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The Impacts of Policy Issues on Voting Behavior in Taiwan: A Mixed Logit Approach

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Abstract

Policy ideology does play an important role in influencing voting behavior since Downs proposed the famous spatial voting theory in 1957. The majority of the research in Taiwan however focuses much more on the sociological and psychological factors such as the ethnicity and "Lee Tun-hui Complex". This contribution of the study is to propose a jointed voting model to test different voting theories simultaneously. Moreover, Mixed Logit model that help to measure individual-specific and choice-specific independent variables is operated for several empirical tests on the 1996 Taiwan Presidential election. It is found that even if voter's party identification and evaluation on candidates' competent are significant, most of the sociological factors including the ethnicity, income, and education are not noteworthy in explaining voting decision as previous studies. Most importantly, voter's policy preference does play an important role although the policy distance between candidate and voter may not be the only way to affect the decision. It is found that the direction theory, proposed by Rabinowitz and MacDonald in 1989, is also significant.

Keywords: spatial theory, directional theory, Mixed Logit

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Of the voting behavior theories, rational choice model of voting, also known as economic approach of voting, attracts a lot of attention since Downs seminal work *An Economic Theory of Democracy* in 1957. Voting decision under this paradigm is the outcome of an explicit cost-benefit calculation simply from the voter and candidate's policy ideology. Since then, there are enormous amounts of research emerging under this division. The most important and complex rational variables are from different versions of spatial voting theories-proximal spatial theory and directional spatial theory. Downs proximal spatial model assumes voter's preference follows directly from the closeness distance between voter's ideal point and candidate's policy position. Several efforts have attempted to modify this proximity theory since Rabinowitz and MacDonald proposed their new version of spatial voting, direction theory, in 1989. Directional theorists believe the selection of candidates or parties is based on the direction and intensity of their policy differential. Comparing to the traditional proximity logic, directional theory contradicts conventional wisdom that the closer the individual's policy position to the party's ideal point, the more favorably the individual would rate the party. The rational postulation apparently does not lead to the same conclusion for these two different spatial theories. Since then, there have been many efforts trying to combine these two versions of spatial theories (e.g. Rabinowitz and MacDonald 1989; MacDonald et al. 1991; Merrill 1993; Iversen 1994; Dow 1998; Adams and Merrill 1999; Lewis and King 2000), a correct function form however is still vague and the statistical method for the empirical test is indistinct.

The rational analysis of the electoral behavior is also important for the empirical research in Taiwan. Since the political reform in the late 1980s, Taiwan holds elections more frequently than any other polity except for the United States (Robinson 1997:3). Elected officials include village chief, county magistrates, provincial assembly and provincial governor, members in Legislative Yuan and National Assembly; and beginning in 1996, President and vice-President also derive authority from election to fixed terms. Policy platform and policy ideology, without doubt, plays an important role in these campaigns. Moreover, the party cleavage in Taiwan depends mainly on different policy standpoints, especially the unification-independent from China issue and welfare state policy that the Democratic Progressive Party (DPP) has been pursuing. Unfortunately, according to Fu (1998), the way these policy platforms affect the constituency' voting behavior remains ambiguous.

Following of the study will start to review the rational choice approach in voting behavior and try to organize a unified theoretical model of voting. Of which, different branches under rational choice stream will be incorporated. Estimations from Mixed Logit model, (1) a new empirical methodology following McFadden's Conditional Logit legend, will be presented.

Rational Choice Approach in Voting Behavior

The essence of the economic approach is adopting the concepts of rational calculation and objective utility in explaining individual voting behavior. Voting decision, under this paradigm, is the outcome of an explicit cost-benefit calculation. Although there are several branches under this approach, all of them share the idea of rationality in voters. The first mainstream under the economic approach is (proximal) spatial theory of voting. Since Downs seminal book, an enormous amount of research has been done on this subject. The key concept of spatial voting model is the central tendency of the distribution of voters' preferences. With a single issue of dimension, the partisanship and vote choices are related to the relative distance between voters' preferences and the positions adopted by party leaders and candidates. In spatial theory terms, the voter will cast his vote for the candidate closest to him in a space that describes all the policy factors that are of concern to the voter. Later on, spatial theorists start to expand the traditional uni-dimension of political issue into a multidimensional analysis. They also build up a mathematic and graphical methodology to represent candidates and voters as points in Euclidian space. The fundamental property of the modern spatial model becomes the representation of voter utility as a function of spatial distance (Enelow and Hinich 1984). More specifically, a voter's preference for a candidate is inversely related to the distance separating the two. The primary utility function for voter i to vote for candidate θ is expressed as $U_{ij}(\theta) = - \| \theta_{ij} - X_{ij} \|_{Aij}$. Where θ_{ij} is voter i's perception of candidate θ's position on policy issue j; X_{ij} is voter i's ideal position on issue j, and A_{ij} is a symmetric positive definite matrix of weights measuring the relative importance of issues to voter i. Voter i votes for candidate θ over other candidate ψ if and only if his utility for θ is greater than that for ψ. The negative sign preceding the right hand side indicates the fact that voter's utility will decrease if the difference between θ_{ij} and X_{ij} increases. Therefore, voter i's utility of voting candidate

θ is maximized when X_{ij} equals θ_{ij}. That is the situation when the voter's policy position is exactly identical with that of the candidate. After all, electoral competition and equilibrium result take place primarily on the predictive dimensions as described in the equation.[2]

