

Homo Oeconomicus 25(1): 91–106 • (2008)



www.accedoverlag.de

## Who Votes for Ecologist Parties? Evidence from Suburban France

Yves Egal

Orbanis, Urban Ecology Consulting, Puteaux, France  
(eMail: yegal@club-internet.fr)

Raphaël Franck

Department of Economics, Bar Ilan University, Ramat Gan, Israel  
(eMail: franckr@mail.biu.ac.il)

Nicolay Gertchev

Institut de Recherche en Géostratégie Economique Internationale, Université Paris-II  
Pantheon-Assas, France  
(eMail: nikolay.gertchev@ec.europea.eu)

Bruno Jérôme

Institut de Recherche en Géostratégie Economique Internationale, Université Paris-II  
Pantheon-Assas, and Université de Metz, France  
(eMail: bruno.jerome@libertysurf.fr)

Bertrand Lemennicier

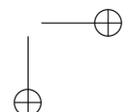
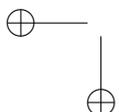
Institut de Recherche en Géostratégie Economique Internationale, Université Paris-II  
Pantheon-Assas, France  
(eMail: bertrand.lemennicier@gmail.com)

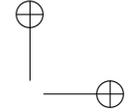
Nicolas Vaillant

Faculté Libre de Sciences Economiques et de Gestion, Université Catholique de Lille,  
France  
(eMail: nvaillant@icl-lille.fr)

**Abstract** This paper analyzes the determinants of the votes for the French ecologist party, whose political platform promotes the protection of the environment and left-

© 2008 Accedo Verlagsgesellschaft, München.  
ISBN 978-3-89265-067-6 ISSN 0000-0000





wing economic policies. We examine its electoral results in the March 2001 mayoral and April 2002 presidential elections in the Hauts-de-Seine department, located in the suburbs of Paris. In particular, we show how city-specific characteristics around each polling station influenced the voters' choice. Voters living in non-affluent neighborhoods used the ecologist vote in an opportunistic manner to send a signal to the incumbent mayors for an improvement in the quality of urban amenities.

*Keywords* ecologist parties, vote function

## 1. Introduction

Many studies have analyzed the political economy of environmental policies, e.g. Aidt (1998), Joskow and Schmalensee (1998), Hahn (1990), Kirchgässner and Schneider (2003). Much research has also been done on vote-popularity functions to explain how economic and political circumstances influence elections as can be seen in the surveys of Nannestad and Paldam (1994) and Lewis-Beck and Paldam (2000).

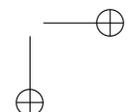
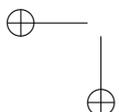
However there has not been, to the best of our knowledge, an analysis of the determinants of the votes for the ecologist parties, which have placed environmental policies and the protection of the environment at the core of their platform. However, in the past twenty years, left-wing ecologist parties have come up as forces to be reckoned with in European politics. In France, Germany and Sweden, they formed alliances and coalitions with the older and far more established social-democrat parties. Ecologist leaders became government ministers. In this study, we will focus on the determinants of the votes for the French ecologist left-wing party, known as the Greens.

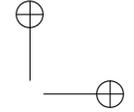
So far, research on vote-popularity functions in France has focused its efforts on understanding the determinants of the votes for the more traditional and well-established left- and right-wing parties. Studies that highlight the significant impact of economics on the vote in French national elections include Lewis-Beck (1995, 1997) and Jérôme et al. (1999, 2003). At the local level, researches on vote functions aim at explaining why an agent, whose preferences remain a priori unchanged, modifies his vote from an election to another. Jérôme and Jérôme-Speziari (2002) notably analyze the evolving behavior of French voters at the 1989, 1995 and 2001 mayoral elections.

The Greens are the result of numerous conflicts between party members and leaders in the ecologist movement: there are in France ecologist parties that are distant allies of the mainstream right-wing parties.<sup>1</sup> The Greens have

---

<sup>1</sup> Throughout this study, we always refer to the French ecologist left-wing party as the Greens, with a capital 'G'. This is done in order to avoid confusions with other ecologist parties, as well as with areas that are green without a capital 'G', i.e. areas that have a lot of greenery.





no less than eight factions, as documented by Abonneau and Ysmal (2002). If these groups tend to agree on many issues, they often differ on the strategy to achieve their goals. Some favor the entry of the party in the government, a feature which is compatible with stylized facts on vote functions. Others prefer grassroots activism that relies on local associations. Thus, depending on local circumstances, Green candidates may run on a list of their own instead of building an alliance with the other left-wing parties like Green leaders did at the national level.

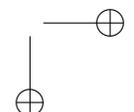
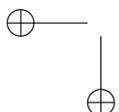
In this paper, we focus on the electoral results of the French left-wing ecologist party, in the first rounds of the March 2001 mayoral elections and the April 2002 presidential election in the Hauts-de-Seine department, located in the suburbs of Paris.<sup>2</sup> This allows us to examine how voters may use elections and political coercion to modify the local environment to their preferences. Indeed, even if the ecologists do not win the elections, they may have a few representatives in city halls who may eventually influence the redistribution of local taxes and improve urban amenities.

