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Vote functions in France and the 2002 election forecast[1]

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Introduction

The 2002 French elections which, at least for the presidential first-ballot vote, surprised most commentators is a good occasion to take an in-depth look at the vote function literature applied to the French case. The vote function methodology has been used in France to explain election outcomes since more than 25 years. The first paper was the study of Rosa and Amson (1976) devoted to the empirical analysis of the vote for left party candidates, that was then considered as a purely protest vote. Since this first study, the political situation as well as the economic situation has changed a lot. What have we learnt in those 25 years?

The first section of the chapter presents the basic elements of the vote functions. Then, we evaluate the literature on vote function concerning French election outcomes. We will see that the contribution of this literature is more important concerning the political part than the economic part of the vote function. The third section of the chapter is devoted to the estimation of a vote function for French legislative elections. We offer some empirical results, especially for the 2002 legislative election. We also try to evaluate the robustness of the estimation, in particular, by considering a different set of data and by estimating different formulations of the equation. In the last section we examine the important problem of the transformation of the first-ballot vote into the final outcome. This leads us to estimate different formulations of a swing ratio function.

Presentation of the vote function

The aim of the vote function is fundamentally to explain the election outcome by taking the pre-election situation into account. This growing literature, which is based on the pioneer works of Kramer (1971) and Fair (1978) concerning the United States, is now rather extensive.[2]

The literature on the vote function is mainly empirical and the aim of these studies is to explain the election outcome by using a vector of explanatory variables X.[3] Therefore, one has to estimate an equation of the following type:

$$V_t = f(X_t) + e_t$$

where V stands for election outcome in the year t (measured, for example, by the percentage of vote in favour of the incumbent, or in favour of the left-wing parties . . .), f is the vote function and e is an error term. Generally, the relation between X and V is assumed to be linear and therefore the estimation method which is used is ordinary least squares (OLS).[4]

The dependent variable

Since the aim of the vote function is to explain election outcome, the dependent variable can be either the incumbent vote, the opposition vote or the vote for one of the parties (or coalition of parties).[5] The fact that the incumbent vote is the most frequently used variable originates in the responsibility hypothesis according to which citizens vote for (against) the government if the economic situation is going well (badly).[6] Nevertheless, in the French case, this choice raises some problems.

First, there is the existence of the Front National (FN). Where should the vote for this extreme-right party be catalogued? Together with the vote for right-wing parties or always with the opposition?[7] This question seems particularly important after the 2002 presidential election where the strength of the FN vote may explain the absence of the Left at the second-ballot vote.

The second problem refers to the existence of "cohabitation" where a President and a Prime Minister from opposing party coalitions serve together. Which party should be considered as the incumbent, the party of the President or the party that has a majority at the Assembly? Almost all the options have been envisaged in the literature.[8]

Owing to these problems, it is better to consider as the dependent variable the vote for one of the competing party coalitions. The choice

of the left-wing vote is preferable since it is easier to compute than vote for the right-wing parties because it avoids choosing if one should or should not include the FN vote with the Right vote.

National/local data

Two main approaches have been used to explain and/or forecast election outcomes in France:

The first approach considers national data and introduces a low number of explanatory variables. These variables, that we will present later in the chapter, are generally an economic indicator and/or a political one. Their aim is to take into account the responsibility hypothesis. Among the studies belonging to this approach, one can mention Rosa and Amson (1976), Lecaillon (1980), Lewis-Beck (1985,[9] 1991), Courbis (1995), Fauvelle-Aymar and Lewis-Beck (1997) and Dubois (2001). The second approach uses local data (either at the regional or at the departmental level) and, in addition to the economic and political indicators, introduces many explanatory variables either to study some particular dimensions of the vote (for example, the role of abstention, Fauvelle-Aymar *et al*. (2000)) or to account for local specificities (Jérôme *et al*. Lafay, 1993, 1995; 1993; Jérôme and Jérôme-Speziari, 2002; Auberger and Dubois, 2003).

Among the main advantages of using local data, there is the fact that it increases the number of observations and therefore the number of degrees of freedom of the econometric estimation.[10] Moreover, the use of detailed data allows one to explain more precisely the electoral behaviour, the researcher being closer to the phenomenon under study. In particular, it is then possible to account for the influence of the local specificities on election outcome. The use of local data has disadvantages also. In particular, there are problems linked to the availability of some data at the local level. The empirical study below in this chapter will compare estimations made on national and local data.

Forecasting election outcomes

Even if most of the vote functions were primarily designed for explaining election outcome, some of these functions have also been used to forecast them. By electoral forecasting, we mean *ex ante* forecasting, that is, an election forecast that may be published before the election.[11] The vote functions should fulfil some conditions in order to be used to forecast election outcome. The first and essential condition is that the explanatory variables used in the estimated equation should be available before the election.[12] Given this condition, it turns out that a model that has a good *ex post* explanatory power may have a really poor *ex ante* forecasting

capability. Actually, it is really different to offer a good *ex ante* forecast and to provide a good *ex post* explanation. For example, the Jérôme and Jérôme-Speziari (2002) vote function uses a dummy variable equal to one in 2002 (and to zero otherwise) as an explanatory variable for the first-ballot presidential vote. The justification of this dummy variable is that it was the first time during the Fifth Republic that at a presidential election, the Left runs for the presidential election while having a majority in the National Assembly. The introduction of this independent variable totally prevents the use of this equation to forecast the election outcome before the election since one would have to forecast the estimated coefficient of this dummy variable.[13]

A second condition is to try to stay as parsimonious as possible in terms of the number of these explanatory variables. This condition should necessarily be fulfilled when one uses national data since the number of observations is very low. Therefore, the statistical validity of the estimation prevents the use of a large number of explanatory variables since it reduces the degrees of freedom of the estimation. This is especially the case in France owing to the very low number of elections that have been held since the birth of the Fifth Republic in 1958.[14] This problem is non-existent for the estimation based on local data. But when using local data, the researcher has a high incentive to incorporate many variables in the model. That may increase the *ex post* explanatory power of the equation but it is not certain that it will increase the *ex ante* capabilities of the estimation. Indeed, it may increase the instability of the estimation since some explanatory variables may offer good explanation of the past elections but not of the future ones.

