

Fewer voters, higher stakes? The applicability of rational choice for voter turnout in Quebec municipalities

Environment and Planning C: Government
and Policy
0(0) 1–20

© The Author(s) 2016

Reprints and permissions:

sagepub.co.uk/journalsPermissions.nav

DOI: 10.1177/0263774X16676272

epc.sagepub.com



Sandra Breux and Jérôme Couture

INRS-UCS, Canada

Nicole Goodman

Munk School of Global Affairs, Canada

Abstract

Municipal voter turnout is often considered to be a function of electorate size. According to the rational choice theory of voter behavior, a rational voter is more inclined to abstain in the presence of larger electorates, and more likely to participate in smaller ones. This article examines the impact of electorate size on voter turnout using a multivariate regression model to explain voter participation in Quebec municipalities in the 2009 and 2013 local elections ($N = 1040$). Several other assumptions pertaining to the rational voter are also tested. We find that rational choice theory explains 45% of municipal voter participation in these Quebec elections and that it supports the probability of pivotal voting. Our analysis also confirms that the number of electors, number of mayoral candidates, tax rate, presence of a political party, and incumbency have different effects on participation in small and large municipalities.

Keywords

Elections, local government, local politics, municipalities

Introduction

In 2013, the average voter turnout in local Quebec elections was 63.8% in municipalities with populations fewer than 2000 and around 43.4% in those with populations greater than 100,000 (Ministère des Affaires municipales et de l'Occupation du territoire [MAMOT], 2013). Although these averages mask variations and disparities within each group of municipalities, the comparison of these participation rates suggests a link between the size of the electorate and voter turnout in municipal elections.

Corresponding author:

Sandra Breux, INRS-UCS 385 Sherbrooke Est Montréal, QC Quebec, Canada H2X1E3.

Email: sandra.breux@ucs.inrs.ca

The relationship between electorate size and voter participation has long been a subject of debate and research (Dahl and Tufte, 1973), but the topic has received increased attention in the past decade (Oliver et al., 2012; Tavares and Carr, 2013). In a meta-analysis of studies explaining voter turnout using population data, Geys (2006) shows that of 28 studies, 18 identify a relationship between size and voter turnout, with the remaining 10 concluding that there is no link. In an update of this meta-analysis on 42 studies, Cancela and Geys (2016) find that population size has more explanatory power in subnational or local compared to national elections. Linkages between number of electors and voter turnout are extensively addressed by the rational choice theory of voter behavior, developed in Anthony Downs' *An Economic Theory of Democracy* (1957). Rational choice posits that voters are rational actors who are able to prioritize choices, and therefore more likely to vote in elections when the perceived opportunity cost of participating is lower. In other words, the voter is seen as performing a cost–benefit analysis on the basis of the information he or she holds. Consequently, the theory considers voting in large electorates to be less effective, since the probability of a vote making a decisive difference is low, given the sheer number of eligible voters. Conversely, a rational voter is expected to visit the polls more frequently in smaller electorates, since the probability of a vote having an impact on the results is greater.

For some, the rational model of voting behavior seems well suited to understand municipal-level elections (Elmendorf and Schleicher, 2012; Oliver et al., 2012). Although the model has not yet been the subject of a thorough systematic analysis, certain characteristics of municipal electoral dynamics point to its explanatory power for local elections. For example, voter turnout at the municipal level is often considerably lower compared to other levels of government (Nakhaie, 2006), and it is lower in larger cities than in smaller ones. This validates to some extent the theory of rational ignorance (Downs, 1957), according to which it may be rational for voters to remain poorly informed about politics if the cost of acquiring information in terms of time and effort far exceeds the expected electoral gains. Indeed, several hypotheses have been put forth to explain the weak conditions for voting at the local level. Among these are, for example, the lack of media coverage, the frequent absence of political parties or ideological benchmarks that allow voters to identify the presence of coalitions, and poor knowledge of municipal government (Cutler and Matthews, 2005). In this context, going to the polls can represent a high cost to the voter since personal resources such as education or homeownership are generally not enough to compensate the aforementioned information deficit.

The alleged rationality of the voter may be called into question, however, especially in light of two elements. First, the size of the electorate is one explanatory factor among many in municipal electoral participation (Gaardsted Frandsen, 2002; Goldsmith and Rose, 2002). Second, Caren (2007) showed that when analyzing only big cities, the statistical effect of electorate size becomes marginal. This prompts us to examine the relationship between electorate size and voter turnout in smaller municipalities, where an individual vote is more likely to make a difference. A thorough examination of this relationship is relevant since no study to date has examined the determinants of voter turnout in very small municipalities. This analysis also allows us to evaluate the explanatory power of the rational voter model for understanding municipal electoral participation.

The purpose of this article is to evaluate the relevance of the rational choice approach for explaining electoral participation in local elections by examining voter turnout in Quebec municipalities ($N=1040$). To test this topic, the article uses multivariate regression and several assumptions related to the rational voter. Specifically, the first section of the article discusses the relationship between voter turnout and electorate size. Second, we

present reasons why rational choice theory is an interesting lens through which to examine voter turnout in small municipalities. Third the methodological approach is explained, followed by a presentation of the results. To conclude, we show that rational choice theory helps explain 45% of voter turnout in the municipal elections examined here. There remain, however, clear differences between small and large municipalities. In addition, although our study is based on aggregate data, it subscribes to a certain notion of democracy and, more indirectly, of the voter (Blondiaux, 1996) that is not necessarily shared at the municipal level.

Rational choice, voting, and the municipal level

Electorate size and voting

Studies of municipal voter behavior are relatively few, and most focus on the United States. These works share an emphasis on the influence of electorate size on voter turnout, but arrive at different conclusions regarding its impact. In general, these publications can be divided into two types. The first, notably the work of Oliver et al. (2012), maintains that electorate size plays a role in determining electoral participation at the municipal level, arguing that larger municipal size corresponds with lower voter turnout. The second type, by contrast, questions the idea that electorate size influences voter turnout. Tavares and Carr (2013), for example, argue that the influence of electorate size is one of many factors that facilitates contact between individuals and promotes voter participation. They argue that “scholars have suggested that the influences of city size on participation is more complex than Oliver’s description and is mediated by factors such as population density and the concentration of population within metropolitan areas” (2013: 298). Similarly, examining several large municipalities in the United States, Caren (2007) shows that within the same size, category size is weakly correlated with turnout.

These two types of studies summarize classic work by Dahl and Tufte (1973), who emphasize that the expected relationship between electorate size and voter turnout can go in different directions depending on the theory used. This position aligns with the rational choice theory of voter behavior (Downs, 1957). Challenging the psychosocial explanatory models of electoral behavior, which emerged after World War II, rational choice is based on the principle that voters are rational actors and that their decision to cast a ballot is the result of a cost–benefit analysis. If a voter perceives the expected benefits of casting a ballot to outweigh the costs, voting can be considered rational. This calculation, however, is contingent upon an individual’s vote being decisive in the sense that their preferred candidate wins. Primarily aimed at explaining voter turnout nationally, this theory provides a link between electorate size and voter behavior at the municipal level; for the fewer eligible electors in an electorate, the greater the probability that an individual’s vote will have an impact on the election outcome (Gaardsted Frandsen, 2002).

This theory is underpinned by other hypotheses, which are worth examining, given their applicability to municipal elections. According to Trounstein (2009), the municipal level is specific, so much so that the explanatory models of voter turnout developed for the national level cannot simply be “pasted” onto municipal contexts. This does not mean that models designed for other levels of government can never be applied municipally. Rather, the author points to the necessity of keeping in mind the specific context that is unique to the municipal level and observing how these characteristics change, transform, or negate the explanatory models used at other levels of government.

Rational choice theory and municipal elections

According to the rational voter theory, the utility of voting is based on the probability of one's vote making a difference on the outcome of the election, calculated by assessing the benefits from the election of their preferred candidate and the costs related to going to vote. In addition to characterizing voting as the result of a cost–benefit calculation made by the voter, Downs' theory implies that it is not rational to participate in elections if the costs of participation far outweigh the possible benefits, often referred to as “the paradox of voting.” Yet, in every election citizens vote. Therefore, cost–benefit analyses alone cannot explain participation or abstention. For example, a voter might go to the polls so that their candidate wins, to play a decisive role in the election (e.g., as a “pivotal voter”), or merely to ensure the continuity of the political system.