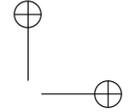
At the national level, the French left-wing ecologist party campaigns in favor of economic regulation, the development of non-polluting sources of energy and free public health-care. At the local level, it aims at improving desirable urban city-specific characteristics, e.g. car-free zones, greenery and public transportation from the suburbs to downtown, where the business centers are located. Such an enhancement of the urban environment increases housing prices, which only benefits home owners. Tenants lose: their situation is worsened by the hike in the rent prices. As a consequence, there is a contradiction between the ecologist parties' left-wing policies and the self-interest of tenants as opposed to that of owners.

Ecologist candidates should therefore obtain a large share of votes in locations which are far from the business centers, where home owners are rich enough to buy a home but not rich enough to live in affluent neighborhoods. In such locations, there should not be many tenants. Thus, in local elections, ecologist candidates compete with candidates of local associations that also seek to improve urban amenities. However, at the national level, the ecologists' program targets voters whose main source of income is public-financed transfers and whose interests are opposed to those of home owners. Therefore home owners should not vote for the ecologists in national elections.

---

<sup>2</sup>In both mayoral and presidential elections in France, if no candidate receives more than 50% of the votes in the first round, a second round must be organized. In mayoral elections, all the candidates who receive more than 10% of the votes in the first round are qualified for the second round. In the presidential elections, only the two candidates with the highest shares of votes in the first round are qualified for the second round. No ecologist candidate was ever qualified for the second round of a French presidential election. In the Appendix, we review the successes and failures of ecologist candidates in local and national elections in France.





The remainder of this paper is as follows. Section 2 presents the data. Section 3 discusses the empirical methodology and section 4 analyzes the results. Section 5 concludes.

## 2. The data

### 2.1 *The Hauts-de-Seine department*

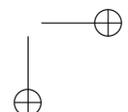
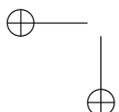
The Hauts-de-Seine department is an area grouping 37 towns with very different characteristics. Neuilly-sur-Seine is one of the richest towns in France; Chaville and Rueil-Malmaison are residential towns with an upper-middle class population. Some towns, such as Montrouge or Malakoff, are mainly working-class areas. On the whole, the Hauts-de-Seine department is representative of suburban France. It is mainly an urban area where there are a few rich people, many middle-class people, and where a growing number of residents largely depend on public transfers. In order to obtain a reliable estimate of real estate prices and the features of the urban environment, we undertook a survey among real estate agents in the department in April 2001.

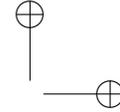
Our unit of analysis is not the town because the same town can comprise residential areas for middle-class people and public housing units for workers. We do not however rely on data at the individual-level obtained through surveys because this type of data would not provide an objective evaluation of the characteristics of the environment where the voters live and which may have a decisive influence on their decision to vote for Greens.<sup>3</sup> Therefore, our unit of analysis is the IRIS2000, which is a division of the French territory that is not governmental but statistical. Following the 1999 census of the French population, the French Institute of Statistics known as 'INSEE' (Institut National des Statistiques et des Etudes Economiques) designed the IRIS2000 which it defines as a grouping of blocks of adjacent lodgings that comprises between 1800 and 5000 inhabitants. It is obvious that an analysis carried out at the IRIS2000-level is more accurate than a study undertaken at the town-level.

In the Hauts-de-Seine department, there are 609 IRIS2000s, i.e. 17 IRIS2000s per town on average. However, a single polling station may group several IRIS2000s. Therefore to ensure the efficiency of our estimators which we discuss in detail below, we only kept the IRIS2000s that match a single polling station. Our sample is therefore limited to 537 polling stations.<sup>4</sup>

<sup>3</sup> A similar argument about the subjectivity inherent in individual-level data obtained through surveys is developed in Glaeser and Ward (2006).

<sup>4</sup> In these rare instances where a polling station groups several IRIS2000s, there exists in our dataset a repetition of the same set of explanatory variables for different values of the dependent variable, i.e. the vote for the Greens. This would not be a problem per se if we were not also using the Heckman (1979) two-stage estimator in our analysis for reasons that we discuss below.





## 2.2 The dataset

As we argued above, we use data at the IRIS2000-level, i.e. at the neighborhood-level, and not at the individual-level because the latter do not take into account the characteristics of the urban environment. These data are listed in Table 1. They account for the features of the urban environment in each IRIS2000, as well as for the national and local economic and political circumstances.