The determinants of the election outcome

The aim of the vote function is to determine the variables to be included in the X vector, that is, to study the determinants of the election outcome.[15] Two categories of factors have been used to explain vote share: economic factors and political factors.

Economic voting

On the whole, it is on the economic part of the vote function that most researchers have concentrated their efforts.[16] Two economic indicators, unemployment and inflation, are considered to be "the big two" (Nannestad and Paldam, 1994) economic variables that explain election outcomes. Some studies use an indicator of the economic growth instead of the unemployment indicators. Among the main results that emerge

from the literature there are the facts that the voters are generally more sociotropic than egocentric,[17] and rather myopic.[18]

The studies dealing with the French vote functions that have been published in the last twenty years have never tried to evaluate the relevance of these results in the French case. It was not the case with the first studies that introduced only economic variables in their estimation (Rosa and Amson, 1976; Lecaillon, 1980; Lewis-Beck and Bellucci, 1982). The problem concerning these first studies is that their results need to be reassessed owing to the major economic and political changes that occurred in France since the end of the 1970s. The recent studies continue to introduce some economic determinants in their estimation. However, the authors generally concentrate their research and their comments on the non-economic variables explaining election outcome.[19]

In sum, concerning the economic dimension of vote, the vote functions literature applied to the French case does not appear to offer really new results. None of these studies has, for example, tried to evaluate if the economic determinant of vote in France may be different from those in other countries. Even if some studies have used both the economic growth rate and the unemployment rate as economic indicators, none have tried to compare their respective explanatory power.[20] However, these two indicators may measure different things. Hence, compared to economic growth about which voters have only perception (and information by the way of media), unemployment is a reality (the voter being either unemployed or experiencing some spells of unemployment). Therefore, the comparison of the unemployment indicator with the economic growth index may be a way to evaluate, in the case of France, the historical sociotropic/egocentric controversy.[21]

The political and institutional factors

Most of the vote function literature does not claim that the economy is the sole force that governs the electoral decision of voters.[22] Numerous other factors may (and do) influence voter's choice such as, in the French context, European construction, immigration policy, the problem of urban insecurity, to mention a few. These factors, which are mainly political,[23] have not yet received all the attention they deserve. One reason is that their influence is fundamentally more difficult to capture than the influence of economic factors.

Concerning political factors, two main approaches are utilised in the vote function for France. Most studies apply the standard method that consists of using the government popularity index as an indicator

of the opinion of the voter about the government performance on issues other than the economic ones.[24] This approach has the obvious advantage of parsimony which is especially useful in the French case. Nevertheless, it does not offer much explanation about the precise political factors that influence election outcome. The only thing shown is that a high popularity helps the incumbent to win the election.

The second approach consists in taking directly into account the political factors suspected of governing voter choice.[25] Among these factors, one can mention the influence of the political ideology and the political history at the local level. Jérôme *et al.* (2003) show, for example, that regions that have never changed their political preferences since 1974 are more likely to vote for their preferred party whereas regions that are politically unstable are less likely to reward the incumbent party. Even if the definition of the related explanatory variable raises questions,[26] the main contribution of this empirical study is to confirm that one has to take into account local specificities when using local data, and especially to introduce measures of the ideology of the local entities. We will present in the empirical section an easier and more robust way to account for these particularities.

A second sort of explanatory variable measuring "ideology" is the vote share at the "preceding" election. The "preceding" election can be either the closest election in the past[27] (Auberger and Dubois, 2003) or the last presidential election when the estimation concerns the legislative election (or the opposite) (Jérôme *et al.*, 2003). In other words, in these studies, the "preceding" election variable is not the lagged dependent variable. The justification for introducing a variable concerning past election outcome is to assess both the permanent and the short-term ideological strength at the local level (region or department). In other words, this variable is, in some part, not really different from the dummy variables we just presented that were used to take into account the political strength of the region. Using a past election outcome variable to account for the short-term strength of the political parties raises one problem related to the time elapsed since the last election. The longer it is, the less this variable will measure what it is supposed to. This is especially true when one uses the past presidential election outcome in the legislative election equation, at least for the 1978, 1986 and 1993 elections. Another problem refers to the institutional component of the vote and in particular the fact that the different elections do not exert the same ideological appeal.[28] Owing to these two problems, it seems better not to introduce a "preceding" election variable in the estimation. Other variables may be used to account for the permanent ideological strength of the region

such as for example the lagged dependent variable.[29] Concerning the measure of the strength of the political parties at the approach of the election, it seems better to retain a popularity indicator of the political parties even if this indicator is a much larger political indicator.[30]

The influence of abstention has also been introduced in the vote functions for France (Fauvelle-Aymar *et al.*, 2000). This study develops the hypothesis of a relation between election outcome and turnout. The theoretical idea is that voters choose at once between voting for one party, voting for another one, or abstaining. Therefore, turnout and vote are treated in the framework of a simultaneous equation model (2SLS). Considering all types of French elections (except the municipal), this study shows that there is a strong interdependence between vote shares and abstention.[31]

Lafay and Servais (2000) study the influence of political scandals that are defined "as the indignation provoked in public opinion by the revelation that a politician, a political group or a political institution has committed an action which is judged illegitimate, illegal, unethical, or shameful" (p. 189). Their empirical study shows that political scandals strongly and negatively influence the vote share of the incumbent.[32]

Concerning the institutional determinants of the vote, two factors have been studied. The first one is the type of election. The different elections that regularly occur in France (presidential, legislative, municipal, cantonal, regional and European elections) do not have the same institutional characteristics and especially the same political salience. As it is well known, their peculiarities strongly influence the level of political mobilisation, the turnout being much higher at presidential elections than at European elections.[33] It turns out that the type of election also influences the election outcome. The empirical study of Fauvelle-Aymar *et al*. (2000) shows that the electorate seems more reluctant to vote for a left-wing candidate at presidential elections than at legislative, cantonal or European elections.