The model of the pivotal voter, developed by Palfrey and Rosenthal (1985), is based on the premise that the voter wants to make a difference. Assuming that the cost of voting is identical for everyone, the authors highlight the existence of equilibrium voting, meaning that when the number of voters is high, the probability of being a pivotal voter is low. “With a relative [...] small number of eligible voters, the equilibrium probability of being pivotal is large enough to motivate individuals with positive costs of voting to participate” (Coate et al., 2008: 583). Although pivotal voting is largely determined by electoral context, including the number of candidates and their perceived margin of victory (Mulligan and Hunter, 2003), the fact remains that there is a higher probability of pivotal voting in smaller electorates. It is also worth mentioning that voters tend to overestimate the advantages of pivotal voting (Blais et al., 2000).

Municipal voter participation is a function of three types of factors that determine rational voting. These factors may affect the cost–benefit analysis as described by equation (1).

$$R = (p * B) - C$$

where R = utility, P = probability of being a pivotal elector, B = benefits of voting, C = cost of voting.

Coate et al. (2008) compare the pivotal voter model—where citizens are motivated to vote by the chance that they might swing the election—to expressive voting—where citizens vote to express their preferences, in 144 small referenda (e.g., less than 900 voters) in Texas from 1976 to 1996. When applied to larger jurisdictions, the pivotal voter model underpredicts total turnout. An expressive voting model, by contrast, is less successful at predicting turnout, although it predicts the closeness of a race equally well. Coate et al. explain this by suggesting that citizens in smaller communities have a stronger desire to express themselves, given their sense of community.

Moreover, as mentioned, according to Downs, there is a form of “rational ignorance” among voters to the extent that it may be rational for them to remain poorly informed about politics if the cost of acquiring information exceeds the expected electoral gains. This phenomenon takes on its own unique characteristic at the municipal level. A number of authors argue that municipal voters suffer from an information deficit because the quality and quantity of political information disseminated locally are lower than at the national level (Cutler and Matthews, 2005; Elmendorf and Schleicher, 2012). Less information makes the cost of acquiring local political knowledge higher than for national elections. Lassen (2005) demonstrated the positive effect of information on municipal voter turnout.

Voters can reduce the cost of acquiring information by taking cues from political parties, whose platforms comprise a summary of their preferences and modify the information context. This does not apply well to North American municipalities, however, where

political parties may not exist. Some find it inappropriate to have parties at the municipal level, arguing that local issues are not sufficiently substantial (Peterson, 1981), while others consider municipal political parties necessary to inform voters (Elmendorf and Schleicher, 2012). Overall, research on the link between voter turnout and municipal parties has produced contradictory findings (Adrian, 1959; Schaffner et al., 2001).

Another possibility is that voters reduce the cost of acquiring political information by engaging in a retrospective vote about government performance (Fiorina, 1981). The quality of a retrospective vote depends on voters' ability to attribute the results to the jurisdiction responsible for them. This would work particularly well at the municipal level, where the proximity to elected officials, especially in very small towns, can promote voters' understanding of issues (Bowler et al., 1993). In addition, it is fair to assume that most voters have made use of municipal services (Schneider et al., 1999).

Another consideration is the proportion of homeowners in a given territory, which is significantly higher in small cities than in large ones. In addition, since property taxes are billed directly to owners, ownership status is a key factor locally (Manturuk et al., 2009). Through local tax bills, homeowners have greater access to municipal information than renters. Also, since property value may be affected by local decisions, owners have a greater incentive to be informed about how their municipality is managed (Oliver et al., 2012). Property owners' greater awareness of municipal politics is also explained by the fact that municipalities are more directly responsible for housing-related issues than higher levels of government.

These findings and hypotheses are consistent with those of Oliver et al. (2012), whose study of individual-level data underscores that education and homeownership are fundamental socioeconomic determinants of municipal voting. In sum, the above elements suggest that (1) rational choice theory could partially explain voter turnout at the municipal level and (2) that this theory is especially applicable to smaller municipalities. The specificity of the municipal level, however, is not uniform and manifests in multiple ways depending on the context. The following section examines the characteristics of the municipal system in Quebec, which are relevant for this analysis.

The specificity of the municipal level: The Quebec case

As noted, most election studies have a subnational or national focus, with few examining municipal elections. This is partly due to difficulties accessing data for local elections, and a general lack of interest by researchers. In Canada specifically, studies of municipal elections remain scarce due to a lack of centralized electoral data (Kushner et al., 1997). Cutler and Mathews (2005) refer to Canadian municipal elections as the poor cousins of political science. Existing studies are generally limited to monographs that deal with a particular city or election (Kushner and Siegel, 2006; Sproule-Jones, 1974; Taylor, 2011). One exception is a recent publication by McGregor and Spicer (2014), which argues that property owners have more political information about their municipality than renters. Their findings reinforce that rational choice theory could explain, in part, municipal voter participation.

Municipal political races have specific characteristics that set them apart from other government elections. The province of Quebec in particular provides a useful case study, given that it encompasses the largest number of municipalities in Canada (1100), providing a large number of cases to examine. Of these communities, 10 have populations greater than 100,000 persons and 1065 have less than 25,000 residents.¹ The 10 largest cities represent 47.2% of the population of the province as of 2014 (MAMOT, 2015). This very large

number of small municipalities explains the difficulty of conducting investigations on electoral participation. It is also why, despite Quebec's centralization of election data since 2005,² large cities have been the focus of most municipal voter studies (Breux and Bherer, 2011).

Second, Quebec is the only province in Canada that has a law governing the formation of municipal political parties. Political parties are permitted in towns with populations greater than 5000 and are subject to rules that limit party spending. Parties may form in communities with less than 5000 persons, but are not subject to financial controls. By and large, municipal political parties in Quebec have no ideological ties to provincial and federal counterparts and are apolitical. Often they are also ephemeral, meaning that their longevity rarely exceeds the election. Similarly, distinguishing between them can be difficult because they lack real electoral platforms. So, while their presence affects the informational context, understanding their impact on voting has been challenging. Further differences exist within municipalities with populations greater than 20,000 since the territory is divided into electoral districts. Municipal councils consist of a mayor, elected at large, and councilors, elected by districts. The number of councilors depends on the size of the municipality.

Third, although municipal voter turnout in Quebec is generally higher than in other provinces (45% compared with an average of 30% in other provinces), the gap between turnout at provincial and federal levels is large—usually between 20 and 30 points. Our recent analysis of Quebec municipalities indicates that size is the most important determinant that motivates turnout (Couture et al., 2014). In fact, when looking at all Quebec municipalities, electorate size explains 36% of the variance in voter turnout. Furthermore, results show that participation is lower than average in larger cities and higher than average in small towns. These findings suggest that rational choice theory might be relevant for explaining municipal voter participation in Quebec. To evaluate this, we focus on small municipalities in Quebec as they have yet to be the focus of such analysis.

Theoretical framework: Rational choice

Equation (2) shows the various variables related to this theoretical framework.

$$\begin{aligned} \text{Turnout} = & a + b_1(\text{Number of electors}) + b_2(\text{Victory margin}) + b_3(\text{Interaction}) \\ & + b_4(\text{Two candidates}) + b_5(\text{Ownership}) + b_6(\text{Education}) + b_7(\text{Spending}) \\ & + b_8(\text{Tax}) + b_9(\text{Party}) + b_{10}(\text{Incumbent}) + b_{11}(\text{Density}) + \epsilon \end{aligned}$$

where a =constant, v_1 : number of electors = $\log(\text{number of registered electors}/100)$, v_2 : victory margin time series = $(\text{number of votes for winning candidate} - \text{number of votes for second place finisher})/\text{total number of votes}$, v_3 : interaction = $(\text{number of elector} \times \text{victory margin})$, v_4 : two candidates = Dummy variables (1 if only two mayoral candidates; 0 otherwise), v_5 : ownership = $\log(\text{total number of housing owners}/\text{total housing}) \times 100$, v_6 : education = $\log(\text{university graduates}/\text{total population})$, v_7 : spending = $\log(\text{net municipal expenditure per capita})$, v_8 : tax = $\log(\text{total municipal autonomous income}/\text{total property value})$, v_9 : party = dummy variable (1 if so; 0 otherwise), v_{10} : incumbent = dummy variable (1 if so; 0 otherwise), v_{11} : density = $\log(\text{inhabitants}/\text{km}^2)$, ϵ = errors term.