### 2.2.1 The urban environment

It can be hypothesized that ecologist candidates obtain a high share of the votes in IRIS2000s where the greenery rate is low, namely, where there are few public gardens and parks. To obtain a proxy on the greenery rate in each IRIS2000, we construct the green surface per inhabitant (GSHBT) variable as the ratio between the area allocated to gardens and parks in a given IRIS2000 and the number of inhabitants in that IRIS2000. The GSHBT variable will also be used to check the robustness of our regressions as we distinguish between IRIS2000 with more or less greenery than the average: we define a green (respectively non-green) IRIS2000s as an IRIS2000 whose green surface per inhabitant in square meter is above (below) the mean value of the GSHBT variable, i.e. above (below) 60.18 m<sup>2</sup>.

The average price of lodging (HOUSING PRICE) estimates the value that individuals attach to the environment. It does not take into account the intrinsic characteristics of the lodging, like the number of rooms in a flat. Rather, the HOUSING PRICE variable provides an indication of the willingness of inhabitants to pay for the extrinsic features of the lodging, namely, the characteristics of the IRIS2000 where the lodging is located. In addition, it serves as a proxy for the income of individuals who inhabit the IRIS2000.

Finally, our dataset includes the number of houses (HOU) in each IRIS2000. In suburban France, as opposed to many other countries, houses are rather small and owned by people with low income while rich people own flats. Therefore, the number of houses should have a positive effect on the results of Greens candidates, at least in the mayoral elections.

---

As Gourieroux (2000) shows, the Heckman's method is significantly less precise, especially for the estimation of the standard error, than the maximum-likelihood and asymptotic least square methods, in a sample with finite size, and particularly when the non-censored observations are few. Therefore to ensure the robustness of our estimations, we only kept the IRIS2000s that match a single polling station. The polling stations that we removed were neither located in the towns with a large population nor in the towns with a small population and no systematic bias was therefore introduced.

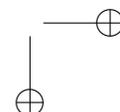
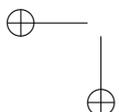
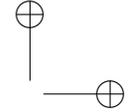


Table 1 — Definitions and summary statistics

Variable	Definition	Mean (S.D.)
LWMAY	1 = towns headed by a left-wing mayor, i.e. a communist mayor, a socialist mayor or by a mayor who is left-wing but not affiliated with any national left-wing party, 0 = otherwise.	22.24%
ECO_LIST	1 = if the Greens in ran on a separate list mayoral elections when they ran on a separate ecologist list.	8.78%
GSHBT	Green surface per inhabitant in square meter. This measure excludes public areas of buildings such as cemeteries or sports grounds.	60.18(58.78)
HOU	Number of houses in each IRIS2000.	33.90(28.97)
HOUSING PRICE	Mean price of housing per square meter in each IRIS2000. It is computed based on a survey that we undertook among real estate agents.	16529(5619)
MAMinf	1 = Noël Mamère's result is less than 3% (i.e. less than one standard deviation from its mean result in the Hauts-de-Seine), 0 = otherwise.	7.16%
PCOWN	Percentage of owners in each IRIS2000.	17.77(7.61)
PCYOUN	Percentage of young people per IRIS2000.	5.36(2.62)
STRONGH_M	1 = IRIS2000s that are strongholds of the Greens in the mayoral elections (in these IRIS2000s, the result of Green candidates is above 16.31%, i.e. the mean of their results in the mayoral elections augmented by one standard error), 0 = otherwise.	3.16%
STRONGH_P	1 = IRIS2000s that are strongholds of the Greens in the presidential elections (in these IRIS2000s, Noël Mamère's result is above 7.5%, i.e. the mean of his result in the presidential election in the Hauts-de-Seine departement augmented by one standard error), 0 = otherwise.	14.71%
ULN	Difference in the unemployment rate per employment zone in each IRIS2000 and the national unemployment rate measured three months before the elections.	-1.13(1.24)
Vp	Result (in percent) of Noël Mamère, the Green candidate in the presidential election.	5.82(1.82)
Vm	Result (in percent) of Green candidates in the mayoral elections. The Green ran separate lists in the mayoral elections in 19.92% of the IRIS2000s and obtain 12.14% of votes on average in these IRIS2000s.	2.38(5.16)

*Note:* To check for robustness of our regressions, we distinguish between green and non-green IRIS2000s we define a green (respectively non-green) IRIS2000 as an IRIS whose green surface per inhabitant in square meters above (below) the mean value of the GSHBT variable, i.e. above (below) 60.19m<sup>2</sup>.



### 2.2.2 The national and local economic circumstances

When mayoral elections were held in 2001 in France, the Green candidates could either have been members of the incumbent local majority or minority. At the same time, they represented at the local level the then left-wing national parliamentary majority. Hence in the mayoral elections, Green candidates may have been judged on local criteria and/or on the comparison between the local and the national economic circumstances. Similarly, Green leader Noël Mamère was one of the presidential candidates representing the incumbent left-wing majority in 2002, and his share of the vote should be analyzed by comparing the local and national economic circumstances.