The conventional proximal spatial theory has undergone serious criticism ever since Downs proposed it. Rabinowitz and Macdonald (1989), following Stokes' (1963) concept of dispositional or diffuse political issues,[3] argued that the voters' judgement is based on their direction of the political issue toward candidates. That is, in contrast to the spatial distance of voting choice, under Rabinowitz and Macdonald's directional model, "selection of candidates is based on the direction and intensity of change from a status quo or neutral point." According to Rabinowitz et al. (1989) and Macdonald et al. (1991), the spatial formula to calculate the directional effect of policy issues may be presented as: $\sum(\theta_j \times X_j)$, or $|\theta||X| \cos\theta X$. The component j indexes the various issues of relevance in the campaign. θ and X stand for vectors of policy distances from neutral point, for candidates and voter respectively. $|\theta|$ and $|X|$ represent the length of vector θ and X. Finally, $\cos\theta X$ is the cosine of the angle formed by the vectors θ and X. The component, $|\theta||X| \cos\theta X$, is the scalar product which distinguishes from the length component of proximal spatial theory.

The different assumptions between proximity theory and directional theory is that directional theory proposes a combination of directional compatibility and intensity that determines the affect of voter toward the candidate. While for the proximal spatial theory, it is believed that only the distance determines the affect. Moreover, their difference may also be observed in their inferences of the candidates' optimum policy position. Unlike the well known "medium voter theorem" in the spatial theory, the directional model implies that a candidate may adopt a wide variety of issue positions that are just as desirable as the center.

Another branch of rational voter theory is called performance voting or economic voting, distinguishing from issue voting tradition of Downsian approach. According to this line of attack, government economic policies and the consequent economic performance are the basis for voting choice. The electoral result is the reflection of the dynamic economy. Vote therefore is treated as a reward-punishment tool to the incumbent. The reason and advantage of performance voting for the voters themselves is that it helps to distin-

guish different parties when they have similar platforms and current policies (Downs 195 7: 44). Moreover, it also offers the electorate a reasonable shortcut to ensure unsuccessful policies to be dropped and successful ones to be continued. (Dalton and Wattenberg 1993: 208.) A major debate over the performance voting is the timing of economic conditions on voting. Key (1966), the representative of retrospective voting theory, pursues that voter is merely required to make a retrospective assessment of current incumbent's performance in office, and then votes the incumbents to reward them if they are better off financially, and vice verse. The essence of retrospective voting is to keep the administration in check with voter's expectations and to induce the government policy to satisfy the electorate's expected utility. (Kramer 1971). Another version is called "prospective voting" or "sophisticated voting." According to Chappell and Keech (1985), voters utilize their votes, instead of being reward-punishment tool for their financial consideration, to direct the government toward the socially optimal policy they desire. Sophisticated voters consider future economic performance and infer whether the incumbent's past macroeconomic policy stance was correct and use the inference to predict the future economy if the incumbent stays in power (Susuki 1991).

The rational choice theory of voting unfortunately has not yet drawn much attention in Taiwan. Some discussion on the issue voting in Taiwan may be found in Hsieh et al. (1995) and Chung (1998). Lin et al. (1996) and Liou (1996) also used Enelow-Hinich spatial analysis to present the political dynamics in Taiwan. The general feature of these studies is that, although they noticed the importance of policy issues, most of them still take other non-policy issues, such as party identity or candidate competent, very seriously into their analysis.

Model and Methodology

As mentioned earlier, there have been several efforts, such as Rabinowitz and MacDonald (1989), MacDonald et al. (1991), Merrill (1993), Iversen (1994), Dow (1998), Adams and Merrill (1999), and Lewis and King (2000), trying to combine these two versions of spatial theories. Although these studies generate different appearances, the common idea underlying the unified voting model may be summarized as following:

$$V_{ij} = F(U_{ij}, \Omega)$$

$$U_{ij} = -\sum_{k=1}^{k}(\mu_{i.k}^{2} - C_{ij.k})^{2} = -\sum_{k=1}^{k}(\mu_{i.k}^{2} + C_{ij.k}^{2}) + \sum_{k=1}^{k}2\mu_{i.k}C_{ij.k}$$

$$where \sum_{k=1}^{k}(\mu_{i.k}^{2} + C_{ij.k}^{2}) \text{ is the length variable.}$$

$$and \sum_{k=1}^{k}2\mu_{i.k}C_{ij.k} \text{ is the scalar product.}$$

i represents each voter, i = 1, 2, 3, ... , n. j is the candidate(s), and k is the policy issue(s). V_{ij} means the voter i's decision to vote for candidate j is based on voter i's policy utility with regarding to the candidate j's policy positions, U_{ij}. Moreover, voter i's utility is composed of two elements. $\mu_{i.k}$ is voter i's location at each k policy issue, and $C_{ij.k}$ is voter i's perception of candidate j's ideal point at each k issue. Ω_i refers to all other non-policy factors or called valence dimension. The advantage of the unified rational model is to comparing two versions of spatial theories simultaneously. The length component measures the policy distance between the voter and the candidate and as a matter, it represents the effectiveness of proximity theory. The scalar component, for the directional theory, captures the directional effect between the voter and the candidate. Moreover, although both length variable and scalar product are composed of voter and candidate's policy points, the significant proximity theory relies on the negative magnitude of length component while the coefficients in scalar product is supposed to be positive in directional theory. Another feature of the unified model is that there can be included as many policy issues as possible. Take Taiwan as an example, we may concurrently analyze the effectiveness of a party's different policy platforms, say unification-independence from China issue, welfare issue, and political corruption issue, at the same time.

