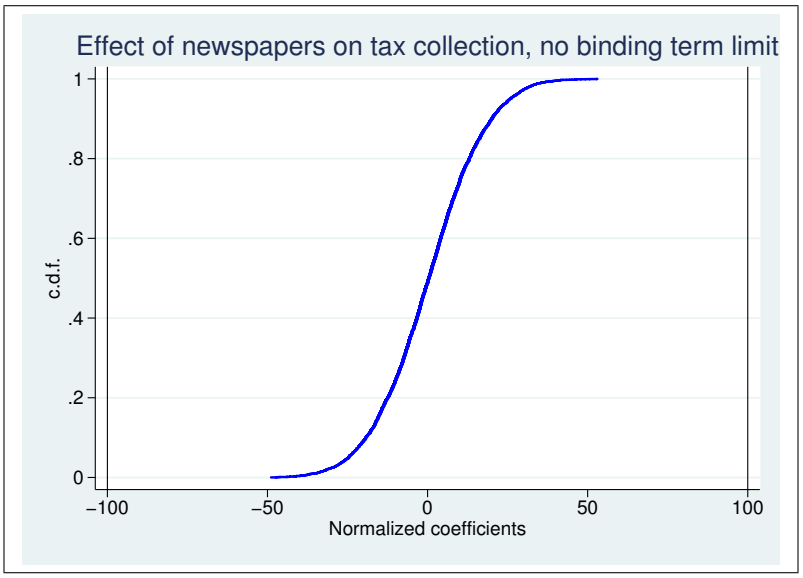
Notes. The graph reports 10,000 placebo estimates of false newspaper entries and exits. For each simulation, in the subsample of municipalities that never experienced either newspaper entry or exit, we randomly assigned false entries or exits, according to the shares of true entries and exits observed in the other municipalities. The graph reports the cumulative distribution function of the 10,000 average treatment effects, normalized over the true baseline effect on reelection.

Figure A12 – Placebo tests for speed of collection



Notes. The graph reports 10,000 placebo estimates of false newspaper entries and exits. For each simulation, in the subsample of municipalities that never experienced either newspaper entry or exit, we randomly assigned false entries or exits, according to the shares of true entries and exits observed in the other municipalities. The graph reports the c.d.f. of the 10,000 average treatment effects, normalized over the true baseline effect on speed of collection (all sample).

Figure A13 – Placebo tests for speed of collection (non-binding term limit)



Notes. The graph reports 10,000 placebo estimates of false newspaper entries and exits. For each simulation, in the subsample of municipalities that never experienced either newspaper entry or exit, we randomly assigned false entries or exits, according to the shares of true entries and exits observed in the other municipalities. The graph reports the c.d.f. of the 10,000 average treatment effects, normalized over the true effect on speed of collection (non-binding term limit).

Appendix B: Theoretical mechanism

In order to better frame the theoretical mechanism behind our empirical results, this section presents a retrospective voting model linking newspapers, voters, and politicians. The main structure of the model follows very closely the theoretical framework of Prat and Strömberg (2005, 2011).[1]

There is a continuum of voters of measure one. Voters' payoffs are additive over two periods and there is no discounting. In period one, an incumbent of type (ability) θ is in office. The incumbent's type is uniformly distributed in $\left[-\frac{1}{2}\bar{\theta}; \frac{1}{2}\bar{\theta}\right]$ where $\bar{\theta} \leq 2$. The incumbent has to decide upon the level of effort e_1 to be exerted in the first period. The incumbent's idiosyncratic ability and his effort jointly determine the overall amount of public good received by voters in the first period. Specifically:

$$g_1 = \theta + e_1$$

The utility of voter j in the first period is given by:

$$U_1^j = g_1 + \beta^j + \eta$$

where β^j is an idiosyncratic preference shock about the incumbent that affects the utility of voter j when the incumbent is in office. β^j is i.i.d. across voters and uniformly distributed in $\left[-\frac{1}{2}B; \frac{1}{2}B\right]$ where $B > 2$; η is a preference shock on the incumbent that affects all voters in the same way, and is uniformly distributed in $\left[-\frac{1}{2}; \frac{1}{2}\right]$.

There are n active newspapers in the market providing local news. A share $(1 - s_n)$ of voters is uninformed and thus only observe $\beta^j + \eta$. Instead, a share s_n of voters is informed and they observe g_1, β^j, and η. Moreover, $s_0 \in (0, 1)$ and $\partial s_n / \partial n > 0$. In addition to the value of information regarding the incumbent's type, in the second period informed voters receive an additional private benefit from being informed equal to $T > 1/2$ when choosing the incumbent (e.g., they can choose an optimal private action tied to the incumbent's type).