The votes for Noël Mamère should be negatively affected by poor local economic circumstances, which we measure by the gap between the rate of unemployment in each IRIS2000 and the national rate of unemployment (ULN). Conversely, Green candidates competing in the mayoral elections may benefit from an increase in the local rate of unemployment, since they position themselves as the local defenders of the most underprivileged sections of the population.

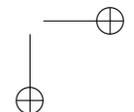
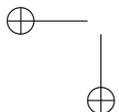
### 2.2.3 The national and local political circumstances

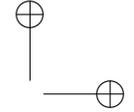
In our sample, Green candidates presented lists of their own in three right-wing and two left-wing towns that comprise 105 IRIS2000s.<sup>5</sup> The variable `ECO_LIST` measures the mean electoral cost that the Greens incur in mayoral elections when they ran on a separate ecologist list instead of forging an alliance with the local socialist (social-democrat) and communist candidates.

Moreover, we take into account some additional characteristics of the Hauts-de-Seine for our analysis of the presidential elections. When the first round of the presidential election was held in April 2002, 9 towns, which grouped 120 IRIS2000s, were headed by left-wing mayors.<sup>6</sup> In these 9 left-wing towns, the variable `LWMAY` provides the additional share of votes obtained by Green candidate Noël Mamère in the presidential election. Furthermore, we include the `Vm` variable, i.e. the share of votes obtained by the Green candidates running in the 2001 mayoral elections, among the deter-

<sup>5</sup>The three right-wing towns are Anthony and Rueil-Malmaison, both held by RPR (Gaullist)-affiliated mayors, and Chatillon, which has a RPF (conservative)-affiliated mayor. The two left-wing towns are Nanterre and Vanves that respectively have a communist and a socialist mayor.

<sup>6</sup>There are 37 towns in the Hauts-de-Seine department. The 9 left-wing towns in the Hauts-de-Seine are Bagneux (communist), Chaville (socialist), Clamart (formerly a right-wing town which became socialist in the 2001 mayoral elections), Clichy (socialist), Fontenay-aux-Roses (socialist), Gennevilliers (communist), Malakoff (communist), Nanterre (communist) and Vaucresson (a town with a left-wing mayor who is not affiliated with any national left-wing party).





minants of the votes for Noël Mamère. Thus, we can assess the loyalty of Green voters from the mayoral to the presidential elections.

Our analysis also relies on the percentage of individuals age 18–25 in each IRIS2000 (PCYOUN). This variable should have a positive impact on the Green vote because many proposals of the ecologist party, e.g. legalization of soft drugs, are aimed at young voters.

Finally in some IRIS2000s, Green candidates obtain votes that are largely superior to their overall results in that town. We measure the additional mean share of votes obtained by the Greens in such strongholds where they have established important political networks by the dummy variable *STRONGH\_M* in the mayoral elections and by the dummy variable *STRONGH\_P* in the presidential election. Conversely Green candidate Noël Mamère may find it especially hard to gain votes in some IRIS2000s in the presidential election: his electoral cost is measured by the variable *MAMInf*.

### 3. The empirical methodology

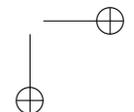
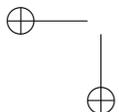
In this section, we discuss our approach to the estimation of the vote-popularity functions for the Green candidates running in the mayoral and presidential elections. The empirical relations we present are the best we obtained among several equations testing different combinations of explanatory variables, including non-linear specifications. For brevity, we suppress subscript *i* in the relations below.

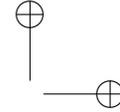
#### 3.1 Estimating the Green vote in the 2001 mayoral elections

The empirical relation used to estimate the features of the Green vote  $V_m$  in the 2001 mayoral elections is:

$$V_m = \alpha_0 + \alpha_1 \cdot HOUSING\_PRICE + \alpha_2 \cdot HOU + \alpha_3 \cdot PCOWN + \alpha_4 \cdot ULN + \alpha_5 \cdot STRONGH\_M + \alpha_6 \cdot ECOLIST + \nu \quad (1)$$

In mayoral elections, the dependent variable is either the percentage of Green votes or zero if no Green candidate was running in a given IRIS2000, obviously for strategic reasons. The dependent variable is therefore censored since we do not have the votes for the dependent variable even when information for the explanatory variables is available. Thus an OLS estimation or a weighted least-squares probit procedure for grouped data would generate biased and inconsistent parameter estimates. However, selection models can be used. Ideally, we should use an estimator combining selection techniques with grouped data, but to the best of our knowledge, such an estimator does not exist. As a consequence we use the classic Heckman (1979)'s two-stage





procedure.