In general, there are two data characteristics in this unified voting model. One is the dependent variable is multiple discrete choices of different parties or candidates. The second is the independent variables contain both choice-specific (U_{ij}) and individual-specific variables (Ω_i). For the second one, the most widely adopted discrete choice model in dealing with multiple categorical outcomes, Multinominal Logit (MNL), is not applicable

since it only deals with individual-specific variables. To solve the problem an increasingly popular multiple discrete choice model, Multinomial Probit (MNP), may become the celebrity. Many electoral studies using MNP can be seen in Alvarez and Nagler 1995, 1998a, 1998b; Adams and Merrill 1999; and Lacy and Burden 1999, 2000. Unfortunately, despite the considerable improvement in MNP, this new methodology also has its own limitation. First, the computational burden of computing multidimensional normal integrals makes the model impractical. Currently, few commercial statistics package is capable of managing MNP estimation. More seriously, MNP encounters the identification problem because of its postulation on the error distribution. That is, the assumption of multivariate normality in the stochastic term leads the correlation between unobserved error utility in MNP unexplainable and makes it easy to suffer the model misspecification problem (Glasgow 2000: 3). This is the reason that in practice MNP model may not always be identified or estimated and there are often more than one set of parameters in the error covariance matrix and so does the slope estimations. It is also known as the fragile identification problem inherent in MNP (Alvarez and Nagler 1998: 77). Because of the dilemma in the normality assumption, Glasgow mentioned the ineptitude of MNP in dealing with spatial theory of voting (Glasgow 2000:22).

In this paper, Mixed Logit (MXL) is used as a substitute model to get rid of the choice-specific variable problem in MNL and the identification problem in MNP. Based on MXL, the predicted probability of individual i choosing candidate or party j is calculated as:

$$P_{ij} = Pr(y = j \mid x_i, z_i) = \frac{exp(x_i \cdot \beta_j + z_{ij} \cdot \alpha)}{\sum_{j=1}^{j} exp(x_i \cdot \beta_j + z_{ij} \cdot \alpha)}$$

The coefficient β_j is subscripted based on the individual alternatives and so the model estimates a set of coefficients for each choice j. zij, different from xi, denotes the choice specific variables and there is only one single α coefficient for each z variable throughout different outcomes. Comparing to MNP, the MXL computation is relatively easier and most importantly, MXL may estimate a more realistic substitution patterns and allow for great

flexibility in specification structure (Glasgow 2000). However, few study in voting research, except Alvarez and Nagler (1998) and Glasgow (2000), has applied MXL.

Data in 1996 Taiwan Election

The importance of the 1996 election in Taiwan relies on the fact that, after the 1994 Constitution amendments, it marked the first presidential election to a popular, single ticket, and plurality system. The KMT nominated Lee Teng-hui as the president candidate and Premier Lien Chan as his running mate. Lee without surprisingly made a overwhelm victory over his opponents. To test how different rational choice theories have worked on the voting behavior, an election survey of Taiwan conducted by the Election Study Center (ESC) at National Cheng Chi University, is chosen. The total respondents of the survey are 1,396.

To make the raw data structurally ready for the Mixed Logit analysis requires several rearrangements. The first issue concerns missing values in the voting choice variable. In the questionnaires, there are five categories including four candidates and one missing value. 393 missing cases indicate that the respondents refused to answer this question and these cases have to be eliminated in the unified rational model because the perceptions of candidate's policy location from these people (i.e. $C_{ij.k}$) are indecisive. Second, the choices of Chen and Lin are combined into one category to indicate the semi-NP votes. This assumption is a critical and necessary step at this moment because the policy questions in the poll are based on three parties instead of four candidates. To satisfy the unified rational model and data limitation, the discrete choice for now is changed to party vote instead of voting for different candidates.

As mentioned earlier, the electoral decision to a specific party (V_{ij}) under the unified rational voting model relies solely on the voter's policy utility to this specific party (U_{ij}). In other words, it has nothing to do with the voter's policy utility corresponding with other candidate (e.g. Uil). MacDonald et al. proved that mathematically the voter's policy utilities to two parties are completely opposing and therefore, it requires only one to explain the voting decision (MacDonald et al. 1991: 1126). This argument implies that the policy variables, including the length variable and scalar product, are actually candidate-specific variables instead of individual-specific variables. For that reason, some

structural rearrangement is also necessary for the policy-oriented variables including Mainland policy, economic and welfare policy, and social order/personal freedom issue. Another two rational choice variables, retrospective and perspective evaluations, carry the simple individual specific feature and will be considered in the following estimation as well.

Estimation of Mixed Logit Model

The overall MXL model in Table 1 provides statistical significance and meaning. Since policy direction and distance between party and voter are created as choice specific variables, their coefficients in MXL are consistent throughout different party choices as shown in Table 1. Of the three policy issues, policy ideals of economic/welfare priority and social order issue have significant effects on voting result in respect of the directional consequence. That is, voters make the electoral decision based on whether they share the same side on the economic and political policy platforms with the party, instead of how close that might be. Unlike the economic and social order policy preferences, which have solely directional effect on the voting behavior, the Mainland policy coefficients are statistically significant in both distance and direction components. That is to say, the voters judge this party's platform in both perspectives considerably. From the party or the candidate's viewpoint, they better keep their national identity policy as similar with their constituents as well, in terms of distance and direction.