The second institutional factor that has been analysed is the influence of "cohabitation" where a President and a Prime Minister from opposing party coalitions serve together. The main issue in relation to cohabitation concerns the attribution of responsibility for the economic situation. As it seems now clear after three cohabitations, it is the Prime Minister that, at the election time, will be considered as responsible for the economy, the President being mainly confined to foreign affairs (Lewis-Beck, 1997b; Jérôme *et al*. 2003; Lewis-Beck and Nadeau, 2003).

The contribution of the literature on vote functions for France is clearly more important concerning the political and institutional components

of vote compared to the economic part of it. Nevertheless, the influence of some particular aspect of the French political system has not yet been investigated. For example, one interesting question will be to evaluate the respective weight of the economic and political factors according to the type of election. For example, Is a bad economic performance more costly for the ruling party, in terms of vote, when it runs for a presidential race than for another election type?

Estimation of a vote function for French legislative elections

The aim of our empirical study is to offer answers to two questions:

1. Is it better to use local data?
2. What variables should be included in the vote function when using local data?

We wish to build a robust vote function for French election outcome that could be used to study some particular dimensions of the vote or to forecast election outcome. The variable that we try to explain is the vote share received by the left-wing parties at the first round of the legislative election.

The basic model

We will estimate an equation of the following form:

$$V_{it} = \alpha + \beta\, Unem_{it} + \delta\, Pop_t + \varepsilon_{it}$$

where:[34]

- V_{it} is the vote share of the left-wing parties at year t in region (or department) i or at the national level.
- *Unem* is the economic explanatory variable. The choice of this variable is dictated by the availability of the data. It turns out that the unemployment rate is the only economic indicator available at the local level.[35] More precisely, we use the following variable: the unemployment rate multiplied by a dummy variable equal to one when the Left is the incumbent and to minus one otherwise.[36] The dummy variable allows us to account for the fact that the responsibility hypothesis, on which the vote function is built, works both when the Left is the incumbent and when it is in the opposition. As the unemployment situation influences the vote for the Right incumbent, it indirectly

affects the Left opposition vote share (in the opposite direction).[37] One may expect a negative coefficient for this variable.

- *Pop* is the popularity index. The popularity indicator considered here is the popularity index of the political parties. To consider the popularity of political parties instead of the popularity of the Prime Minister (or the President) allows reduction of the noise present in the popularity index.[38] This variable is available only at the national level.
- ε is the error term.

No variable is introduced to evaluate the influence of cohabitation. The reason is that this potential effect is impossible to assess in the case of our sample of elections. There were three cohabitations in France following the 1986, 1993 and 1997 legislative elections. Therefore, a dummy variable for "cohabitation" should equal one in 1988 and in 2002.[39] However, these two elections were at the same time "confirming elections" that is, a legislative election just following a presidential election (as in 1981).[40] Therefore, this dummy variable cannot distinguish between this latter effect and the cohabitation effect.[41] Owing to this problem, we choose not to introduce election dummy variable.

The following table presents the results for the national, regional and departmental level (Table 11.1). To allow easy comparison, we consider the same sample of elections in the three cases. These elections are the five legislative elections that were held in 1986, 1988, 1993, 1997 and 2002. The Left was the incumbent in 1986, 1993 and 2002 and the Right in 1988 and 1997.

The estimation at the national level is not satisfactory. First, the sample is extremely small. Second, neither coefficient for the two independent variables is statistically significant at conventional levels. This result is in particular explained by a problem of high multicollinearity. The simple coefficient of correlation between *Pop* and *Unem* at the national level

Table 11.1 Vote equations (1986–2002)

	National model	**Regional model**	**Departmental model**
Intercept	42.89***	35.87***	42.90***
Unem	–0.22	–0.17***	–0.22***
Pop	2.22	8.54***	2.86*
Adj. R^2	0.70	0.31	0.15
N	5	110	480

*, ** and *** significant at 10%, 5% and 1% level respectively.

is –0.73. When only one explanatory variable is introduced at a time (either the popularity index or the unemployment rate), they both have the correct sign and the coefficients are significant at the 5 per cent level.

The results improve when the estimation is made on local data. The two explanatory variables are highly significant. One problem that we encounter is linked to the value of the coefficient associated with the popularity indicator. It differs considerably between the two estimations. An increase of 0.1 point for the popularity indicator leads to an increase in vote of about 0.9 points in the estimation based on regional data but of less than 0.3 points in the estimation based on departmental data. The main explanation for this high instability of the coefficient associated with the popularity indicator is linked to the fact that this variable is only known at the national level. Therefore, the inclusion of these data is nearly similar to the introduction of one dummy variable by election. In other words, in addition to taking into account the influence of popularity, it measures the influence of the particularities of each election. The only solution to this problem would be to have local data on popularity, data that are unfortunately not available. Concerning the coefficient associated with the unemployment rate, it is highly similar in the two estimations. An increase of 1 point in the unemployment rate brings a diminution of the vote for the Left of about 0.2 point.