The first stage of this procedure allows us to determine the characteristics of the IRIS2000 where the Greens chose to present candidates of their own and refused an alliance with the other left-wing parties. The second stage of the regression enables us to assess the determinants of the Green vote.<sup>7</sup>

### 3.1.1 The first stage of Heckman's procedure

In the first stage of Heckman (1979)'s procedure, we use a probit model so as to obtain a selection model of the Green presence: we thus assess the characteristics of the IRIS2000s where the Green party chose to have candidates running on separate lists in the 2001 mayoral elections, instead of running under the banner of an united left-wing local coalition. We define the selection variable VPRES which takes the value 1 if Green candidates were present in a given IRIS2000 in the mayoral elections and 0 otherwise. Consequently, we select and estimate the following probit model:

$$\begin{aligned} \Pr(\text{Green}) &= \text{VPRES} \\ &= \gamma_0 + \gamma_1 \cdot \text{ULN} + \gamma_2 \cdot \text{GSHBT} + \gamma_3 \cdot \text{DLWMAY} \\ &\quad + \gamma_4 \cdot \text{PCYOUN} + \gamma_5 \cdot \text{HOU} + \varepsilon \end{aligned} \quad (2)$$

From the estimated parameters of the probit model, we calculate the estimated hazard rate  $\hat{\lambda}_i$  which is equal to:

$$\hat{\lambda} = \frac{f(X \cdot \gamma)}{F(X \cdot \gamma)} \quad (3)$$

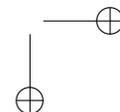
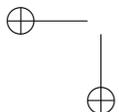
where  $X$  and  $\gamma$  are the vector of regressors and the vector of parameters of (2) respectively,  $f()$  is the probability density function of a standard normal variable, and  $F()$  the corresponding cumulative distribution function. We can then use  $\hat{\lambda}$  to normalize the mean of the true error term to zero, and hence get consistent estimators for equation (2).

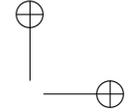
### 3.1.2 The second stage of Heckman's procedure

The second-stage of the two-stage estimator uses the following model:

$$\begin{aligned} V_m &\phi_0 + \phi_1 \cdot \text{HOUSING\_PRICE} + \phi_2 \cdot \text{HOU} + \phi_3 \cdot \text{PCOWN} \\ &+ \phi_4 \cdot \text{ULN} + \phi_5 \cdot \text{STRONGH\_M} + \phi_6 \cdot \text{ECOLIST} + \sigma \cdot \hat{\lambda} + v \end{aligned} \quad (4)$$

<sup>7</sup>The justification for our using Heckman's two-stage method should be made clear by reminding the reader of Heckman (1979)'s original paper. To understand the determinants of female wages, one cannot only examine the individual characteristics of women who work. In a first step, one should explain why some women work while others chose not to. In a second step, the determinants of female wages, on a sample restricted to working women, can be analyzed.





where  $\sigma$  is the standard deviation of the true error term.

If the associated coefficient to the Heckman's  $\hat{\lambda}$  is insignificant at the 5% percent level, the estimated vote for the Greens is not affected by a selection bias.

### 3.2 Estimating the Green vote in the 2002 presidential election

The empirical relation used to estimate the features of the Green vote  $V_p$  in the 2002 presidential election is:

$$\begin{aligned} V_p & \beta_0 + \beta_1 \cdot HOUSING\_PRICE + \beta_2 \cdot GSHBT + \beta_3 \cdot HOU \\ & + \beta_4 \cdot PCOWN + \beta_5 \cdot PCYOUN + \beta_6 \cdot ULN \\ & + \beta_7 \cdot STRONGH\_P + \beta_8 \cdot DLWMAY + \beta_9 \cdot MAMinf \\ & + \beta_{10} \cdot Vm + u \end{aligned} \quad (5)$$

The dependent variable  $V_p$  is built as the ratio between the number of votes in favour of Green candidate Noël Mamère and the total number of valid votes. Therefore, grouped data estimation techniques<sup>8</sup> can be used to estimate equation (5). Following Greene (2002), we can undertake a cross-sectional estimation of the economic relation in equation (5) using a weighted least-squares probit procedure for grouped data over the 537 IRIS2000s in our sample.

## 4. The results

The results of our empirical analysis of the 2001 mayoral elections are given in Table 2, which reports the results for the first and second stages of estimation using Heckman (1979)'s method. Table 3 reports the estimation results based on the votes obtained by Green candidate Noël Mamère in the 2002 presidential election. In both tables, we report regression results on the whole sample, as well as on two sub-samples where we distinguish between green and non-green IRIS2000s.

### 4.1 The ecologist vote in the 2001 mayoral elections

In Table 2, which reports the regression results for the mayoral elections using Heckman (1979)'s two-stage procedure, we find that Heckman's  $\hat{\lambda}$  is insignif-

<sup>8</sup>When a set of binary data relates to individuals, each observation consists of  $[y_i, x_i]$  where the dependent variable  $y_i$  equals 0 or 1. Grouped data are obtained by observing the response of  $n_i$  individuals, all of whom have the same  $x_i$ . The dependent variable consists of the proportion  $P_i$  of the  $n_i$  individuals who respond with  $y_i=1$ . Therefore observations in a grouped data framework are  $[n_i, P_i, x_i]$ ,  $i = 1, \dots, N$ . Election data are the classic case in point.