Table 1 here.

Furthermore, Table 1 also indicates the importance of performance voting in Taiwan election. The negative sign on retrospective assessment indicates when the voters appreciate more on the KMT government's previous achievements; they are less likely to vote for either opposing parties including DPP and NP. On the contrary, the prospective evaluation, another performance voting variable, is not so consistent and significant in determining the party votes. This comparison between retrospective and prospective evaluations satisfies Key's (1966) scheme that the vote is a reward-punishment tool for the voters to check the government's previous performance.

Other Electoral Behavior Theories

Although Table 1 provides a satisfying result for the rational choice model of voting, the majority of the electoral studies in Taiwan follow the roots of other voting approaches. Many of them have been paying much attention on the significance of voters' ethnicity, national identity and their cognition as influencing the voting decision. The reason for focusing on these psychological perceptions in Taiwan electoral studies derives mainly from the intricate historical, cultural, and ethnic connection with Mainland China. The most popular index in explaining people's political behavior is their national identity. In Taiwan, national identity refers to the sub-ethnic cleavage between people's preference for unification with or independence from China. Chen (1995) and Shyu (1996) found this national identification, instead of the partisan identity popular in western electoral behavior, as the prime factor for voting choices. According to them, those with strong Taiwanese independence ideology favor DPP candidates, while those with strong Chinese unification conscious are pro New Party and/or KMP. You (1996), furthermore, pointed out that the factor underlying Taiwanese national identity actually stems from their different ethnic identity and group consciousness. He found lower educated and middle age Taiwanese have stronger Taiwanese ethnic identification and support DPP and its Mainland policy. On the other hand, those who identify themselves as Chinese have the characteristics of youth and high education. These people support KMT strongly even though they are not the majority. Several other studies, like Liaw (1996), also find the independent influence of the sociological effects (i.e. education, residence, age, income, marriage, gender, and occupation) in persuading the voting behavior in Taiwan. The sociological factor itself, however, is not enough to explaining the voting behavior (Fu 1996). Another important variable influencing Taiwanese voting behavior is the voter's perception of the candidates. Fu (1998) emphasized that candidate's characters, including their competence, integrity, reliability, charisma, and personal comments were strong criterion for the voting decision in the 1994 Taipei mayor election. That is, instead of party or ethnic identity, she found that the voter's evaluation of the candidate was the major factor. Hawang (1996), Liaw (1996) and Liang (1994) have offered a similar conclusion in other elections. Similarly, Shyu (1995) and many other scholars

used the term, "Lee Teng-hui complex," to describe Lee's personal charisma as having the strong effect on KMT vote turnout in several elections. Chu (1996), nevertheless, compared the party identity and candidate evaluation and found regularity in party voting, at least in the 1991 National Assembly election.

These studies may be ascribed into other theories of individual voting behavior-sociological approach and socio-psychological model. The pioneers of sociological approach were lead by several Columbia University's scholars in the early 1940s. According to this approach, voting decision is influenced by voter's group consciousness since people use group cues to guide their voting choices. In other words, sociological factors create common group interests that shape the party coalitions and define the images concerning which party is most attuned to the needs of various types of people (Dlton and Wattenberg 1993). Lazarsfeld, Berelson, and Gaudet's famous book, *The Peoples Choice* (1944),is one of the masterpieces for sociological approach in voting researches.(4) The characteristics of sociological approach, according to Berelson et al. (1954), is that personal opinion and attitudes are gradually influenced and formulized through continuous discussion and interaction with the family and relatives. This sort of personal communication within the groups and subgroups furthermore affects his or her voting decision as well as other social behavior. Because of the reason, sociological approach emphasizes the importance of social groups like labor union, political party, occupation, race, peer group, ...etc.

Social-psychological model of voting, also known as Michigan model of voting, has been one of predominant paradigms in voting studies since the publication of *The American Voter* in 1960. Campbell and his Michigan University colleagues asserted a lack of ideological awareness and understanding by the American electorate. They concluded that the electorate "is almost completely unable to judge the rationality of government actions; knowing little of the particular policies and what has led to them, the mass electorate is not able to appraise its goal or the appropriateness of the means chosen to secure these goals." (Campbell et al. 1960: 543). The focus of the Michigan approach is the mediating role of long-term psychological predisposition, particularly the party identification, in guiding citizen actions. Generally speaking, socio-psychological model assumes individual voting behavior is predetermined by a set of long-run social and psychological variables including the voters' party identity and their perception of candidate's personality. They

particularly emphasize, on the party identification as a power predictor of voting choice. That is, party identification acts to filter individual's views of the political world, providing them not only with a means for making voting decisions but also with a means for interpreting short-term issues and candidates since parties are central actors in most political conflicts (Dalton and Wattenberg 1993).

More Mixed Logit Analysis

To make an accomplished consideration of the voting behavior in Taiwan, a full model that incorporating variables from rational choice theory, socio-psychological model and sociological approach, is tested in Table 2.

Table 2 here.