Finally, owing to the low number of French elections and therefore to the low number of observations when one uses national data, it is better to use the local data.[42] The answer of which data-set is preferred is less clear when one compares the two estimations based on local data. The increase in the number of observations (480 in the departmental estimation compared to 110 in the regional one) does not lead to better explanatory power, the R^2 of the regional estimation being higher than the one of the departmental estimation. The main interesting point when using local data is that it allows the researcher to take into account the local particularities of the vote and, in particular, the permanence of electoral behaviour. We will now study how the introduction of the local specificities in the estimation changes the former empirical results.

Local specificities

When using local data, one has to take into account the fact that some regions (or departments) are more inclined to vote for the Left, whereas others prefer the Right. These structural patterns refer in particular to the fact that voting has a strong sociological dimension that may be related to particularities of each region (its political history, its socio-demographic characteristics concerning religious practice, education, age,

income distribution . . .).[43] There are different ways to take these local particularities into account. One method would be to use different explanatory variables measuring the social and demographic structure of the region. Among other limits, this method is really tedious and does not present much interest in the case of pooled time series data.[44]

Two other methods seem preferable. The first one is to use the lagged dependent variable.[45] It is one of the simplest ways of introducing local specificities in a sample of pooled data. The second method consists in allowing the constant or the disturbance in the equation to differ by region or by department.[46] In other words, the equation to estimate is one of the following forms:

$$V_{it} = \alpha_i + \beta\, Unem_{it} + \delta\, Pop_{it} + \varepsilon_{it}$$
$$V_{it} = \alpha + \beta\, Unem_{it} + \delta\, Pop_{it} + u_i + \varepsilon_{it}$$

In the first specification (which is estimated by OLS procedure), α is a constant that differs by region or department. This method of estimation is called the *fixed effects* approach and amounts to introducing as many dummy variables as there are regions or departments.[47] This approach is finally a generalisation of the model where some dummy variables are introduced to account for local specificities, as for example, in Jérôme *et al.* (2003). That study introduces only a limited number of dummy variables (and not as many as there are regions) and therefore acts as an arbitrary constraint on the estimation.[48] For example, the constant of the model is constrained to be the same in all the left-wing regions (or in all the regions for which no dummy variable has been introduced) whereas in the generalised model they may differ for each region. This may seem a less strong hypothesis since it does not require for example that two regions classified on the Left should have the same electoral behaviour.

In the second specification, called the *random effects* model, it is a part of the random disturbance that is specific to each region. More precisely, in addition to the usual error term (ε_{it}), there is the term u_i which is the random disturbance characterising the *i*th region and is constant through time. This second equation is estimated using a feasible generalised least squares procedure.[49]

Whereas they are based on different estimation procedures, the aim of these two approaches is identical. It is to model differences in electoral behaviour across regions or departments.[50]

Taking into account the local particularities of the vote greatly increases the explanatory power of the estimation as one can see with the estimations presented in the Table 11.2.

Table 11.2 Specifications of the departmental model

	Fixed effects	**Random effects**	**Lagged dependent variable**
Intercept	–	43.03***	8.70***
Unem	–0.23***	–0.23***	–0.58***
Pop	2.73***	2.74***	–0.74
Vot(–1)	–	–	0.79***
Adj. R^2	0.83	0.83	0.79
N	480	480	480

*, ** and *** significant at 10%, 5% and 1% level respectively.

This table compares the three different methods of estimation.[51] The first two columns refer to the pooled data analysis method. As one can see, the use of this approach greatly increases the value of the R^2 (the R^2 of the departmental equation was 0.15 in Table 11.1).[52] These two estimations are rather similar but the Hausman test indicates that the random effects model should be preferred to a fixed effects estimation.[53] In the third estimation, the lagged dependent variable is introduced.[54] The result is not very satisfactory. The value of the R^2 is below those of the fixed and random effects models and the popularity coefficient has the wrong sign and is not significant.

The Table 11.3 presents the same estimation for the regional case. The regional estimation results lead to the same conclusion. The explanatory power of the regression greatly increases when using the pooled data analysis models and the use of the lagged dependent variables should be rejected.[55]

Table 11.3 Specifications of the regional model

	Fixed effects	**Random effects**	**Lagged dependent variable**
Intercept	–	35.97***	8.06***
Unem	–0.17***	–0.17***	–0.58***
Pop	8.44***	8.44***	3.73**
Vot(–1)	–	–	0.71***
Adj. R^2	0.81	0.81	0.76
N	110	110	110

*, ** and *** significant at 10%, 5% and 1% level respectively.

In sum, these results show (1) that one has to take into account the local particularities of each electoral region (or department) when using local data to estimate a vote function, (2) the best way to do it is to use the methodology developed for pooled data analysis. One can therefore conclude that it is really better to use local data than national data to estimate vote functions. But which level of detail should one use? It is difficult to evaluate which estimation, at the regional or departmental level, is the best. Their explanatory power, measured in terms of R^2, is identical.

Another way to compare the two estimations is to calculate their prediction power. The following table (Table 11.4) presents the result of the *ex post* prediction of the model at the regional and departmental level. The predictions are of average vote share at the national level for the Left-wing parties. To obtain them, we simply calculated the mean of the prediction at the local level.[56] The table also indicates the absolute mean error (AME) of the forecast computed using the national value of the forecast. The AME of the prediction is lower in the department case.

Table 11.4 gives the figures for the 2002 legislative election. As one can see, the error of the prediction concerning this election is below the AME for the regional model (1.78 versus 1.91), and a bit higher for the departmental model (2.65 versus 1.24). The closeness of these errors to the average suggests a conclusion about the 2002 election: it was not, contrary to what most commentators said, really different from preceding legislative elections.[57]

Finally, it appears that the estimation on departmental data in general is slightly better than the estimation using regional data, because overall it produces less error. This result is not surprising since the department is, in France, the sole electoral entity that is considered as homogeneous (Bon and Cheylan, 1988: 7).