The first three assumptions are related to the probability of a vote making a difference on the election outcome. In accordance with Mulligan and Hunter's (2003) results, this probability increases as the size of the electorate decreases. It is therefore logical to assume that voter turnout will increase as electorate size shrinks. The probability of affecting the election outcome, however, may depend on the competitiveness of the race,

determined in our study by the *margin of victory*. The rational voter has greater incentive to vote when there is a close race between candidates, increasing the chances that their vote will have an impact.³ There is also a possibility of an interaction effect between these two variables.

Variable 4 refers to the hypothesis that voters benefit from electing their preferred candidate(s).⁴ The hypothesis is theoretically justified on the basis that more choice increases the likelihood that a voter can find a candidate that represents his or her preferences (Geys, 2006). In this way, a larger number of candidates increases the perceived benefits of voting and in turn leads to higher turnout. Similarly, if political parties are present, the distance between them is smaller in a two-party system since parties in this environment tend to position themselves to accommodate the median voter. Thus, in accordance with the rational voter theory, turnout should be lower when there are only two candidates, since this offers fewer benefits of voting (Blais and Carty, 1990).

Variables 5 to 11 relate to voting costs. Riker and Ordeshook's (1968) model assumes that the cost of voting is similar for all voters. However, it remains difficult to measure the cost of voting. Often these costs are seen as being strongly linked with the effort to become informed. Information about candidate positions better enable a voter to select a representative from whom he or she will derive the greatest benefit. We propose two distinguishing elements of the costs of voting. One is the informational resources available to the prospective voter, and the other is the context of the election. Election context can influence the decision-making process of the voter by simplifying the amount of information needed to vote.

Variables 5 to 7 concern the resources available to voters to become informed, or to motivate information seeking. Homeownership and education represent two key demographic characteristics of the population of each municipality.⁵ For example, according to the *homevoter hypothesis* (Fischel, 2001) and findings by McGregor and Spicer (2014: 1) "homeownership leads to increased turnout in municipal elections." Likewise, more educated voters have more resources with which to access information, making them more likely to participate.

Variables 8 to 11 concern the information context of the election. Percival et al. (2007) show that in the United States, state election issues become more critical when spending or taxes are higher. As a result, voters are more attentive to the signals sent by the candidates and are more likely to vote since they are better informed. We agree with these propositions since we consider spending and taxation to be information shortcuts (cues) that allow voters to access information through daily experience with, and exposure to, public policies. We also propose that participation is higher in municipalities where at least one political party has a candidate,⁶ since parties are tools for the dissemination and simplification of information (Chong and Druckman, 2007). Voters can also reduce the cost of acquiring political information by engaging in a retrospective vote about government performance (Fiorina, 1981). Thus, the level of information necessary to vote is lower when an incumbent is in the race, which should, in turn, encourage participation.

The final variable is an unavoidable control variable for examining electorate size. Carr and Tavares (2014) emphasize the positive role population density can have on voter participation by creating links between citizens and encouraging them to take action.

Methodology

Definitions for each variable are located in Appendix 1. Our database was constructed from three sources: databases of MAMOT on municipal elections, financial indicators of that ministry, and community profiles from Statistics Canada. The distribution of variables is

presented in Table 1. Our dependent variable is voter participation, measured by the total number of votes cast divided by the number of registered electors and expressed as a percentage. We use regression analyses to test each hypothesis focusing on mayoral races in 2009 and 2013 in Quebec municipalities. We limit our analysis to mayoral elections, given that demographic data are not available at the level of electoral districts for municipal councilors.

Table 1. Descriptive statistics.

	M	Minimum	Maximum	SD
Turnout	57.98	26.90	100.00	11.96
Population	11,956	129	1,678,837	78,712
Number of electors	9052	114	1,101,998	54,037.65
Log number of electors	3.30	2.06	6.04	0.58
Victory margin	19.21	0.00	90.88	15.85
Two candidates	0.69	0	1	–
% Ownership	79.93	14.29	100.00	79.93
Log university	1.09	–1.00	1.86	0.37
Log net spending	3.11	2.76	4.53	0.16
Log taxation	0.06	–0.43	0.77	0.15
Party	0.26	0	1	–
Incumbent	0.73	0	1	–
Log density	1.38	–1.52	3.65	0.81

Table 2. Ordinary least squares (OLS) regression analysis all Quebec municipalities.

Dependent variable Turnout (%) Expected sign in ()	(A) 2009		(B) 2013		(C) Full	
	B	(SE)	B	(SE)	B	(SE)
Constant	166.84**	(29.15)	116.16***	(22.10)	(93.19)	(7.15)
<i>Independent variables</i>						
1. Log number of electors (–)	–15.20***	(0.17)	–11.83***	(1.99)	–14.73***	(1.21)
2. Victory margin (–)	–0.15***	(0.04)	0.05	(0.07)	–0.10***	(0.03)
3. Interaction 1 × 2 (–)	2.03	(1.43)	–1.57	(1.66)	1.05	(1.02)
4. Two candidates (–)	–1.19	(0.88)	–2.36**	(0.75)	–1.89**	(0.62)
5. % Ownership (+)	–0.04	(0.05)	–0.04	(0.04)	–0.06	(0.03)
6. Log university (+)	3.69	(2.17)	–0.35	(0.92)	–0.36	(0.84)
7. Log net spending (+)	1.32	(3.18)	8.34***	(2.52)	5.30**	(1.82)
8. Log taxation (+)	14.12***	(3.05)	8.14**	(2.69)	10.99***	(2.04)
9. Party (+)	0.70	(0.95)	2.19***	(0.88)	1.54*	(0.72)
10. Incumbent (+)	0.69	(0.99)	0.47	(0.78)	0.51	(0.62)
11. Log density (+)	–0.52	(0.86)	–0.44	(0.71)	–0.82	(0.51)
(n)	(495)		(579)		(1074)	
Durbin–Watson					1.91	
Arch test L1					–0.04 ^{n.s.}	
F	33.19***		38.23***		77.34***	
R ²	0.44		0.47		0.45	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

The data include information about 1074 mayoral elections in 2009 and 2013 in 1100 Quebec municipalities. The gap between the number of elections and the number of municipalities is because some seats were won by acclamation, a fairly common phenomenon in small municipalities. About 50% of mayors were elected without opposition in 2009 and 47% in 2013. Our study focuses on the 495 elections in 2009 and 579 elections in 2013, which took place in 739 municipalities. Of these communities, 337 had elections in both 2009 and 2013.

Descriptive statistics

Table 1 presents descriptive statistics of the data. This shows significant variation among variables and presents support for the pivotal voter hypothesis, especially in very small municipalities. In two instances where municipalities had a tied result for mayoral elections, there is a victory margin of 0%.⁷ In addition, 35 elections had a victory margin of less than 1%. Of these, three races were decided by a one-vote margin⁸ and four by margins of less than two votes.⁹ Overall, these results support the probability of voters being pivotal in small electorates.

Voter turnout also varies considerably, ranging between 26.90% and 100.00%,¹⁰ a mean of 57.98% and a standard deviation of 11.96%. Turnout was less than 50% in 26.6% of elections and above 70% in 15.1%. Finally, there is variation among sociodemographic indicators such as population density, homeownership, and university education, while public spending and tax rates vary greatly between municipalities.

Table 3. Ordinary least squares (OLS) regression analysis of four population categories.