Not surprisingly, Table 2 illustrates the importance of Michigan model variables. Voter's party identity and valuation to candidates based on the socio-psychological model of voting are quite powerful in explaining the voting behavior in Taiwan. Higher party appraisal on each party has a robust positive influence on the voting for the same party. The impact of party identity on each party voting is impressively since all effects are significant at 0.01 confident level. Four candidates' evaluations encompass the same pattern and significance as the party identity. The positive and statistically significant coefficients of Chen and Lin's evaluations on voting for the NP also validate the process of combining them as the NP votes into Mixed Logit analysis. As for those long-term sociological variables, they do not have much stimulus individually. Some specific influences though may be found in the voter's age, residential area and religion preference. However, while several statistical tests are implemented, it is found that the structure of the sociological variables is not stable and consistent.[5] In Table 3, the Mixed Logit is operated again without these sociological variables, and not surprisingly, the significance of all other variables does not change much and Pseudo R^2 drops only 2%. It signifies the incapability of sociological factor as a whole in explaining the voting behavior.

Table 3 here.

While comparing Table 3 with the original Mixed Logit analysis in Table 1, it is

found that rational choice model itself starts to elaborate. First, the effect of directional theory is no longer distinguished in determining the voting decision. Party's economic and welfare policy is the only issue left with directional effect. Secondly, unlike social order issue, Mainland policy remains its effect but only in the distance perspective. Third, although the coefficient of "Econ/Welfare Policy Length" becomes significant, the positive sigh leaves it unexplainable and may be neglected.(MacDonald et al. 1991)

Generally speaking, it is found the effects of rational choice model become intricate after controlling several socio-psychological factors such as party identification and candidate's evaluations. However, it may still be concluded that Mixed Logit analysis justifies the significance of rational choice model in explaining the voting behavior in Taiwan. It is just that we may need to be careful in interpreting its dynamic character.

Conclusion

Downs rational analysis of voting recasts the voting theory in economic terms. The voter is the consumer who uses votes as dollars to express his or her demands in political policies. The politician and the party on the other hand is the suppliers of the governmental policies, trying to attract enough votes to win the election. Following the policy proximity logic, Downs predicted that parties will mover toward the median voter. Although it may still be true for the party to propose the platform in Mainland policy, this paper find policy direction between party and voter is much important for the economic and welfare policy. The party and candidate therefore may as well succeed being the extremist in the policy of this kind.

Although this paper uses appropriate statistical model to examine the electoral turnout and find the rationality rooted in the voting decision, there remains some criticism to the election in Taiwan. According to the 1997 Human Rights Reports published by the U.S. State Department, there were still several problems in Taiwan election such as the corruption, abuse of political influence, and political libel. This condemnation to Taiwan election may actually occur especially in the local and legislative elections where the single nontransferable voting system (SNTV) was taken and the policy issues are trivial. As a matter, further studies should put more attention on those elections.

Note

(1)In this paper, Mixed Logit Model (MXL), a combination of Multinominal Logit (MNL) and Conditional Logit (CLGT), refers to a discrete choice model that may deal with individual specific and choice specific independent variables simultaneously. It is also known as "Error Components Logit", "Mixed Multinominal Logit", "Random Parameters Logit", or "Random Coefficients Logit". Economists Schmidt and Strauss (1976) also developed another "mixed logit model" to detect the union earnings. Although with the same name, Schmidt and Strauss's model is basically dealing with the dependent variable combining dichotomous and continuous characters.

(2)For more detail mathematical explanation of spatial model, see Riker and Ordeshook (1968, 1973), Mckelvey and Ordeshook (1972), and Enelow and Hinich (1984).

(3)Stokes (1963) made several critiques on the Downsian spatial theory. One of them is the fallacy of "ordered dimensions", which is the spatial theorist's assumption that voters perceive a set of ordered alternatives on the relevant issues of the campaign.

(4)They adopted the panel technique to observe the dynamics of voting preferences during the 1940 election year. Plus their subsequent study of the 1948 election, Berelson et al. (Voting, 1954) established the demographic patterns to explain the voting choices.

(5)Wald tests are conducted to test the joint significance of several clusters of sociological independent variables. Most of them show statistically insignificant and fail to reject the null hypothesis that the coefficients are simultaneously equal to zero.

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Table 1：Mixed Logit Estimates （Rational Choice Model）
1996 Taiwan Presidential Election

	Ln (P_{DPP}/P_{KMT})	Ln (P_{NP}/P_{KMT})
Econ/Welfare Policy Length	0.012 (0.012)	
Econ/Welfare Policy Scalar	0.049 (0.011) **	
Mainland Policy Length	−0.025 (0.009) **	
Mainland Policy Scalar	0.071 (0.010) **	
Social Order Issue Length	−0.001 (0.012)	
Social Order Issue Scalar	0.069 (0.011) **	
Retrospective Evaluation	−0.154 (0.049) **	−0.197 (0.044) **
Prospective Evaluation	−0.066 (0.061)	−0.071 (0.053)
Constant	1.528 (1.009)	2.398 (0.852) **
N = 1003		
LR χ^2X^2 = 866.60		
P-value > χ^2 = 0.00		
Log Likelihood = −668.61		
Pseudo R^2 = 0.39		

（Note 1）：Standard errors in the parentheses. * indicates statistical significant at 95% level. * * indicates statistical significant at 99% level.

（Note 2）：Three policy issues are derived from code number H1A ～ H2D.

（Note 3）：Retrospective and Prospective Evaluations combine the perceptions of "social economic conditions", "personal and family finance", "social safety", "ethnic relations", and "cross-strait relationship". They are from code number D1 to D10.