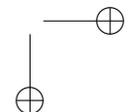
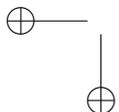


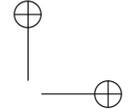
Table 2 — Estimates of the Green vote in the mayoral elections (Heckman two-step estimator)

	Whole sample		Green IRIS2000s		Non-green IRIS2000s	
	Coef.	z-stat	Coef.	z-stat.	Coef.	z-stat.
Step 1						
Characteristics of the IRIS2000s where the Greens ran separate lists						
ULN	0.149	2.04	0.432	3.64	-0.535	-3.74
GSHBT	-0.001	-0.72				
LWMAY	-0.081	-0.48	-6.109		1.464	5.71
PCYOUN	-0.019	-0.57	0.107	1.54	0.040	-0.77
HOU	0.016	6.27	0.014	3.41	0.021	4.22
Intercept	-1.005	-3.83	-0.688	-1.52	-2.343	-5.64
Step 2						
Characteristics of the Green vote in the mayoral elections						
STRONG_M	6.79	10.25	7.633	7.59	6.017	6.06
ULN	1.013	2.65	0.541	1.00	1.728	1.66
PCOWN	0.103	3.20	0.122	2.74	0.115	2.32
HOUSING PRICE /1000		0.087	0.139	1.48	-0.217	-0.50
ECOLIST	-4.188	-4.17			-3.187	-2.97
Intercept	11.982	7.26	5.876	2.50	17.220	3.27
$\lambda$	0.053	0.074	0.196	0.14	-0.594	-0.55
Wald $\chi^2$	229.30		78.17		161.76	

Notes (1) HOUSING PRICE was divided by 1000 to rescale the coefficients that had too high a numerical value. (2) GSHBT was dropped from the regression on the two sub-samples because of multi-collinearity. (3) An IRIS2000 is green (respectively non-green) if its green surface per inhabitant in square meters is above (below) the mean value of GSHBT, i.e. above (below) 60.18m<sup>2</sup>.

inant at the 5%-level in each regression, thus showing no sample selection bias. Therefore, the first-step of Heckman (1979)'s procedure allows us to explain where the Greens choose to have candidates run on their own, instead of being on an united left-wing list with the socialist and communist parties, while the second step assesses the determinants of the Green vote in mayoral elections.

When the data are regressed on the whole sample, the first step of Heckman (1979)'s procedure shows that the Greens choose to present candidates in areas where the unemployment rate and the number of individual houses are high. This result would suggest that the ecologist party believes that its electorate is mainly made up of poor individuals, who are unemployed and who lived in individual houses. However this results needs to be refined as we distinguish between green and non-green IRIS2000s in our sub-samples. In both sub-samples, green candidates run in IRIS2000s where the number of individual houses is high. It could well be then that house owners have a



higher willingness to pay for environmental protection.<sup>9</sup> But we observe that in green IRIS2000s, they choose to run when the unemployment rate is high while in non-green IRIS2000s, they run when the unemployment rate is low. These observations thus suggest that the Greens are aware of the existence of two opposite components of that determine their electoral success in local elections: the owners' willingness to safeguard the environment and the support from the disenfranchised sections of the population.

These observations are confirmed when we examine the second stage of Heckman's procedure. On the whole sample, unemployment has a positive impact on the Greens' electoral success; however when we break down the sample between green and non-green IRIS2000s, we find that the impact of unemployment is only significant in non-green IRIS2000s. Only one variable is significant over all the samples: the percentage of owners in an IRIS2000 always boosts the votes for the Green candidates in the mayoral elections. Hence owners care about environmental protection and send a signal to the incumbent mayors in order to increase the value of their real estate. But it may be hypothesized that they are likely to be affluent enough to oppose the redistribution policies which the Greens promote in national elections.

#### 4.2 *The ecologist vote in the 2002 presidential elections*

Table 3 provides the regressions results of the determinants for Green candidate Noël Mamère in the Hauts-de-Seine department. Perhaps the most striking result is that the  $V_m$  variable, which represents the share of votes obtained by the Green candidates in the mayoral elections, is not significant in these regressions: this suggests that Green voters do not remain loyal to the Greens. Indeed, only one variable retains a positive and significant effect in both the mayoral and presidential elections: this is the HOU variable, which stands for the number of individual houses in an IRIS2000. This is presumably because owners of individual houses in the Hauts-de-Seine have a rather low income and depend on the public transfers that the Greens promote in national elections. Otherwise, all the variables which had a positive and significant effect on the Greens' success in the mayoral elections become either non-significant or have a negative impact on Noël Mamère's results in the presidential election. This finding, which indicates that the determinants of the votes differ from mayoral to presidential elections, is confirmed in the remainder of our analysis.