Table 11.4 *Ex post* prediction (1986–2002)

	Predicted vote share		**Actual vote share**
	Regional model	**Departmental model**	
1986	41.84	43.25	45.26
1988	49.71	49.14	49.43
1993	38.69	42.15	42.11
1997	46.59	48.48	47.25
2002	43.00	43.87	41.22
AME	1.91	1.24	

In order to check the reliability of the results, different tests and estimations have been performed. Concerning the explanatory variables, several other variables have been introduced. For example, the popularity indicator used in the former estimations was replaced by different other indicators such as the popularity differential between the left-wing and the right-wing parties, the popularity of the Socialist Party (instead of the left-wing parties). In each case, we used either the indicator in absolute value or in relative value.[58] The empirical results did not change at all. We also estimated the vote function by excluding Corsica (the region or the two departments), as it is done in numerous studies, on the basis that figures for Corsica are highly specific. It turns out that the results are not different when these data are included or excluded from the regression. In other words, the data for Corsica cannot be considered as outliers.[59]

Forecasting the election outcome

We will now study the forecasting power of our estimation. How did this model perform for the 2002 legislative elections? We calculated the *ex ante* forecast based on the estimated coefficient for a reduced sample including only the pre-2002 legislative elections.[60] Using regional data, the 2002 forecast is 43.31 per cent and it is 45.78 per cent for the departmental data whereas the Left received in reality 41.22 per cent of the total expressed votes. Compared to AME of the prediction (see Table 11.4), the forecast errors for 2002 are slightly higher whether one uses regional data or departmental data.

One can also notice that if the *ex post* predictions were better while using departmental data (Table 11.4), the *ex ante* forecasts are worser, than with the regional data. However, if one wants to draw a conclusion about the respective forecasting power of these two levels of analysis, one should take into account that the forecast standard error is higher in the regional than in the departmental model. The figure is 0.62 for the department and 1.13 for the region forecast standard error of estimate. As it is this standard error of estimate that gives the width of the confidence interval of the forecast, one can conclude that this interval is larger for the regional than the departmental forecast. In sum, the 2002 forecast based on departmental data is less accurate but also less uncertain. Therefore, the choice of the level of analysis (regional or departmental) depends on what is considered to be the most important when forecasting.

Given the particularities of the French electoral system, to know the first-ballot vote share does not necessarily offer accurate information

concerning the final result of the election. Other estimation is needed to be able to forecast the second-ballot outcome and in particular the number of seats in the Assembly.

From votes to seats in the Assembly

The main problem that researchers encounter when they want to forecast the final outcome of French elections (that is, the party that will hold the Presidency or the partisan composition of the National Assembly) is to model the second-ballot vote. The principal method that has been used to forecast the number of seats is to estimate a "swing ratio" which is an equation that relates the number of seats to the first-ballot votes. Estimations based on local data are undeniably preferable when one wants to estimate a swing ratio function, in particular, because it allows to be taken into account the divergence in vote share among regions, whereas estimation on national data strongly smoothes the variance of the local results.

The simplest swing ratio function is of the following type:

$$S_{it} = \alpha_i + \beta V_{it} + \varepsilon_{it}$$

Where S stands for the number of seats and V for the first-ballot vote (both in percentage). Estimated on our data, we get the following equations:

At the regional level:

$$\underset{}{S_{it}} = \underset{(4.28)}{-74.35} + \underset{(6.79)}{2.60} V_{it} + e_{it}$$

Adj. $R^2 = 0.60$, $n = 110$

At the departmental level:

$$\underset{}{S_{it}} = \underset{(17.68)}{-105.86} + \underset{(24.04)}{3.20} V_{it} + e_{it}$$

Adj. $R^2 = 0.56$, $n = 480$

Using these equations,[61] we can compute the number of seats that the Left-wing parties will get at the Assembly. To obtain them, we first predicted the fitted value at the local level for each election and then multiplied these data by the absolute number of seats in the local unit.[62]

The Table gives the sum, by election, of these seats. One can compare the AME of the seat prediction of each level of analysis (Table 11.5).

As we can see, the AME is lower for the estimation based on regional data than for the estimation based on departmental data. Therefore, one can conclude that it is better to estimate seat functions on regional data. One explanation of this result is related to the fact that the departmental level is too detailed when one analyses the number of seats. The average number of seats in the regions is 25.2 compared with 5.8 in the departments, with one-third of the departments where there are only two or three deputies. When the department has six seats, a seat share (the fitted value of the equation) between 8.34 per cent and 24.9 per cent leads to predict one seat for the department. The fitted seat share should be in the interval [2 per cent; 5.9 per cent] to predict one seat in a region with 25 seats. Therefore, using regional data allows more precise predictions.

One can also notice in Table 11.5 that the *ex post* predictions are really bad for some elections. It is especially the case for the 1993 election where the model predicts a number of seats much higher than the realised one.

One explanation of this result is linked to the particularities of the French electoral system. In this system, to gather more than 50 per cent of the vote (national average) does not automatically mean a majority assembly at the end of the second round. For example, the final result of the 1988 legislative election was 292 seats for the Left-wing parties that received 49.43 per cent of the first-ballot vote. At the 1993 election they gathered only 83 seats whereas their vote share at the first-round was 42.11 per cent. In other words there is not a direct relation between vote share at the first round and seat share at the end of the second round.

Table 11.5 *Ex post* prediction (1986–2002)

	Predicted number of seats		**Actual number of seats**
	Regional model	**Departmental model**	
1986	226	217	243
1988	298	284	292
1993	147	171	82
1997	267	281	307
2002	180	155	171
AME	27.4	33.0	

The R^2 of the seat estimation is 0.60 (regional data) compared to 0.82 for the vote function. This result is not particular to our estimations. All the empirical estimations of a swing ratio function based on French local data obtain this result (see for example Auberger and Dubois, 2003). Different explanations may be advanced to explain the relatively low explanatory power of the seat function. One explanation refers to the fact that the French political system is a multiparty system. At the first ballot, voters have a choice between many parties[63] whereas at the second round their choice is limited to two or three parties. Therefore, some parties for which some people voted for at the first round are no longer present at the second. What do these voters do at the second round? They may abstain or vote for one of the remaining parties. This explains why the second-ballot vote is not directly related to the first round of the election.