Table 2 : Mixed Logit Estimates (Full Model)
1996 Taiwan Presidential Election

	Ln (P_{DPP}/P_{KMT})	Ln (P_{NP}/P_{KMT})
(*Rational Choice Model*)		
Econ/Welfare Policy Length	0.051 (0.020) *	
Econ/Welfare Policy Scalar	0.045 (0.016) **	
Mainland Policy Length	−0.040 (0.016) *	
Mainland Policy Scalar	0.006 (0.014)	
Social Order Issue Length	0.000 (0.019)	
Social Order Issue Scalar	0.018 (0.015)	
Retrospective Evaluation	−0.038 (0.084)	−0.200 (0.074) **
Prospective Evaluation	0.039 (0.101)	−0.033 (0.084)
(Michigan Model)		
Party ID on KMT	−1.531 (0.420) **	−0.607 (0.176) **
Party ID on DPP	0.677 (0.190) **	−0.141 (0.234)
Party ID on NP	−0.976 (0.706)	0.782 (0.255) **
Evaluation on Chen	0.227 (0.187)	0.898 (0.143) **
Evaluation on Lee	−0.493 (0.157) **	−0.554 (0.149) **
Evaluation on Peng	1.092 (0.220) **	−0.033 (0.305)
Evaluation on Lin	0.294 (0.326)	1.121 (0.220) **
(Sociological Model)		
Male	0.433 (0.368)	−0.197 (0.322)
Income	0.290 (0.229)	0.172 (0.194)
Middle Educated	0.882 (1.491)	−0.610 (1.335)
High Educated	−0.038 (2.676)	0.445 (2.332)
Income × Middle Educated	−0.185 (0.304)	0.101 (0.259)
Income × High Educated	−0.022 (0.470)	−0.170 (0.414)
Age	−0.032 (0.015) *	−0.016 (0.013)
From China provinces	0.604 (0.736)	0.408 (0.485)
Urban	1.570 (0.384) **	0.470 (0.347)
Religion	0.106 (0.388)	−1.000 (0.311) **
Constant	−2.454 (2.150)	1.867 (1.767)
N = 1003		
LRχ^2 = 1659.12		
P-value > χ^2 = 0.00		
Log Likelihood = −272.35		
Pseudo R^2 = 0.75		

(Note 1) : Standard errors in the parentheses. * indicates statistical significant at 95% level. * * indicates statistical significant at 99% level.

(Note 2) : Personal evaluations include voter ' s perceptions of " kindness " , " leadership " , " honest " , " trustworthy " and " understanding " to four candidates. They are in number G1 to G5 of the survey.

Table 3: Mixed Logit Estimates (Rational Choice and Michigan Model) 1996 Taiwan Presidential Election

	Ln (P_{DPP}/P_{KMT})	Ln (P_{NP}/P_{KMT})
(Rational Choice Model)		
Econ/Welfare Policy Length	0.047 (0.019) *	
Econ/Welfare Policy Scalar	0.046 (0.015) **	
Mainland Policy Length	−0.028 (0.015) *	
Mainland Policy Scalar	0.011 (0.013)	
Social Order Issue Length	0.006 (0.019)	
Social Order Issue Scalar	0.023 (0.015)	
Retrospective Evaluation	−0.001 (0.076)	−0.157 (0.070) *
Prospective Evaluation	0.061 (0.098)	−0.003 (0.081)
(Michigan Model)		
Party ID on KMT	−1.450 (0.397) **	−0.590 (0.164) **
Party ID on DPP	0.637 (0.176) **	−0.190 (0.228)
Party ID on NP	−0.989 (0.725)	0.914 (0.245) **
Evaluation on Chen	0.541 (0.154) **	0.994 (0.121) **
Evaluation on Lee	−0.388 (0.139) **	−0.537 (0.138) **
Evaluation on Peng	1.225 (0.212) **	0.124 (0.291)
Evaluation on Lin	0.492 (0.305)	1.200 (0.203) **
Constant	−3.000 (1.751)	0.122 (1.340)
N = 1003		
LRχ^2 = 1611.73		
P-value > χ^2 = 0.00		
Log Likelihood = −296.04		
Pseudo R^2 = 0.73		

(Note) : Standard errors in the parentheses. * indicates statistical significant at 95% level. * * indicates statistical significant at 99% level.

政策議題對台灣選舉行爲之影響——混合型洛基分析之應用

王鼎銘*

《本文摘要》

以政策爲依歸的理性投票行爲研究自 Downs 於1957年提出了著名的空間投票理論後，引起廣泛的討論。然而在台灣的選舉研究大多數集中於一些如省籍情節或李登輝情節等社會和心理變項上。本文的貢獻乃在提出一個整合的投票模型以便同時測試不同的投票理論。此外，一個可用於同時測量專屬個體型和依附選擇型自變項的不連續選擇模型—混合型洛基分析（Mixed Logit）將用於解析1996台灣總統大選選民投票行爲。實證的結果發現即使選民的政黨認同及對候選人特質的評價對選舉結果有相當程度的影響，省籍、收入和教育程度等社會變項並不如過往研究般的重要。最重要的是政黨政策對選民的影響並非一成不變的以雙方政策之差距爲準，相對的 Rabinowitz 和 MacDonald 於1989所提的方向理論有時反而更能解釋選民的投票行爲模式。