Dependent variable:	(D) 0–999		(E) 1000–5000		(F) 5000–20,000		(G) + 20,000	
	B	SE	B	SE	B	SE	B	SE
<i>Expected sign in ()</i>								
Constant	124.07***	(14.28)	115.94***	(13.02)	78.12***	(22.68)	40.94	(21.76)
<i>Independent variables</i>								
1. Log number of electors (–)	–26.73***	(3.64)	–19.00***	(2.67)	–11.55**	(4.33)	–5.70	(3.12)
2. Victory margin (–)	–0.04	(0.07)	–0.15***	(0.04)	–0.14	(0.07)	–0.05	(0.06)
3. Interaction 1 X 2 (–)	–.10	(2.25)	1.94	(1.36)	1.08	(2.44)	–0.81	(2.19)
4. Two candidates (–)	–2.99*	(1.30)	–1.16	(0.89)	–0.72	(1.24)	–5.04***	(1.49)
5. % Ownership (+)	0.04	(0.06)	–0.081	(0.06)	–0.02	(0.06)	0.03	(0.06)
6. Log university (+)	–0.93	(1.15)	1.26	(1.71)	0.60	(2.85)	3.38	(2.17)
7. Log net spending (+)	2.99	(3.01)	2.07	(2.97)	4.71	(5.70)	9.15	(6.63)
8. Log taxation (+)	9.18**	(3.28)	9.50**	(3.15)	25.75***	(5.71)	24.15**	(8.69)
9. Party (+)	6.13**	(1.94)	1.02	(0.98)	2.21	(1.37)	1.86	(1.56)
10. Incumbent (+)	3.29**	(1.19)	0.04	(0.88)	–0.68	(1.44)	0.87	(1.53)
11. Log density (+)	5.03***	(1.11)	–2.46**	(0.85)	–2.02*	(0.94)	–0.11	(1.16)
(n)	(319)		(497)		(172)		(86)	
Durbin–Watson	1.97		1.91		2.10		1.98	
Arch test LI	–0.06 ^{n.s.}		–0.04 ^{n.s.}		–0.05 ^{n.s.}		0.03 ^{n.s.}	
F	11.46***		9.78***		4.10***		4.52***	
R ²	0.29		0.18		0.22		0.40	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Regression design

Our research design consists of a time-series cross section, since our data contain a cross section and longitudinal section. We are interested in voter turnout for mayoral elections in Quebec municipalities (Panel=739 municipalities) for the 2009 and 2013 elections (Time=two election years). This design requires us to be mindful of autocorrelation and heteroscedasticity of our error terms, which would impact the efficiency of our ordinary least square (OLS) estimates. We use Durbin–Watson and Arch tests to test for this, which show no autocorrelation or heteroscedasticity is present. Our analysis is divided into seven OLS models. The first model (A) evaluates only the 2009 election; the second model (B) focuses on the 2013 election; and the third model (C) offers a combined analysis of both elections. Models D–G present the results for four groups of municipalities, Table 3. Specifically, model D applies to towns with less than 1000 inhabitants; model E to towns with populations between 1000 and 5000; model F to cities with 5000 to 20,000 inhabitants; and model G to those with populations greater than 20,000.

Results

Table 2 presents the three regression models for all municipalities ($N=1074$). The first two models (A and B) include results of each election, while model C presents the combined

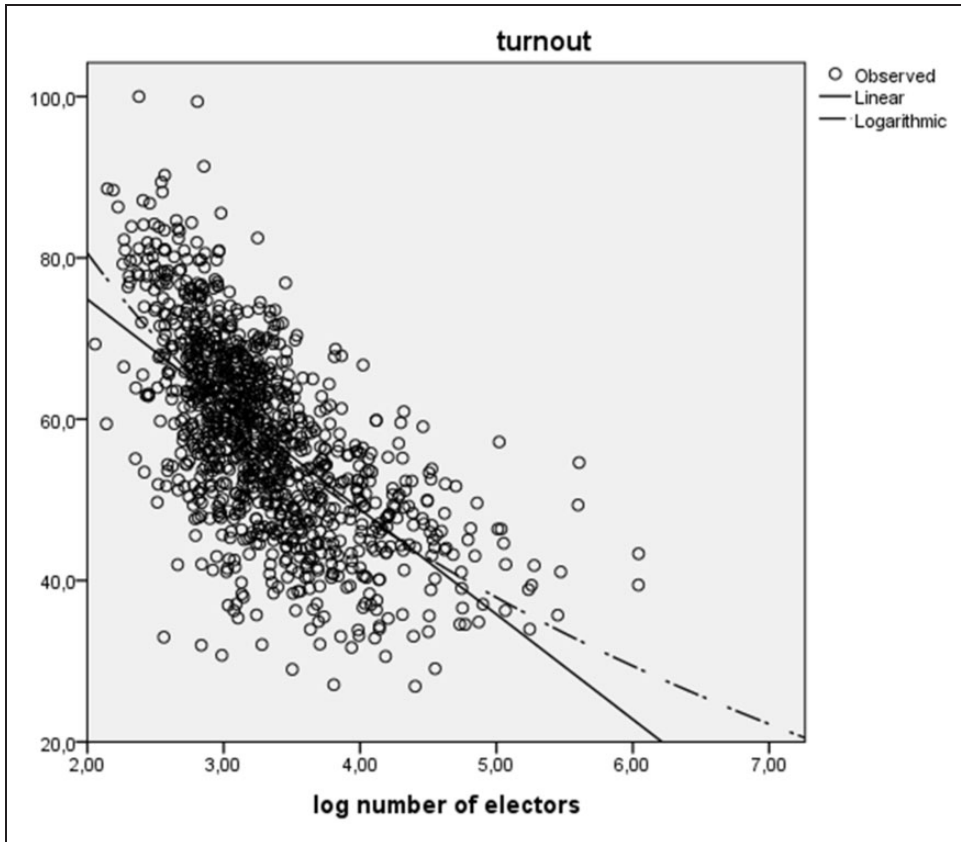


Figure 1. Turnout and number of electors (expressed logarithmically) in all Quebec municipalities.

results of both elections. We focus here on the latter model and only mention differences in the results of models A and B. Using R -squared, model C predicts 45% of the variance in voter turnout based on independent variables ($R^2=0.45$; $F=77.34$; sig: $p < 0.001$). This level of explanation does not appear to be very high. However, 6 out of 11 variables are statistically significant and offer support for some of our hypotheses.

First, the two variables that theoretically affect the probability of a voter being a pivotal voter (lines 1 to 3) are statistically significant in model C. Electorate size, expressed logarithmically, is negatively associated with voter turnout ($b=-14.73$; beta = -0.72 ; sig: $p < 0.001$). This relationship is consistent with our hypothesis that voter turnout decreases as electorate size increases. Specifically, an increase of one standard deviation in the number of voters reduces voter turnout by 0.72 standard deviations. This is the most important variable in the model. Victory margin is also negatively associated with electoral participation ($b=-0.10$; beta = -0.13 ; sig: $p < 0.001$), indicating that voter turnout is lower in instances where there is a larger difference in votes cast for the winning candidate and second-place finisher. Specifically, an increase of one percentage point in the victory margin reduces voter turnout by 0.10 percentage points. This relationship is statistically significant