This problem is particularly exacerbated for the FN due to its electoral strength. According to their first-ballot vote, the candidates of this party may be present at the second round in front of either one candidate (from the Left or the Right) or two candidates (from the Right and the Left). This latter configuration is called a triangular contest. If in the first case, the final result is easy to guess, it is harder concerning the second. If the vote for the FN logically reduces the vote for the Right, it also reduces, but more weakly, the vote for the Left. To give an example, at the 1997 legislative election, among the 76 triangular contests of the second-ballot, 47 were gained by the Left and 29 by the Right.

Problems may also occur without the presence of the FN at the second round. At the second round, the voters that voted for the FN at the first round, may choose either to abstain, to vote for the Right or to vote for the Left. The consequences of these three electoral choices will not be the same for the composition of the Assembly.

In other words, concerning the estimation of the swing ratio function, the implicit hypothesis that the French political system functions as a bipartisan system is all the more problematic.

Improving the seat forecast

Different solutions have been envisaged in the literature to increase the explanatory power of the swing ratio function. Some studies have introduced a dummy variable in their analysis to take into account the probability of occurrence of a triangular contest[64] (Jérôme and Jérôme-Speziari 2002, Auberger and Dubois, 2003). Another solution is to estimate a vote function for the FN and to take these votes into account when estimating the swing ratio function. The main difficulty of this

approach is to find the explanatory variables that may explain the FN vote.[65] Some more research is needed on this subject.[66] Here, we will only test the first proposition. In the following estimation of the seat function, we introduced in addition to our former explanatory variables, a variable (*Tri*) that indicates the occurrence of a triangular contest with a candidate of the extreme right-wing parties.[67] One can expect a positive sign for the coefficient associated with this variable since it is generally argued that the FN hurts the right-wing parties more than the left ones.

The results are the following:[68]

$$S_{it} = \underset{}{-107.60} + \underset{(17.33)}{3.21} V_{it} + \underset{(23.29)}{0.07} Tri_{it} + \underset{(3.48)}{e_{it}}$$

Adj. $R^2 = 0.57$, $n = 480$

The coefficient associated with this variable is significant (at the 1 per cent level) and as expected its sign is positive.

The Table 11.6 compares the *ex ante* and *ex post* 2002 forecast for the Left seats in the Assembly, utilizing the departmental data. To obtain the *ex ante* forecast, we introduced the 2002 vote forecast that we obtained before in the seat equation that is estimated on all the elections before 2002.

On the first row, the first value (220) is the *ex ante* forecast obtained with the first seat equation (with departmental data and without the *Tri* variable)[69] and the second (202) is the *ex ante* forecast with the estimation that takes into account the occurrence of a triangular contest. In reality, the number of seats for the Left in 2002 was 171. The problem is that the *Tri* variable is only known at the end of the first round. In the table, the figures refer to the forecast based on the realised number of triangular contests. If one wants to make an *ex ante* forecast before the first round of the election, one has to draw different scenarios. One can consider that the two extreme scenarios are 1. a situation without any triangular contest, 2. the same situation as in 1997 (where the number of triangular contests was the highest of the Fifth Republic). The seat forecast

Table 11.6 Seats for the 2002 elections (departmental data)

	Specification 1	**Specification 2**	**Specification 3**
Ex ante forecast	220	202	200
Ex post prediction	155	145	188

corresponding to the first scenario is 202, whereas it is 210 seats in the second scenario. The result in the table is similar to the first scenario forecast.[70] The introduction of the *Tri* variable improves the forecast, since there is an error of 49 seats with the first specification and of 31 with the second specification.

The figures of the second row are the predictions that we obtain when we introduced the actual 2002 vote share of the Left in the seat equation estimated on all the elections before 2002 (and with the actual number of triangular contests).[71] As one can see the error is strongly reduced.[72] This result indicates that a large part of the error in the 2002 seat forecast is due to the error in the 2002 vote forecast. It is the reason why we choose to estimate a third specification.

Specification 3 is an equation that directly relates the seat share at the departmental level to the determinants of the vote (instead of the vote share), that is the popularity indicator and the unemployment rate.[73] The forecasts given by this estimation are as good as the forecasts given by the seat function.[74] Therefore, one can conclude that it is finally as good to estimate a direct relation between seat and the determinants of the vote, rather than a swing ratio function.

This result opens a new area of research for the electoral forecasting model. Instead of trying to improve the vote function, it may be preferable to improve directly the seat function. This seat function should use as explanatory variables the determinants of the vote instead of the vote share.

Conclusion

One aim of this chapter was to offer a brief survey and to evaluate the vote function literature applied to the French case. Numerous interesting points have been studied in the literature, especially concerning the political part of the vote function. But on the whole it seems that each author builds his or her own vote function without comparing it to the existing ones.

The aim of our empirical study was not to offer another new function. It was to define the basic conditions that a reliable vote function should respect. Hence, owing to the particularities of the French party system, we argue that it is preferable to use the left-wing vote share for the dependent variable, rather than the vote for the incumbent. The empirical study shows that it is really better to use local data to estimate vote functions. It allows for the accounting of the local specificities of the vote. We also argue that the best econometric approach when using

local data is to apply the methodology of pooled data analysis. However, the choice of the level of detail (regional or departmental) is not settled once and for all. The use of departmental data definitely increases the number of observations but faces the problem of a lack of data at the local level (i.e., as the popularity indicators).