Notably we find that in the presidential election, Green candidate Noël Mamère is trounced in IRIS2000s with numerous owners, even though they supported Green candidates in the mayoral elections. In all likelihood, own-

<sup>9</sup> We owe this point to a referee.

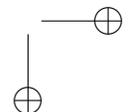
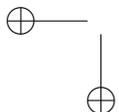


Table 3 — Estimates of the Green vote in the presidential elections  
(grouped data estimator)

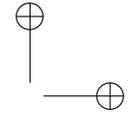
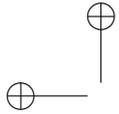
	Whole sample		Green IRIS2000s		Non-green IRIS2000s	
	Coef.	z-stat	Coef.	z-stat	Coef.	z-stat
STRONG_M	–	–				
ULN	–0.022	–4.71	–0.015	–2.54	–0.032	–3.86
PCOWN	–0.002	–2.90	–0.001	–1.01	–0.003	–3.02
HOUSING PRICE /1000	–0.006	–5.27	–0.004	–2.10	–0.008	–5.03
GSHBT	0.000	–1.44				
LWMAY	0.023	2.10	0.023	1.36	0.013	0.69
STRONG_P	0.188	16.13	0.189	9.76	0.182	10.22
MAMinf	–0.312	–11.94	–0.321	–9.60	–0.266	–7.95
Vmi	0.001	1.38	0.000	0.012	0.002	1.25
PCYOUN	0.004	2.26	0.007	1.72	0.004	2.07
HOU	0.001	3.58	0.001	2	0.001	2.33
ECOLIST	–	–				
Intercept	–1.540	–71.99	1.582	37.85	1.501	52.43
Adjusted $R^2$	0.663		0.589		99.16	
$F$	89.99		32.21		99.16	

Notes (1) HOUSING PRICE was divided by 1000 to rescale the coefficients that had too high a numerical value. (2) GSHBT was dropped from the regression on the two sub-samples because of multicollinearity. (3) ECOLIST and STRONGH\_M were dropped from all regressions because of multicollinearity. (4) An IRIS2000 is green (respectively non-green) if its green surface per inhabitant in square meters is above (below) the mean value of GSHBT, i.e. above (below) 60.19m<sup>2</sup>.

ers reject the national policies of the Greens which they view as being harmful to their interests. In addition, unemployment has a negative effect on the Green candidate's vote: the voters punish the Greens whom they view as representing the incumbent left-wing government.

Finally, a couple of remarks may be made on the significance of the LWMAY and PCYOUN variables. The LWMAY variable, which signals that the town in which the IRIS2000 is located is headed by a left-wing (either communist or socialist) mayor, is positive and significant at the 5%-level. This suggests an interesting pattern among left-wing voters: they use the Green vote to express their diffidence against the policies of the socialist and communist parties, while still voting for a left-wing party. Such a protest vote on the part of left-wing voters illustrates the failure of socialist leader Lionel Jospin to convince left-wing voters to support him in the first round of the presidential elections and ultimately, explains his failure to accede to the second round of the presidential elections.

In addition, the share of people age 18 to 25 in an IRIS2000 has a positive



impact on the votes for Noël Mamère. This is because the Greens' ideological stance on issues like drug legalization must be favored by young people in the Hauts-de-Seine. But in Table 2, we notice that the PCYOUN variable was not significant: young individuals do not support the Greens in the mayoral elections, most likely because they do not pay local taxes and therefore do not have a stake in their redistribution. Eventually, the behavior of young people only reinforces the differences in the Green vote between local and national elections.

## 5. Conclusion

The joint study of the mayoral and presidential vote function of the Greens in the Hauts-de-Seine department, which represents suburban France fairly well, leads to some unexpected conclusions. We indeed find that the Green vote appears more sophisticated than expected on two major points.

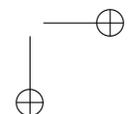
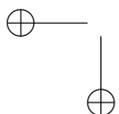
First, we find that there is not any form of loyalty among Green voters between local and national elections. Green voters in the mayoral elections are mostly inhabitants of non-green IRIS2000s with a low patrimonial value who support candidates to send a signal for more greenery to the incumbent mayors. However in the presidential elections, Green voters are mostly young and poor people, who support the Greens' stance on economic and social issues, as well as traditional left-wing voters who use the Green vote to express their rejection of the policies conducted by the socialist and communist parties while still voting for a left-wing party.

Second, the Greens seem to benefit from poor local economic circumstances, even when they belong to the ruling majority at a national level. Thus, voters find that the Green vote is a way to protest or to express concern for issues which are not only environmental, but also economic. Conversely, in national elections, when the Greens defend their national platform within a left-wing coalition, they are more exposed to a form of punishment by voters who suffer from poor economic circumstances. Thus it seems that their entry in the government did not eventually serve the Greens, who hence pay the price of the inconsistencies in their platform.