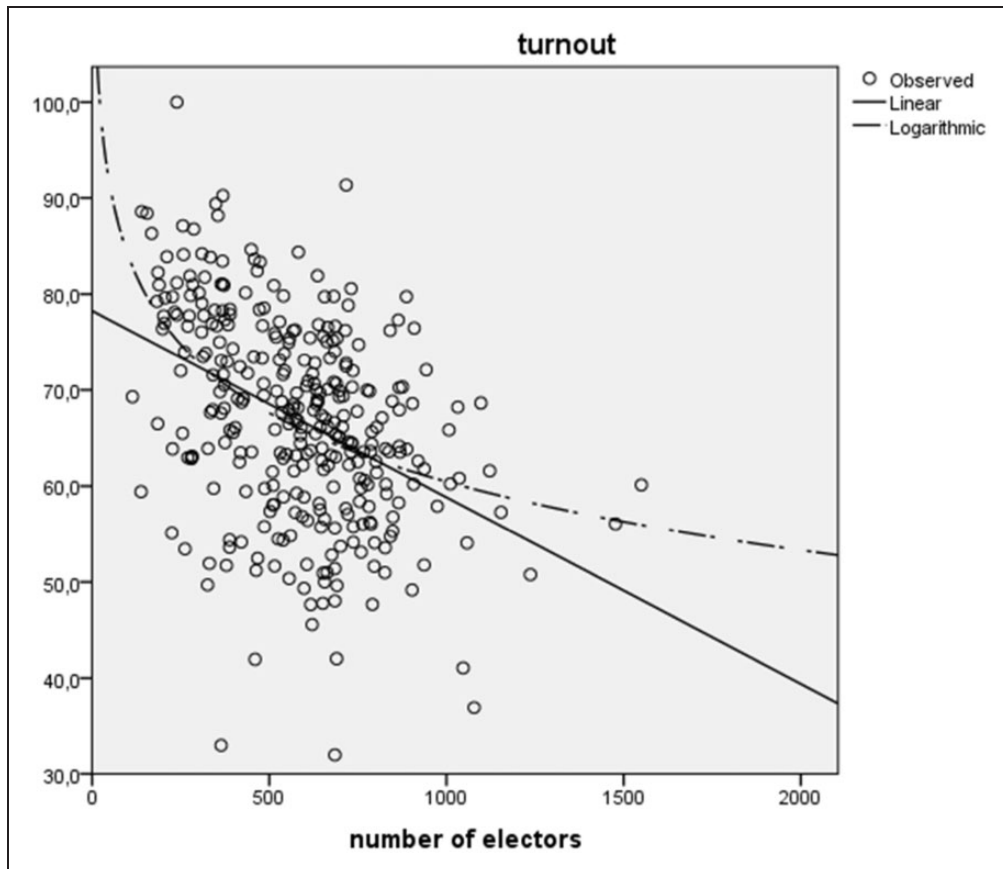


Figure 2. Turnout and number of electors in municipalities with less than 1000 inhabitants. Note: For some cities, the number of voters is higher than the number of residents since non-residents have the right to vote because they are property owners.

for 2009 but not for 2013. Moreover, there is no interaction effect between electorate size and victory margin in any models.

The presence of two candidates is the only variable linked to the benefits of the vote (line 4). This dummy variable must be interpreted in relation to cases where there are more candidates. The results show that the presence of only two candidates reduces voter turnout by 1.80 percentage points ($b = -1.89$; -0.0 beta; sig: $p < 0.01$). This relationship is statistically significant for 2013 but not for 2009.

Of the variables associated with information resources (lines 5 and 6), none is associated with electoral participation. Homeownership (expressed as a percentage) and the proportion of university graduates (expressed logarithmically) are not statistically significant in model C and are not associated with electoral participation in other models.

Three of the four variables associated with information shortcuts (cues) (lines 7 to 10), are statistically significant. One is the overall rate of taxation (expressed logarithmically), which is positively associated with voter turnout ($b = 10.99$; beta = 0.13; sig: $p < 0.001$). Therefore, the higher the tax rate in a given community, the greater voter participation. This result is consistent with our expectations, since taxation is related to daily experience with, and exposure to, public policies, which is an informational cue for voters. We observe a similar

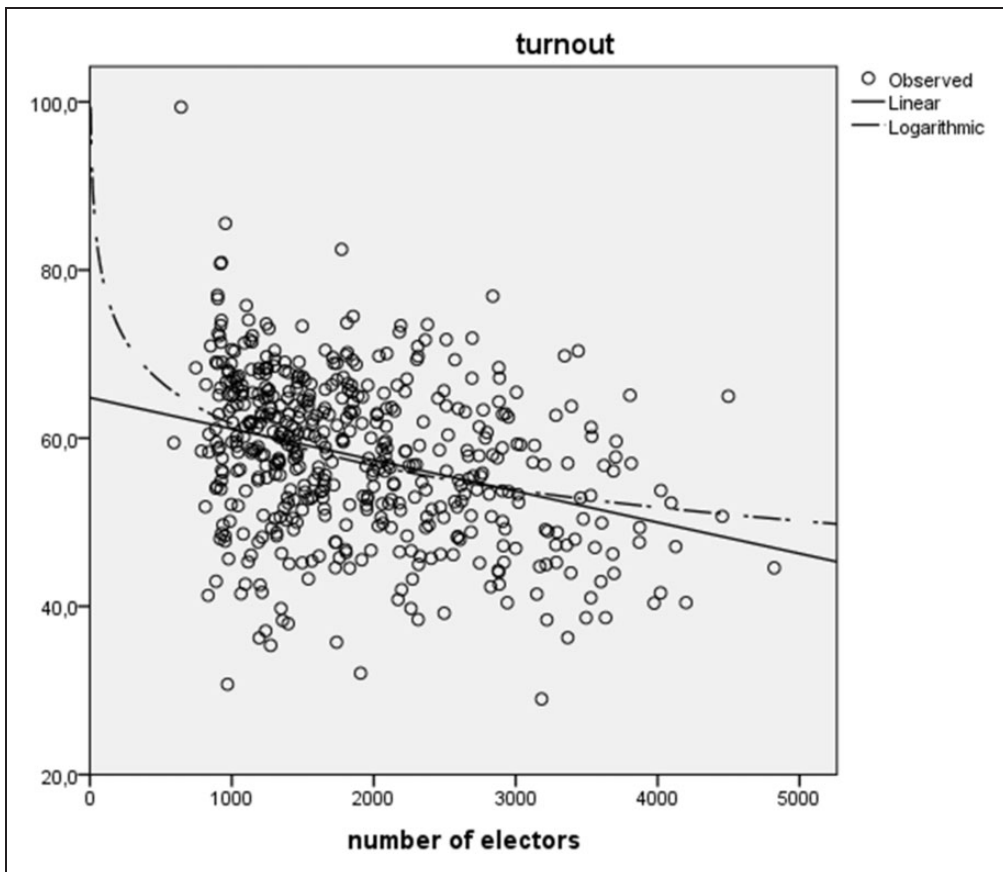


Figure 3. Turnout and number of electors in municipalities with 1000 to 5000 inhabitants.

relationship for net expenditure per capita (expressed logarithmically) ($b = 5.30$, $\beta = 0.07$; sig: $p < 0.01$), indicating that the higher public spending, the higher voter participation. The latter relationship is significant only for the 2013 election. The other significant variable is the presence of at least one political party; however, these groups have no links to party organizations at other levels of government. This variable is positively related to electoral participation ($b = 1.43$; $\beta = 0.06$; sig: $p < 0.05$). Specifically, voter turnout was 1.54% higher when a political party participated in the election. This finding is consistent with our hypothesis, since political parties are information dissemination tools that facilitate voting. Finally, the presence of an incumbent is not statistically related to electoral participation in the three models. Population density (logarithmically expressed) is also not associated with voter turnout.

Finally, visible distinctions between the 2009 and 2013 elections can be explained by three differences in the samples. One, there were more elections in 2013. Second, there are differences with regard to the victory margin since results were significantly closer in 2013 (average victory margin of 14% compared to 25% in 2009). Third, there were more parties in 2013 than in 2009 (151 compared to 130).