What should the agenda for future research be? We have seen that many things deserve more attention. In particular, much work is needed concerning the modelling of the seat functions. The equation that may allow the transformation of the first-ballot vote into seats is yet to be discovered. One track to explore is the direct estimation of the seat function. That may reduce the loss of information and also the error of the forecast due to the fact that the *ex ante* forecast of the seat number is based on the *ex ante* forecast of the first-ballot vote.

Appendix: The variables – Definition and sources

V: Vote share (in per cent) received by the left-wing parties at the first round of the legislative election as a percentage of the total number of expressed votes (blank and null votes excluded). The left-wing parties include extreme left, communist party, socialist party, left radical party, ecologists parties and various minor left parties. *Source*: Ministère de l'Intérieur (French Home Office). Some of these data come from the database of the CIDSP–BDSP, Université de Grenoble.

Pop: popularity of the left-wing parties given by the SOFRES polls institute 3 months before the ballot. This variable is built in weighting the sum of the popularity indexes for the communist party, the socialist party, and the ecologist party, the three expressed in ratio (per cent of people that have a good opinion on the party/per cent of people that have a bad opinion on the party). The weights are computed according to the political strength (the vote share of the Left vote) of each party (communist/socialist/ecologist) at the previous legislative elections: 1978: 0.50/0.50/0.00, 1981: 0.40/0.60/0.00, 1986: 0.30/0.70/0.00, 1988: 0.20/0.80/0.00, 1993: 0.20/0.80/0.00, 1997: 0.20/0.60/0.20, 2002: 0.20/0.65/0.15.

Unem: unemployment rate in the quarter preceding the quarter of the election ballot multiplied by a dummy variable equal to one when the Left is the incumbent and to minus one otherwise. *Source*: INSEE.

Tri: percentage of districts in each department where there is a triangular contest with a candidate of the extreme right parties. *Source*: Auberger and Dubois (2003).

Notes

1. We thank Michael Lewis-Beck for his helpful comments and his careful revision of the English of this text. We also benefited from useful suggestions by Jean-Dominique Lafay and Patricia Vornetti.
2. According to Lewis-Beck and Paldam (2000), there exist at least 200 articles and books devoted to the study of vote and popularity functions. Recent special issues of journals have been devoted to the vote function. See for example, *International Journal of Forecasting* (1999), *Electoral Studies* (2000), *American Politics Research* (2001).
3. When the objective is to explain the popularity of the government, the function is called a popularity function. Here, we will not comment at all on the popularity function literature.
4. We will consider below slightly different methods of estimation.
5. Generally, the models use as dependent variable the first-ballot vote share. An exception is Auberger and Dubois (2003) who consider the second-ballot vote at the legislative election (or the first-ballot when there is no second round).
6. All the recent studies of French electoral outcome consider the incumbent vote as the dependent variable while the first studies used the vote for the left-wing parties.
7. Obviously, the FN party is ideologically closer to the Right, but, at the same time, its members behave as opponents when the Right is governing.
8. We will return later on the notion of cohabitation.
9. This was the first vote function that was explicitly aimed at forecasting French elections outcomes.
10. The degrees of freedom of an estimation are equal to the number of observations minus the number of explanatory variables (including the constant).
11. The *ex ante* forecast value of the dependent variable is based on the coefficient of an equation which is estimated on a sample that excludes the election that is forecast. This should not be confused with the *ex post* prediction which is simply the fitted value of the dependent variable (where the equation is estimated on the whole sample including the election that is fitted).
12. It is eventually possible to have, in the estimation used to forecast, one variable that is not available before the first-ballot. The solution is then to draw different scenarios according to the value we expect for this variable.
13. As the value of this dummy variable was zero for all past elections, this variable cannot be present in the estimation used to make *ex ante* forecast about the 2002 election. It turns out that in the empirical study (including the 2002 data) this estimated coefficient is one of the highest of the estimation (their results indicate that the cost for the Left of this new political configuration amounts to 6.23 per cent of the vote).
14. There were 12 legislative elections and 7 presidential elections.
15. The aim of some studies is mainly to forecast election outcome.
16. See the survey of Lewis-Beck and Stegmaier (2000).
17. The electoral decision of a sociotropic voter is related to his or her opinion about the general economic situation while the decision of an egocentric voter depends on his or her personal situation.
18. The voters consider the recent past and not the economic situation that occurred a long time ago to evaluate the government performance.

19. For example, Lafay and Servais (2000) focus on the impact of scandals on the vote and Jérôme *et al*. (2003) study the role played by the inversion of the electoral calendar that occurred in France in 2001.
20. The choice of one of these indicators is generally driven by a problem of data availability. The unemployment rate is, for example, one of the few economic series that exist at the local level in France.
21. It is not really true to argue that no one has tried to sort out egocentric versus sociotropic for the French case. But these issues have been studied only with survey data (and not with aggregate election data). See for example, Lewis-Beck (1988, 1996, 1997a) who shows that the French voters are sociotropic and that pocketbook effects are negligible.
22. The first studies introduced only economic determinants in their estimation (for example, Rosa and Amson 1976; Fair 1978).
23. In the case of France, there are also institutional factors (see later on this point).
24. Obviously, the government popularity is likely to be influenced by economic factors but the correlation is not perfect, (Lewis-Beck and Rice, 1992).
25. It is then necessary to use local data since the introduction of a large number of explanatory variables imply the need to increase the degrees of freedom of the estimation.
26. In Jérôme *et al.* (2003) the ideological strength of a region is measured by a dummy variable that equals one if the region has always been on one side of the political spectrum between 1974 and 1997. In Jérôme and Jérôme-Speziari (2002), the dummy variable is slightly different. Its definition is the same but the data is recalculated at each election. One problem associated with these dummies is that sooner or later there will be no more case where the dummy will be one. In 2002, there is, for example, no longer any region whose political colour remains on the Left since 1974 (6 regions still have a right-wing ideology). This means that it will be necessary, in the future, to compute a new variable to account for the ideological strength of the regions.
27. Except when it was the municipal elections since these elections are more difficult to assess according to the right-wing/left-wing criteria.
28. See p.xx.
29. See p.xx.
30. It also measures the opinion about the parties' programs, the image of the parties . . .
31. As a general rule, an increased participation benefits the left-wing party but less when it is the incumbent.
32. It is a cross section analysis that considers the first-ballot of the 1995 municipal election in a sample of 92 cities.
33. The figures are 71.60 per cent for the last presidential election (first-ballot vote) and 46.76 per cent for the last European election.
34. See the Appendix for a precise definition of the variables and for the sources of the data.
35. This problem of data availability considerably reduces our sample of elections since the series of unemployment data at the local level starts in 1978 concerning the regions and only in 1982 concerning the departments.
36. As is usual, we consider that the Left is the incumbent when it has a majority at the Assembly (whatever party the President belongs to).