In the second period, voters have to decide whether to reelect the incumbent or choose a randomly drawn challenger, i.e., they choose an action $a \in \{i; c\}$. Moreover, a fraction of voters γ has a positive cost of voting $\varepsilon \in \left(\max\left\{\beta^j + \eta; 0\right\}, \frac{1}{2}(1 + B)\right)$. To simplify notation, we refer to these voters as "$\gamma - voters$". Specifically, the second period expected utility of

[1] Note that, differently from Prat and Strömberg (2005, 2011), the model is not focused on the conflicts between multiple groups of voters. Indeed, our empirical analysis investigates the effects of a change in the supply of newspapers on the accountability of politicians within a given city (rather than on how differences in the supply of news across cities affect the incentives of politicians to distribute resources across them).

an informed voter j when the incumbent is reelected is:

$$U_2^j(a=i,g_1) = E(g_2|g_1) + \beta^j + \eta + T - \varepsilon \cdot \mathcal{I}_\gamma$$

where $\mathcal{I}_\gamma$ is the indicator function indicating whether voter j is a $\gamma - voter$. The second period expected utility of an uninformed voter j when the incumbent is reelected is:

$$U_2^{un}(a=i) = E(g_2) + \beta^j + \eta - \varepsilon \cdot \mathcal{I}_\gamma$$

On the other hand, the expected utility for any voter j (informed or uninformed) when the challenger is elected is:

$$U_2^j(a=c) = E(g_2^c) - \varepsilon \cdot \mathcal{I}_\gamma$$

where g_2^c denotes the level of public good supplied by the challenger if elected.

The incumbent has a fixed budget B in each period. The incumbent can spend any part of this budget in producing the public good and then keep the rest as private rents. Specifically, each unit of public good has a cost $\frac{1}{2}(e)^2$ for the incumbent. Therefore, the incumbent's payoffs are as follows:

$$V = \begin{cases} B - \frac{1}{2}(e_1)^2 & \text{if not reelected} \\ 2B - \frac{1}{2}\left[(e_1)^2 + (e_2)^2\right] & \text{if reelected} \end{cases}$$

It is immediate to see that the incumbent has a dominant strategy to exert zero effort in the second period, i.e., $e_2 = 0$ and thus $g_2 = \theta$. Similarly, also the challenger always exerts minimal effort. Hence, $e_2^c = 0$ and $g_2^c = \theta^c$. Thus, $\gamma - voters$ turnout only when they are informed and their updated beliefs on the incumbent's type are not too low. The timing of the game is as follows. In the first period, Nature selects θ, which remains unknown. The incumbent politician exerts effort e_1 and then g_1 is realized. In the second period, voters choose whether to reelect the incumbent or vote for the challenger. If the incumbent is reelected, g_2 is realized. If the challenger wins, g_2^c is realized.

As pointed out by Prat and Strömberg (2011), since there is a continuum of voters, this electoral game has multiple equilibria. Similarly to them, we focus on sincere (perfect Bayesian) equilibria, where each voter chooses the candidate who gives her the higher expected utility. Then, the following proposition applies.

Proposition 1 *In a pure-strategy sincere equilibrium, the incumbent selects effort:*

$$e_1^* = B \cdot s_n \frac{2-\gamma}{2(1-\gamma) + s_n \cdot \gamma}$$

An informed voter j has beliefs $\hat{\theta} = g_1 - e_1^*$ and she votes for the incumbent if and only if:

$$\hat{\theta} + \beta^j + \eta + T \geq \varepsilon \cdot \mathcal{I}_\gamma$$

An uninformed voter j votes for the incumbent if and only if:

$$\beta^j + \eta \geq \varepsilon \cdot \mathcal{I}_\gamma$$

The incumbent is re-elected with probability:

$$P(e_1^*) = \frac{1}{2} + s_n \frac{2T(2-\gamma) + \gamma(B - 2\varepsilon)}{2(2 - \gamma(2 - s_n))}$$

Proof.
Assume there exists a pure strategy sincere equilibrium. Voters vote for the politician who provides the highest second period expected utility. An uninformed voter participate in the election if and only if:

$$\max\left\{E(g_2) + \beta^j + \eta - \varepsilon \cdot \mathcal{I}_\gamma; E(g_2^c) - \varepsilon \cdot \mathcal{I}_\gamma\right\} \geq 0$$