Table 3 presents the regression models for four different groups of municipalities. Model D applies to towns with fewer than 1000 inhabitants since previous research has

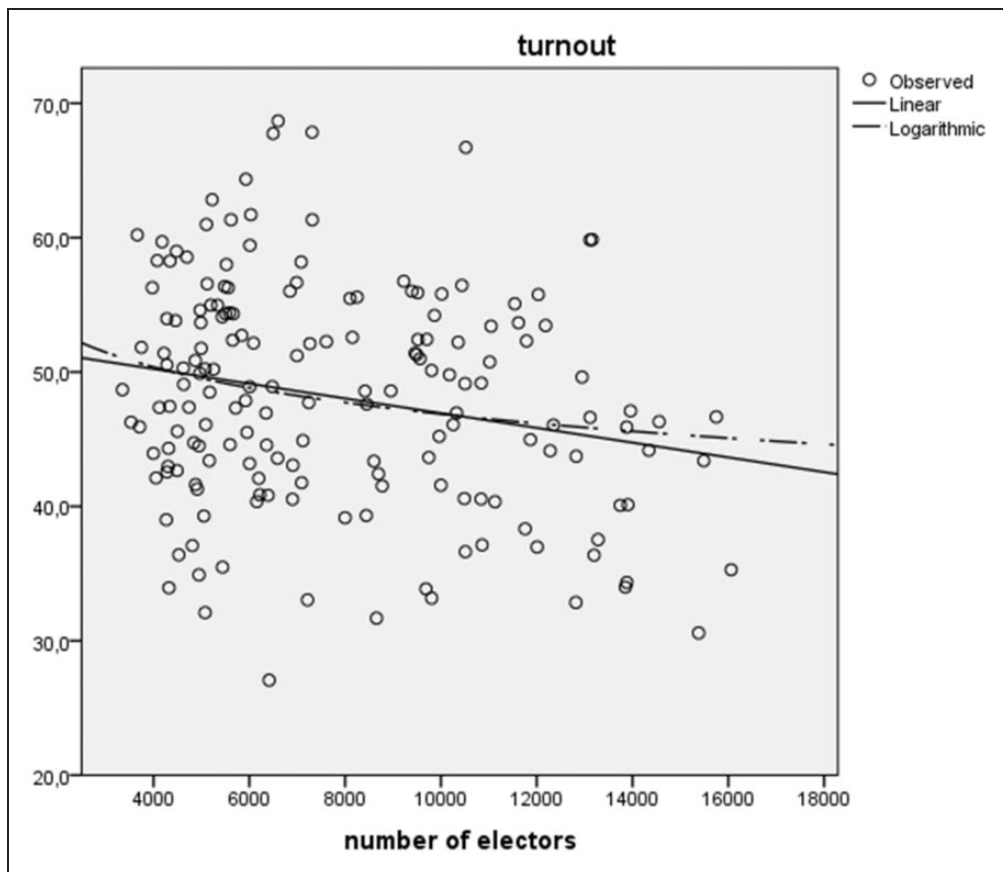


Figure 4. Turnout and number of electors in municipalities with 5000 to 20,000 inhabitants.

shown the opportunity to be a pivotal voter exists in small electorates (Coate et al., 2008). Model E applies to towns with populations between 1000 and 5000, and model F between 5000 to 20,000. The threshold of 5000 was set because campaign-spending regulations are less stringent for municipalities with less than 5000 inhabitants. Finally, model G applies to cities with populations greater than 20,000 to examine municipalities divided into electoral districts. Results show that the assumptions drawn from the rational voter theory are useful in explaining voter turnout in all population categories, notably in municipalities with fewer than 1000 inhabitants.

In model D variables such as the number of electors, presence of two mayoral candidates, tax rate, presence of a political party, and incumbency are statistically significant. An increase in number of electors (expressed logarithmically) results in a decrease in voter turnout ($b = -26.73$; sig: $p < 0.001$). Furthermore, the presence of an incumbent has a 3.29 point increase on turnout. Moreover, a race between only two candidates decreases participation by 2.99 percentage points. An increase in the tax rate is also linked to an increase in participation ($b = 9.18$; sig: $p < 0.001$). Finally, the presence of a political party increases voter turnout by 6.13 percentage points, a relationship not found in other population categories. However, the margin of victory is not statistically significant in towns with less than 1000 inhabitants.

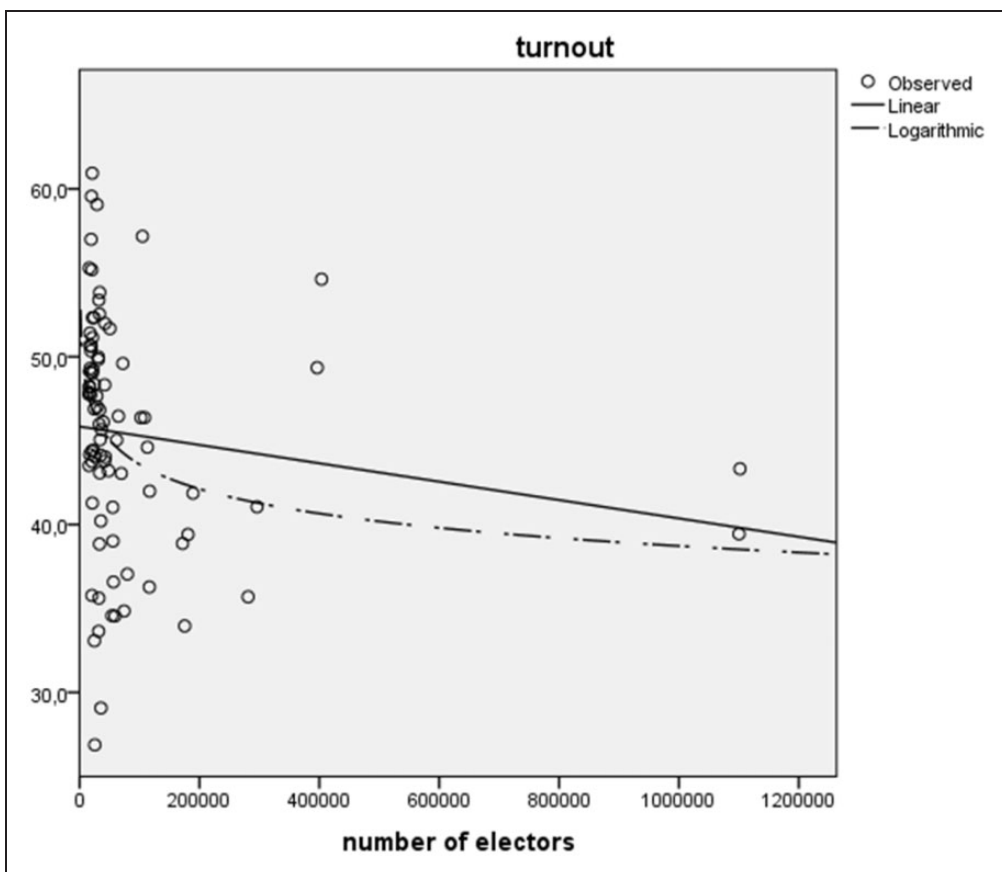


Figure 5. Turnout and number of electors in municipalities with more than 20,000 inhabitants.

In model E, the number of electors (expressed logarithmically) ($b = -18.97$; sig: $p < 0.001$) and the margin of victory are both statistically significant. These results support the two assumptions about pivotal voting in towns with 1000 to 5000 inhabitants. A similar result is found for electors in the 5000 to 20,000 category in model F, but the effect is smaller ($b = -11.63$; sig: $p < 0.05$). Victory margin is not significant in model F. Taxation is positively related and significant in all models (D–F). Finally, in line with our hypothesis, population density has a positive effect on voter turnout in very small municipalities ($b = 5.03$; sig: $p < 0.01$), while it tends to have a negative effect in models E ($b = -2.46$; sig: 0.01) and F ($b = -2.02$; sig: 0.05).

Model G presents results for cities with more than 20,000 inhabitants. Rational choice hypotheses are less relevant for explaining voter turnout in major cities. Indeed, electorate size and victory margin are not linked with voter participation. Only the presence of only two candidates ($b = -5.04$; sig: 0.001) and taxation ($b = -24.15$; sig: 0.01) are statistically significant.

Finally, the fact that regression coefficients are larger for small municipalities and decrease gradually between size category raises questions about whether the relationship between electorate size and voter turnout is linear or logarithmic. The scatterplot in Figure 1 shows that electorate size expressed logarithmically allows to linearize the relationship with voter turnout. However, Figures 2 through 5 show that within each size category, an adjustment based on logarithmic function is not more effective than an adjustment made from a simple regression line to explain voter turnout with electorate size. These results suggest that a different explanatory dynamic is present within these size categories. In sum, the hypotheses derived from the rational voter theory are better applied to very small municipalities, where the probability of being a pivotal voter is higher.