37. Partisan considerations may play a role, especially if one considers that each party represents constituencies with different views and interests regarding the macroeconomic variables. The left-wing parties may be considered as more inclined to fight unemployment and therefore this may increase the vote for a left-wing opposition when the unemployment is growing. On these points, see in particular the partisan political business cycles literature (Hibbs, 1977; Alesina, 1987). We will not test this partisan hypothesis in our empirical study.
38. Especially when the Prime Minister changes whereas there is no change in the political orientation of the government.
39. But not in 1997 (whereas the 1997 legislative election followed the 1993 one) since in 1997 there was no longer any cohabitation (it ended with the 1995 presidential election).
40. At confirming legislative elections, it is generally argued that the result is biased in favour of the party that just won the presidential election.
41. It seems preferable to use presidential elections data to assess the electoral effect of the cohabitation.
42. With five elections as in our sample, the R^2 of the national estimation is not significant when there are the two explanatory variables.
43. On the sociological determinants of the vote, see for example, Boy and Mayer (2000).
44. As the socio-demographic variables are highly structural, they do not change a lot from one election to another. Moreover, one may encounter a problem of data availability since some of these socio-demographic variables are not frequently updated.
45. In other words, it is the percentage of vote received by the Left at the last legislative election.
46. Whereas in the standard OLS estimation, the constant is constrained to be the same in all electoral units.
47. It is why this method is also called the least squares dummy variable model.
48. One advantage in introducing these dummy variables could be to offer some genuine explanation of the electoral results but it appears that these variables are generally defined in an ad hoc way. For example, these dummy variables do not offer any explanation of why some regions keep their ideological preference while others change them from one election to another.
49. On these pooled data analyses, see Greene (1997).
50. Different statistical tests can be used to test which approach is the most appropriate. See p.xx.
51. Due to a lack of space, we do not present the value of each regional specific effect. Therefore, in the table, there is no constant in the equation with fixed effects.
52. One should notice that the second estimation is made using a random effects model. This method amounts to using a feasible generalised least squares procedure and there is no precise counterpart to R^2 in this FGLS procedure (Greene, 1997). The R^2 that is given in the tables is the pseudo-R^2 calculated by Eviews.
53. A Fisher test indicates that it is better to use a fixed effects model than a standard OLS model without any effects and a Lagrange Multiplier test indicates

that it is better to use a random effects model than a standard OLS model without any effects.

54. The estimation is OLS without any effects.
55. The statistical test concludes, as in the departmental case, in favour of a random effects model.
56. Auberger and Dubois (2003) show that the means of the departmental vote and the national vote are not statistically different.
57. That is also the conclusion of Parodi (2002).
58. For example, when we take the difference between the percentage of voters having "a good opinion" and those having "a bad opinion", the relative value of the indicator refers to the ratio of these two percentages.
59. The use of more formal methods to detect outliers in a regression (such as those based on the studentised residuals) leads to the same conclusion.
60. We still used the random effects model.
61. These estimations are made using OLS without any specific effects since it is the more appropriate according to the statistical test that assesses the validity of using either a fixed effects model, a random effects or a model without specific effects.
62. The method of estimation used does not prevent the fitted value (the seat share in percentage at the local level) from being below zero or superior to one. In those cases, we rounded the fitted value respectively to zero or to one.
63. At the 1997 legislative election, almost fifty differently labelled partisan groups were present at the election (Lewis-Beck 2000: 4).
64. Such as a dummy variable equals one when both the Left and the FN are politically important at the local level and the Right is the incumbent and equals zero otherwise.
65. Obviously, one can use as explanatory variable the score of this party at the past election (cf. Jérôme *et al.*, 1993) but this is not enough as it does not allow explanation of the evolution and the fluctuation of the vote for the FN.
66. For a first attempt to estimate a vote function for the FN, see Jérôme and Jérôme (2002).
67. The value of this variable is 100 in 1986 since there were no triangular contest but only one ballot. See the appendix for the source of this variable.
68. The estimation is made on departmental data since we have only data for the *Tri* variable at this level of analysis.
69. The *ex ante* forecast on regional data is 233 seats (without the *Tri* variable).
70. This result is not surprising since there were, in 2002,only 9 triangular contests for 555 electoral districts compared to 76 in 1997.
71. On regional data, the *ex post* forecast is 180 seats (specification 1).
72. This time, specification 1 is better than the specification including the *Tri* variable.
73. To estimate this equation, we used a random effects model as the test shows that it is the most appropriate. Both the coefficients associated with the popularity indicator and with the unemployment indicator have the correct sign and are significant at the 1 per cent level.
74. On regional data, the *ex ante* forecast is 210 seats and the *ex post* forecast is 191 seats.

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