Therefore, a share $(1-s_n)\gamma$ of voters does not turnout. Instead, the remaining share of uninformed voters $(1 - s_n)(1 - \gamma)$ vote for the incumbent if and only if:

$$E(g_2) + \beta^j + \eta \geq E(g_2^c)$$

that is $\beta^j + \eta \geq 0$. Since $E(g_2) = E(\theta) = 0$ and, similarly, $E(g_2^c) = E(\theta^c) = 0$. Thus, the probability that an uniformed voter of type $(1 - \gamma)$ votes for the incumbent is:

$$\Pr(\beta^j \geq -\eta) = \frac{1}{2} + \frac{1}{B}\eta$$

Consider now the informed voters. Let the posterior beliefs of an informed voter j on the incumbent's type be $\hat{\theta}$. Then the voter will be able to select the right private action and get a payoff T if the incumbent wins. In a pure-strategy equilibrium, the voters' beliefs are correct on the equilibrium path and the informed voter receives T with certainty if the incumbent is elected. Hence, the informed voter participates in the election if and only if:

$$\max\left\{\hat{\theta} + \beta^j + \eta + T - \varepsilon \cdot \mathcal{I}_\gamma; E(g_2^c) - \varepsilon \cdot \mathcal{I}_\gamma\right\} \geq 0$$

Therefore, a share $s_n\gamma$ of voters would turnout and vote for the incumbent if and only if $\hat{\theta} + \beta^j + \eta + T \geq \varepsilon$. Hence, the probability that an informed voter of type γ votes for the incumbent is:

$$\Pr(\beta^j \geq \varepsilon - \hat{\theta} - \eta - T) = \frac{1}{2} + \frac{1}{B}\left(\hat{\theta} + \eta + T - \varepsilon\right)$$

Instead, a share $s_n(1 - \gamma)$ of voters always turnout and they vote for the incumbent if and only if $\hat{\theta} + \beta^j + \eta + T \geq 0$. Hence, the probability that the $(1 - \gamma)$ informed voter votes for the incumbent is:

$$\Pr(\beta^j \geq -\hat{\theta} - \eta - T) = \frac{1}{2} + \frac{1}{B}\left(\hat{\theta} + \eta + T\right)$$

Therefore, by the Law of Large Numbers, the incumbent's votes are:

$$(1-s_n)(1-\gamma)\left[\frac{1}{2}+\frac{1}{B}\eta\right]+s_n\left[\gamma\left[\frac{1}{2}+\frac{1}{B}\left(\hat{\theta}+\eta+T-\varepsilon\right)\right]+(1-\gamma)\left[\frac{1}{2}+\frac{1}{B}\left(\hat{\theta}+\eta+T\right)\right]\right]$$

while the challenger votes are:[2]

$$(1-s_n)(1-\gamma)\left(\frac{1}{2}-\frac{1}{B}\eta\right)+s_n\left[(1-\gamma)\left(\frac{1}{2}-\frac{1}{B}\left(\hat{\theta}+\eta+T\right)\right)\right]$$

Therefore, the incumbent is elected if and only if:

$$\frac{2}{B}(1-\gamma)\left[\eta(1-s_n)+s_n\left(T+\hat{\theta}+\eta\right)\right]+s_n\gamma\left[\frac{1}{2}+\frac{1}{B}\left(\hat{\theta}+\eta+T-\varepsilon\right)\right]>0 \tag{1}$$

That is:

$$\eta \geq -s_n\frac{2\hat{\theta}(2-\gamma)+2T(2-\gamma)+\gamma(B-2\varepsilon)}{2\left[2-\gamma(2-s_n)\right]}$$

hence her probability of winning is:

$$P(\hat{\theta})=\frac{1}{2}+s_n\frac{2\hat{\theta}(2-\gamma)+2T(2-\gamma)+\gamma(B-2\varepsilon)}{2\left[2-\gamma(2-s_n)\right]}$$

An informed voter observes $g_1=\theta+e_1$. If the voter conjectures that the incumbent exerts effort $\hat{e}_1$, her belief on θ is:

$$\hat{\theta}=g_1-\hat{e}_1=\theta+e_1-\hat{e}_1$$

Thus, since $E(\theta)=0$, then the unconditional probability of the incumbent winning given her effort is:

$$P(e_1)=\frac{1}{2}+s_n\frac{2\left(e_1-\hat{e}_1\right)(2-\gamma)+2T(2-\gamma)+\gamma(B-2\varepsilon)}{2\left[2-\gamma(2-s_n)\right]}$$

Therefore, the maximization problem of the incumbent is:

$$\max_{e_1} B\cdot P(e_1)-\frac{1}{2}(e_1)^2$$

hence the first order condition provides the optimal level of the incumbent's effort.