關鍵字：空間理論，方向理論，混合型洛基分析

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審查意見答覆

審委意見(一)

本文使用一個同時測量「專屬個體型」和「依附選擇型」的混合洛基模型，來分析討論一九九六年總統選舉的投票行爲，在研究方法上有所更新，文獻檢討也與主題相關，有相當的貢獻。但本文也有許多缺點，分別說明如下：

壹、在論文寫作上：

一、寫作風格不佳，錯字多。

1.光是一個 Downs 就至少寫錯了四次：第一頁寫成 Down′s, Dowan′s；第四頁也寫成 Down′s；第十七頁寫成 Downs′s。

2.第十頁第一段第五行，應是 made 不是 mad。

3.在第六行中 a Taiwan election survey 很拗口，an election survey of Taiwan 會比較好。

4.第十四頁的 et. ad.應是 et al.。

5.其他還有多餘的句點等。

二、文法錯誤的地方很多，如定冠詞使用和介系詞的使用都有疏漏，應該請英文秘書代爲修改潤飾，或寫成中文（如果中文比英文好的話）。

三、多處文句不通順，語意不清。

1.如在第二頁最後一行。“Elected officials include village chief, county magistrates, provincial assmebly and provincial governor, Legislative Yuan and National Assembly, and beginning in 1996； president and vice-president also derive anthority from elections to fixed terms. . . .” 文中指的是“Elected officals”，而立法院和國民大會是機關，用 legislators of the Legislative Yuan, representatives of the National Assembly 會比較好，至於總統加上冠詞，p 大寫才知道指的是誰。

2.第七頁的“party identity and candidate competent. . . . . ” candidate competent 是什麼？

3.第十頁中間第一段交代不清，應交代調查執行相關的資料。

4.第十一頁倒數第三行，“. . . . . both policy ideal of national security issue and party′s economy welfare priority. . . ”

四、文獻檢討不應用概括的方式說，有很多學者這樣作。

1.如在第四頁中，Later on, many spatial theorists expand.....。應指出這些學者是誰，並引註說明。

2.在第七頁中，“ ... most of the studies still take other... ”，也應有 citation。

五、把 median voter 翻譯成「中位數選民」不妥。

六、引述 You 的文章只有一篇，依慣例（1996）就可以了，不必（1996a）。

貳、在分析方面：

一、分析的說明過於簡略，且有些誇大。如在第十一頁倒數第二行，“ have tremendous affect on voting ”，不知道作者的依據是什麼？就只是從係數和標準差的關係，0.049（0.011）和0.069（0.011），看出來嗎？那爲何第三個政策在表二，引進密西根模型，成爲不顯著。

二、表一、表二和表三的註記不清楚。

三、統計的慣用語不嫻熟。如在第十六頁：“ significant at 0.01 confident level ”表二和表三的註記則寫成“ statistical significant at 99% level ”，其實用常用的 p 值表示就可以。

四、對統計數值和顯著的詮釋不足。表二和表一中相同的變數在顯著水準的變化，作者並未比較說明。作者應約略說明爲何在表一爲顯著，在表二卻爲不顯著。更重要的是在表一（較爲簡單的模型）不顯著，在表二爲顯著的理由爲何。另外，retrospective evaluation 變爲不顯著，作者有何要說。

參、在實質方面的問題：

本文標題爲“ The Impacts of Policy Ideology on Taiwan Voting Turnout： A Mixed Logit Approach ”，有兩個不妥的地方。首先，policy ideology 與文中的討論不相稱。在文中，討論政策的方向和強度多，討論意識型態的內容和本質少。討論的三個政策爲社會福利、統獨、和自由/國家安全的選擇偏好，恐怕無法將一個議題當作是一個意識型態。其次，“ voting trunout ”比較靠近「出來投票」的意思，常有 turnout rate 的說法，當然也可以是「投票結果」的意思。但在本文中，應該是指投票的選擇，也就是 vote choice 或 voting decision, voting choice 的意思。本文使用的混合洛基模型，在研究方法上有所更新，文獻檢討也與主題相關，有相當的貢獻。但本文有許多缺點，希望作者重新修訂，再提出。

審委意見(二)

一、建議修改英文題目，voting turnout 顯然不妥，也許可以考慮...on Behavior in Tai-

wan。

二、資料分析部分，變數的定義應該要夠周全些

三、三個表格提供的檢定數據看似模型適合度的檢定，如果是，則表示模型並未被接受，（因爲 p 值極小）；如果不是，則建議作者列出模型適合度的檢定指標。

四、本文比較值得討論之處是作者選擇以兩個依變數的分析，一個是選民投給民進黨對抗投給國民黨的機率比，另一個是選民投給新黨對抗投給國民黨的機率比，做爲全文立論的主要檢證，這和選民爲什麼選擇國民黨，或選擇民進黨，或選擇新黨並不是完全相同的意思。筆者好奇的是如果以同樣的方式來進行分析投給國民黨對抗投給民進黨者，投給新黨者對抗投給民進黨者，或者是投給國民黨者對抗未投給國民黨者，投給民進黨者對抗給未投給民進黨者，投給新黨者對抗未投給新黨者等等，會不會也有相同的結論？或者是有更值得討論的發現。

審委意見(三)