Discussion and conclusion

The analysis presented here shows that our model explains 45% of the voter turnout in the 2009 and 2013 Quebec municipal elections and offers support that the rational choice voter model is relevant in explaining voter participation municipally. Several factors support that assertion. First, the effect of electorate size on voter turnout is significant, confirming our previous work on Quebec municipalities (Couture et al., 2014). This size effect is consistent with the findings of Oliver et al. (2012) and Gaardsted Frandsen (2002), which show that participation declines as municipal electorate size increases. Similar to Caren (2007), our results show that the size effect diminishes in larger municipalities. They are noticeable between the very small (0–999) and small (1000–5000) municipalities and larger ones.

In the case of very small municipalities (0–999), our analysis supports the assumption that a voter's decision to go to the poll depends on a rational expectation, similar to the "pivotal voter," which is supported by the fact that the victory margin variable is significant. It also provides support for research that has sought a more nuanced understanding of the effect of size on voter turnout. Significance of population density in our sample, for example, supports Tavares and Carr's (2013) findings that population density may create more links (or even social pressure) between voters and encourage voting. This relationship does not hold, however, for the other categories of municipalities.

Second, our results show that the presence of political parties in small towns is significant. This finding runs counter to our previous work, which determined that the presence of political parties had no impact on voter turnout in Quebec municipalities (Couture et al., 2014) and that in the 10 largest cities there was a negative effect on voter turnout

(Breux et al., 2014). This suggests that local political parties could change election outcomes in small municipalities. How might this be explained?

One explanation may have to do with context. There were some specific trends in larger municipalities in the 2009 Quebec elections such as (1) strong apoliticism, (2) reluctance to integrate political parties in some big cities; (3) acclamations; and (4) a trend toward the personalization of power (Bherer and Breux, 2012). These contextual elements invite us to consider the specificity of the municipal scene, specifically that small and large municipalities are not alike. One could assume that in small municipalities (<1000) the presence of political parties might encourage electoral politicization and positively affect voter turnout. In this sense, our analysis lends support to the idea that the category of “small municipalities” is far from uniform and that the findings about them are not generalizable to the entire category.

Next, homeownership does not seem to determine electoral participation. This is somewhat surprising since it is often argued that the municipal voter is a homeowner, educated, and affluent (Oliver et al., 2012). The rate of ownership varies greatly in our sample (from 14% to 100% depending on the municipality). In their analysis of suburban municipalities, Oliver and Ha (2007) suggest that differences between homeowners and renters “seem to be subsumed by other individual-level factors such as candidate issue positions or subjective evaluations of candidates” (2007: 403). This may be especially true for small municipalities in Quebec, where local politics is relatively lively and varied. The effect of variables such as taxes, spending, and the presence of political parties illustrate this.

Finally, taxes and expenditures are positively correlated with voter turnout. Greater tax rates and higher spending per capita encourage people to vote, but these variables do not act jointly because they are negatively correlated with each other. Some voters may be inclined to vote municipally because of fiscal pressures or spending, while others may cast a ballot based on tax rates and government allocation of tax dollars. Together, these findings show that rational choice theory helps explain, in part, electoral behavior in Quebec municipalities. However, if rational choice theory explains 45% of the voter turnout, how might we explain the remaining 55%?

Of the possible explanations found in the literature, most highlight the characteristics of the community. Many emphasize that contact between candidates and residents is more prevalent in small municipalities, which are generally rural, than in cities. With respect to Canada, Lightbody explains that many small communities have established lines of communication with public officials, familiar political patterns, and “information about civic affairs is only a coffee cup away” (2006: 199). He argues that in the smallest Ontario communities, voting can become a communal social activity, pointing to a strong inverse relationship between turnout and community size.

Social capital theory is also useful for explaining these differences, given its emphasis on feelings of community belonging, civic duty, social capital, social networks, and an interest in public affairs as having a role in voter turnout, especially municipally (Nakhaie, 2006). However, other research calls into question the role of social capital, particularly as it relates to population concentration. In a meta-analysis of voter turnout, Smets and van Ham show that the hypothesis that citizens in rural areas turnout at higher rates because of stronger associational ties “may be outdated as almost all tests and studies find insignificant effects” (2007: 13). Similarly, drawing on sociological arguments that politics is more personal in low-density areas, and that there is less social pressure to participate in densely populated areas that are more individualistic, Geys finds a weak relationship between population concentration and voter turnout. Therefore, claims of greater interpersonal contact in small municipalities, and their impact on voting, should be taken with caution. This application is relevant here, given that within very small

municipalities in our sample, the presence of political parties is significant, which points to a certain degree of local politicization. To the extent that the presence of parties is not significant in the other size categories of municipalities, and that the relationship between density and turnout is inverse in those categories, this observation highlights the very specific situation of small municipalities in Quebec and the difficulty of understanding the impact of social capital on voter turnout.

Overall, our findings underscore the need to continue examinations of municipal politics and elections, especially in places with small electorates where a lower number of voters may increase the electoral stakes.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Fonds Québécois de la recherche Société Culture.

Notes

1. Seven hundred and eighteen have populations fewer than 2000.
2. Centralization of municipal data is unique to Quebec.
3. The relationship between a small margin of victory and increased turnout can translate into greater political mobilization during close elections (Cox and Munger, 1989).
4. The opposite hypothesis—that a greater number of candidates could create confusion among voters and decrease voter turnout—could also be made.
5. We approach the interpretation of these variables with caution to avoid an ecological fallacy (King, 1997).
6. The opposite hypothesis—that a greater number of political parties could create confusion among voters, increase information costs, and therefore decrease voter turnout—could also be made.
7. One was Saint-Herménégilde in 2013, where the two candidates each obtained 184 votes; and the other was Saint-Bruno-de-Guigues, also in 2013, where the two candidates each obtained 239 votes.
8. Sainte-Euphémie-sur Rivière-du-Sud in 2013 and Sainte-Félicité in 2013 and Blanc Sablon in 2009.
9. Rivière-Saint-Jean in 2013, and New Carlisle, Henryville and Sainte-Angèle-de-Prémont in 2009.
10. The 100% voter turnout refers to the town of Godbout in 2009, where all of the 239 registered voters voted. We also identified a voter turnout of 99.38% in the town of Bristol in 2009, where only 4 of the 642 voters did not go to the polls.

References

- Adrian CR (1959) A typology for nonpartisan elections. *Political Research Quarterly* 12(2): 449–458. DOI: 10.1177/106591295901200206.
- Bherer L and Breux S (2012) L'apolitisme municipal. *Bulletin d'Histoire politique* 21(1): 170–184.
- Blais A and Carty RK (1990) Does proportional representation foster voter turnout? *European Journal of Political Research* 18(2): 167–181.
- Blais A, Young R and Lapp M (2000) The calculus of voting: An empirical test. *European Journal of Political Research* 37: 181–201.
- Blondiaux L (1996) Mort et résurrection de l'électeur rationnel. Les métamorphoses d'une problématique incertaine. *Revue française de science politique* 46(5): 753–791.