$$e_1^*=B\cdot s_n\frac{2-\gamma}{2(1-\gamma)+s_n\gamma}$$

which is increasing in B, s_n and γ. Then, since in equilibrium it must be that $e_1^*=\hat{e}_1$, then:

$$P(e_1^*)=\frac{1}{2}+s_n\frac{2T(2-\gamma)+\gamma(B-2\varepsilon)}{2(2-\gamma(2-s_n))} \tag{2}$$

■

As pointed out by Prat and Strömberg (2005), the above proposition is analogous to the main results of the literature on career concerns (e.g., Holmström, 1999). Informed voters cannot disentangle what share of the public good provision is due to the incumbent's

[2]Notice that the incumbent votes and the challenger votes do not sum up to one since, as discussed above, a share $(1-s_n)\gamma$ of voters does not turnout.

idiosyncratic ability relative to the part due to the effort of the incumbent. However, in equilibrium they rationally anticipate the equilibrium level of effort chosen by the incumbent. Clearly, this is the level of effort where the marginal benefit of trying to induce voters to believe that she is of higher quality is equal to the marginal cost of exerting effort. Moreover, the higher is the share of informed voters (s_n), the higher the equilibrium level of the incumbent's effort.

The above proposition has an immediate corollary establishing a causal mechanism between the number of active newspapers and electoral and public policy outcomes.

Corollary 1 *An increase in the number of active newspapers providing local news in city i, increases:*

i) The share of informed voters.

ii) The turnout rate in local elections.

iii) The effort of the incumbent and the expected competence of reelected incumbents.

iv) The probability of the incumbent being reelected.

Proof.
i) is immediate since $\partial s_n/\partial n > 0$. *ii*) follows from the fact that γ voters turnout only if they are informed. Hence, the higher s_n is the lower is the share of the population who abstains (i.e., $(1 - s_n)\gamma$). The first part of *iii*) derives immediately from the comparative statics of e_1^* with respect to s_n. Moreover, equation (1) in the proof of Proposition 1 provides the condition for the incumbent being reelected. Hence, since $\hat{\theta} = \theta + e_1 - \hat{e}_1$ and in equilibrium $e_1 = \hat{e}_1 = e_1^*$, the above condition could be expressed in terms of a threshold on θ. That is, in equilibrium, before observing $\hat{\theta}$, the incumbent is reelected if and only if:

$$\theta > -\frac{1}{2}\left[\frac{4\eta(1-\gamma)}{s_n\,(2-\gamma)} + \frac{B\gamma + 2T(2-\gamma) - 2\gamma(\varepsilon-\eta)}{(2-\gamma)}\right] = \tilde{\theta}$$

Hence, the second part of *iii*) derives from the fact that $\partial\tilde{\theta}/\partial s_n = 2\eta\frac{1-\gamma}{(s_n)^2(2-\gamma)} > 0$. Finally, *iv*) follows from (2) since $\partial P(e_1^*)/\partial s_n = (1-\gamma)\,\frac{2T(2-\gamma)+\gamma(B-2\varepsilon)}{(2(1-\gamma)+s_n\gamma)^2} > 0$. ■

The key result of the above corollary is represented by *iv).* The intuition behind this result is as follows. Informed voters would vote for the incumbent if and only if $\hat{\theta}+\beta^j+\eta+T \geq \varepsilon\cdot\mathcal{I}_\gamma$. Hence if and only if $\hat{\theta} + T \geq \varepsilon \cdot \mathcal{I}_\gamma - (\beta^j + \eta)$. Then, since $\gamma - voters$ turnout only when they are informed and their updated beliefs on the incumbent's type is not too low and given that $E(\beta^j) = E\,(\eta) = 0$, the expected vote share of the incumbent will be increasing in $s_n(g_1 - e_1^* + T)$. In equilibrium this will be equal to $s_n(\theta + T)$. Therefore, an increase in s_n will increase the incumbent vote share if and only if $(\theta + T) > 0$. Hence, since $T > 0$, an increase in the supply of newspaper (which increases the fraction of informed voters s_n) will end up increasing the electoral advantage of an average incumbent (ie., $\theta = 0$) and even more so if her competence is higher than average (i.e., $\theta > 0$)

Overall, the above corollary shows that our empirical results are consistent with the theoretical mechanism described in this section. Namely, the entry of newspapers in the market for local news increases turnout in municipal election. Moreover, it improves the effort of the incumbent mayor in managing the municipality efficiently. Then, voters reward the higher effort exerted by the incumbent mayor by increasing her vote share and thus enhancing her reelection probability. Overall, the positive effects of an expansion in the supply of newspapers on voters' welfare are more pronounced when the incumbent mayor is not term-limited and thus face reelection incentives. In other words, newspapers matter for public policy mostly when incentives matter.