## Appendix

### A A review of ecologist parties' successes and failures in French elections

From the end of World War II to the early 1970s, French ecologists were only radical and isolated 'animal lovers'. The struggle against nuclear energy in the early 1970s however provided some ground for the creation of a genuine political party.



At the 1974 presidential election, René Dumont obtained 1.32% of the votes. Between 1978 and 1988, ecologists obtained from 3% to 5% of the votes in the successive parliamentary elections. They then benefited from a breakthrough at the 1989 European elections, gaining 10.6% of the votes. In the 1992 regional elections, the movement was divided in two parties: the right-leaning 'Generation Ecologie' (GE – Generation Ecology) obtained 7.1% of the votes while the left-leaning Greens gained 6.8%. A reunified list obtained 11.08% at the parliamentary elections the following year. The Greens however suffered a couple of setbacks in the 1994 European elections and in the 1995 presidential elections, when the Green candidate Dominique Voynet only obtained 3.4% of the votes. In the 1997 parliamentary elections, the ecologists were once again divided and only obtained 6.3% of the votes, i.e. 3.7% for the Greens, 1.7% for GE, and 0.7% for the short-lived and apolitical 'Mouvement Ecologiste Indépendant' (MEI – Independent Ecologist Movement). In the 1999 European elections, the various ecologist parties obtained 11.4% of the votes, including 9.8% for the Greens. In the last presidential election in 2002, there were two ecologist candidates: the left-wing Green candidate Noël Mamère gained 5.25% of the votes while Corinne Lepage, the leader of the right-leaning 'Cap 21', obtained 1.88%.

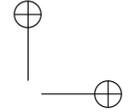
In local elections, the Greens' main problem is their lack of presence in each constituency. As such, their overall results do not accurately reflect their real influence. For instance, in the 1995 mayoral elections, they obtained 1.03% of the national votes, but 6.1% in cities with more than 9,000 inhabitants. However, through local alliances with other left-wing parties, Green politicians have become mayors of mid-sized French towns like Bègles and Saumur.

### Acknowledgements

We thank Arye Hillman, Roger Congleton, Abraham Lioui, Miriam Krausz, Hillel Rappaport, Stanley Winer, participants at the Bar Ilan economics workshop and the 2005 Silvaplane seminar on political economy. Part of this article was written while Franck was visiting the Center for the Study of Public Choice at the George Mason University economics department. The usual disclaimer applies.

### References

- Abonneau, J. and Ysmal, C. (2002), Chasseurs ou écolos: Qui va gagner?, *Le Figaro* 7.  
Aidt, T.S. (1998), Political internalization of economic externalities and environmental policy, *Journal of Public Economics* 69: 1–16.



- Glaeser, E.L. and Ward, B.A. (2006), Myths and realities of American political geography, *Journal of Economic Perspectives* 20: 119–144.
- Gourieroux, C. (2000), *Econometrics of Qualitative Dependent Variables*, Cambridge University Press.
- Greene, W.H. (2002), *Econometric Analysis*, Prentice Hall.
- Hahn, R.W. (1990), The political economy of environmental regulation: Towards a unifying framework, *Public Choice* 65: 21–47.
- Heckman, J.J. (1979), Sample selection bias as a specification error, *Econometrica* 47: 153–161.
- Jérôme, B. and Jérôme-Speziari, V. (2002), Les municipales de mars 2001: Vote récompense ou vote sanction? Les leçons du modèle politico-économique, *Revue Française de Science Politique* 52: 251–272.
- Jérôme, B., Jérôme-Speziari, V. and Lewis-Beck, M.S. (1999), Polls fail in France: Forecast of the 1997 legislative Election, *International Journal of Forecasting* 15: 163–174.
- Jérôme, B., Jérôme-Speziari, V. and Lewis-Beck, M.S. (2003), Reordering the French election calendar: Forecasting the consequences for 2002, *European Journal of Political Research* 42: 425–440.
- Joskow, P.L. and Schmalensee, R. (1998), The political-economy of market-based environmental policy: The US acid rain program, *Journal of Law and Economics* 46: 37–83.
- Kirchgässner, G. and Schneider F. (2003), On the political economy of environmental policy, *Public Choice* 115: 369–396.
- Lewis-Beck, M.S. and Paldam, M. (2000), Economic voting: An Introduction, *Electoral Studies* 19: 113–122.
- Lewis-Beck, M.S. (1995), Comparaison de prévisions des élections présidentielles en France et aux Etats-Unis, *Journal de la Société de Statistique de Paris* 136: 29–45.
- Lewis-Beck, M.S. (1997), Le vote du porte-monnaie en question, in: D. Boy and N. Mayer (eds.), *L'Electeur a Ses Raisons*, Presses de Sciences-Po.
- Nannestad, P. and Paldam, M. (1994), The VP-function: a survey of the literature on vote and popularity functions after 25 years, *Public Choice* 79: 213–245.