- Bowler S, Donovan T and Snipp J (1993) Local sources of information and voter choice in state elections microlevel foundations of the 'friends and neighbors' effect. *American Politics Research* 21(4): 473–489.
- Breux S and Bherer L (2011) *Les élections municipales au Québec: enjeux et perspectives*. Quebec: Presses de l'Université Laval.
- Breux S, Couture J and Bherer L (2014) *Les candidats sortants: atout ou obstacle à la participation électorale?* *Canadian Journal of Urban Research/Revue canadienne de recherche urbaine* 23(2): 59–78.
- Cancela J and Geys B (2016) Explaining voter turnout: A meta-analysis of national and subnational elections. *Electoral Studies* 42: 264–275.
- Caren N (2007) Big city. Big turnout? Electoral participation in American Cities. *Journal of Urban Affairs* 29(1): 31–46.
- Carr JB and Tavares A (2014) City size and political participation in local government reassessing the contingent effects of residential location decisions with urban regions. *Urban Affairs Review* 50: 269–302.
- Chong D and Druckman J (2007) Framing public opinion in competitive democracies. *American Journal of Political Science Review* 101(4): 637–655.
- Coate S, Conlin M and Moro A (2008) The performance of pivotal-voter models in small-scale elections: Evidence from Texas liquor referenda. *Journal of Public Economics* 92(3–4): 582–596.
- Cox GW and Munger MC (1989) Closeness, expenditures and turnout in the 1982 U.S. House elections. *American Political Science Review* 83(1): 217–231.
- Couture J, Breux S and Bherer L (2014) Analyse écologique des déterminants de la participation électorale municipale au Québec. *Canadian Journal of Political Science/Revue canadienne de science politique* 47(04): 787–812.
- Cutler F and Matthews J (2005) The challenge of municipal voting: Vancouver 2002. *Canadian Journal of Political Science* 38(2): 359–382.
- Dahl RA and Tufte ER (1973) *Size and Democracy*. Stanford, CA: Stanford University Press.
- Downs A (1957) *An Economic Theory of Democracy*. New York: Harper and Row.
- Elmendorf C and Schleicher D (2012) Informing consent: Voter ignorance. Political parties and election law. *UC Davis Legal Studies Research Paper* 285: 1–70.
- Electoral Database from MAMOT (2009 and 2013) This database is partially. Available at <http://www.mamrot.gouv.qc.ca/organisation-municipale/democratie-municipale/archives-des-resultats-des-elections-municipales/> (accessed 19 October 2016).
- Fiorina MP (1981) *Retrospective Voting in American National Elections*. New Haven: Yale University Press.
- Fischel WA (2001) *The Homevoter Hypothesis: How Home Values Influence Local Government Taxation, School Finance, and Land-Use Policies*. Cambridge: Harvard University Press.
- Gaardsted Frandsen A (2002) Size and electoral participation in local elections. *Environment and Planning C: Government and Policy* 20: 853–869.
- Geys B (2006) Explaining voter turnout: A review of aggregate-level research. *Electoral Studies* 25: 637–663.
- Goldsmith M and Rose L (2002) Size and democracy. *Environment and Planning C: Government and Policy* 20: 791–792.
- Key VO (1966) *The Responsible Electorate*. Cambridge: Harvard University Press.
- King G (1997) *A Solution to the Ecological Inference Problem: Reconstructing Individual Behavior from Aggregate Data*. Princeton: Princeton University Press.
- Kushner J and Siegel D (2006) Why do municipal electors vote? *Canadian Journal of Urban Research* 15(2): 264–277.
- Kushner J, Siegel D and Stanwick H (1997) Ontario municipal elections: Voting trends and determinants of electoral success in a Canadian Province. *Canadian Journal of Political Science* 30(3): 539–553.
- Lassen DD (2005) The effect of information on voter turnout: Evidence from a natural experiment. *American Journal of Political Science* 49(1): 103–118.

- Lightbody J (2006) *City Politics*. Toronto: University of Toronto Press.
- MAMOT (2013) Archives des résultats des élections municipales. Available at: <http://www.mamrot.gouv.qc.ca/organisation-municipale/democratie-municipale/archives-des-resultats-des-elections-municipales/elections-municipales-2013/resultats-des-elections-pour-les-postes-de-maire-et-de-conseiller/> (accessed 19 October 2016).
- MAMOT (2015) L'organisation municipale au Québec en 2015. Available at: http://www.mamrot.gouv.qc.ca/pub/organisation_municipale/organisation_territoriale/organisation_municipale_2015.pdf (accessed 19 October 2016).
- Manturuk K, Lindblad M and Quercia RG (2009) Homeownership and local voting in disadvantaged urban neighborhoods. *Cityscape* 11(3): 213–230.
- McGregor M and Spicer Z (2014) The Canadian homeowner: Property values and municipal politics in Canada. *Journal of Urban Affairs* 38(1): 123–139.
- Mulligan CB and Hunter CG (2003) The empirical frequency of a pivotal vote. *Public Choice* 116: 31–54.
- Nakhaie MR (2006) Electoral participation in municipal, provincial and federal elections in Canada. *Canadian Journal of Political Science* 39(2): 363.
- Nie NH, Verba S and Petrocik JR (1979) *The Changing American Voter*. Cambridge: Harvard University Press.
- Oliver JE, Ha SE and Callen Z (2012) *Local Elections and the Politics of Small Scale Democracy*. Princeton and Oxford: Princeton University Press.
- Oliver JE and Ha SE (2007) Vote choice in suburban elections. *American Political Science Review* 101(3): 393–408. DOI: 10.1017/S0003055407070323.
- Palfrey TR and Rosenthal H (1985) Voter participation and strategic uncertainty. *The American Political Science Review* 79(1): 62–78.
- Percival GL, Percival MC, Bowler S, et al. (2007) Taxing, spending, and voting: Voter turnout rates in statewide elections in comparative perspective. *State & Local Government Review* 39(3): 131–143.
- Peterson PE (1981) *City Limits*. Chicago, London: University of Chicago Press.
- Riker WH and Ordeshook PC (1968) A theory of the calculus of voting. *The American Political Science Review* 62(1): 25–42.
- Schaffner BF, Streb M and Wright G (2001) Teams without uniforms: The nonpartisan ballot in state and local elections. *Political Research Quarterly* 54(1): 7–30. DOI: 10.1177/106591290105400101.
- Schneider M, Marchall M and Roch A (1999) Heuristics, low information rationality, and choosing public goods broken windows as shortcuts to information about school performance. *Urban Affairs Review* 34(5): 729–741.
- Smets K and van Ham C (2007) The embarrassment of riches? A meta-analysis of individual-level research on voter turnout. *Electoral Studies* 32(2): 344–359.
- Sproule-Jones M (1974) A description and explanation of citizen participation in a Canadian municipality. *Public Choice* 17(1): 73–83.
- Tavares A and Carr J (2013) So close, yet so far away? The effects of city size, density and growth on local civic participation. *Journal of Urban Affairs* 35(3): 283–302.
- Taylor Z (2011) Who elected Rob Ford, and why? An ecological analysis of the 2010 Toronto election. Paper presented at the Canadian Political Science Association, Waterloo, May 11.
- Trounstine J (2009) *Information, Turnout and Incumbency in Local Elections*. Princeton: Princeton University.
- Wooldridge JM (2002) *Econometric Analysis of Cross Section and Panel Data*. Cambridge: MIT Press.

Sandra Breux, is an associate professor at the Centre Culture Urbanisation Société of the INRS (Institut national de la recherche scientifique). Over the years she has developed a research area on the Canadian municipal level. Her research interests focus on municipal representative democracy and the role of territory on individual behaviour.

Jérôme Couture, has a PhD in political science and is presently a postdoctoral fellow at the INRS (Institut national de la recherche scientifique). His thesis is about the link between public finance and municipal elections in Quebec. He is also a specialist in quantitative methods, which he has been teaching since 2010 at Université Laval.

Nicole Goodman, is director at the Centre for e-democracy with a concurrent appointment in the Innovation Policy Lab at the Munk School of Global Affairs (University of Toronto). Her work focuses on political participation, in particular the impact of digital technology on elections.

Appendix I

Table 4. Operationalization and data sources.

Variables	Operationalization	Source
Turnout	$(\text{Valid votes}/\text{registered electors}) \times 100$	Electoral Results MAMOT (2009/2013)
Party	1 = presence of at least one party 0 = otherwise	
Two candidates	1 = two mayoral candidates 0 = more than two mayoral candidates	
Victory margin	$(\text{Votes for the winner} - \text{votes for the second place finisher}) / \text{Valid votes} \times 100$	
Incumbent	1 = presence of a mayoral incumbent 0 = otherwise	
No. of electors	Number of registered electors	Financial profile MAMOT (2009/2013)
Log spending	Log (net spending/population)	
Log taxation	Log ([independent municipal income/property value] $\times 100$)	
Log density	Log (population/km ²)	Community profile 2006
% Ownership	$(\text{Owned housing}/\text{total housing}) \times 100$	
% University	$(\text{University degree}/\text{population}) \times 100$	Statistics Canada