本文作者以 Mixed Logit Model 檢證 Rabinowitz and MacDonald 在1989年提出的方向理論運用在台灣1996年總統選舉的適當性，是國內有關議題投票的相關研究中，一個重要的作品。值得向貴刊強力推薦。以下，僅對該文章的建議與修改之處，提出吾人的看法。

首先，就全文的結構而言，該文的結構相當完整，不過，對於所有重要變數所運用的原始問題以及作者對於該變數的重新編碼或是處理方式，皆未做任何的交代，這一部分要請作者以附錄的方式，增列於文末，以利未來相關研究者的參考（或是 replication）。作者的結論非常薄弱，與全文並不相稱，建議予以加強。此外，作者談到1997 Human Rights Reports 似乎與全文沒有太大的關係。而在 SNTV 制度之下的立法委員選舉，議題重不重要，還非常值得研究，作者未加驗證即下了“ the policy issues are trivial ”似乎稍嫌武斷。

就作者的理論部分，吾人也提出以下的問題。首先，作者將「林、郝」與「陳、王」兩位候選人合併成新黨的候選人，在依變數的處理、議題投票以及政黨認同上，都將其歸類爲新黨，不過，這個方法的妥當性必須仔細斟酌。一方面，兩組候選人的年齡以及形象上，都有顯著的差異，所吸引的支持群衆，自然也不相同。貿然合併，對於理論的解釋有非常大的問題。就事實以及未來相關研究而言，僅「林、郝」算是與新黨結盟，若是加上「陳、王」，會高估新黨的選民基礎以及影響力，而失去了一組獨立候選人選民基礎的寶貴資訊。因此，吾人建議，模型僅處理「李、連」、「彭、謝」與「林、郝」三組主要政黨候選人，這樣可以兼顧議題投票以及「密西根模型」的要求，

在方法上比較不會引起爭議。

就議題投票而言，美國選民一書作者提出若干的必要條件，作者顯然並沒有考慮。這些條件包括：民衆必須認知到該議題、民衆必須感受到該議題具有某種程度的重要性以及民衆發現某一政黨比其他政黨在這項議題上更能代表自己的立場。建議作者可以一一呈現在三個議題上，民衆是否對於該議題有立場，並且可以區分政黨在該議題上的差別，讓讀者對於議題投票有更清楚的了解。

就作者所使用的資料而言，是1996年的總統選舉資料，而在2000年的總統大選中，台灣也是有超過兩組以上的主要候選人，在單一選區相對多數的選舉中，當主要候選人超過兩組時，候選人採取中間選民立場的「趨中理論」可否適用，值得斟酌。因爲，候選人一旦趨中而放棄自己立場的話，很可能會既失去自己過去支持者，也同時無法贏取中間立場選民的支持，反而弄巧成拙。建議作者在解釋分析結果時，能將這一點考慮進去。

接著，吾人對於作者的模型以及係數的解釋，提出如下的問題，請教於作者。作者文中主要的模型以及研究發現可以從表一到表三看出。不過，作者似乎以表一的發現爲主要支持該研究的驗證。就模型的建構（model specification）而言，學者 David F. Hendry 建議“from general to simple approach”，以避免因爲沒有涵蓋重要的變數而高估了簡單模型中某些變數的影響力。特別是作者要比較 rational choice approach 與 social psychological approach 的解釋力，而表二或表三中的模型，應該會是作者解釋的重點，也是驗證理論的主要資訊。此外，從表一到表三中，有關政策立場各係數的實質意義，作者需要進一步解釋。例如，表一到表三中，社會福利議題 length 的係數皆爲正值，而作者文中自陳，有關距離的係數應該爲負（表示選民與政黨的距離愈接近），且該係數在表二與表三都達到統計上的顯著程度，因此，需要作者詳細解釋，其出現正值的原因是因爲理論上的緣故，還是因爲資料處理的過程所致（有關缺失資料的處理部分，請見下述）。此外，Mixed Logit Model 在國內政治學界算是首見，作者應該對於估計出來的係數做進一步的解釋，例如，當選民與政黨在同一個方向時，對其投票行爲的影響程度、在特定議題上選民每接近政黨立場一個刻度的影響、或是將係數轉換成機率或是成敗比來加以解釋。如此一來，可以讓冰冷的數字可以更鮮活而親近讀者。而表格中三個議題建議直接用英文，例如：Economic Development vs Social Welfare, Unification vs Independence, Social Order vs Personal Freedom 而不用 Policy 1, Policy 2, Policy 3,使讀者更容易瞭解該表格。

作者三個模型中的樣本數都是1,003，不過，實際的調查研究資料中，卻有許多項目缺失值，比方說，受訪者說出新黨在三個議題的立場的樣本數分別是538、731以及

652。由於三個表格都包括新黨，而三個表格的樣本數都超出上述數字甚多。因此，文中的樣本數與表態受訪者的樣本數之間有差異，是不是因爲作者採取特定的插捕（imputation）方式所致？該方式爲何以及該插補方式的適當性，都需要作者進一步說明。

作者文中第16頁對於 significant level 的解釋，值得斟酌。該值僅是代表你犯下 type I error 的機率，也就是你拒絕 null hypothesis 中該係數爲0時，所犯的錯誤機率。而一個變數具有的實質影響效果，應該參考係數的大小才對。

接著，吾人針對該文的表達以及陳述方式，提出以下的建議。由於該文章以英文寫成，因此，許多行文之處，會讓讀者讀起來會有不太明瞭作者的語意之感。文中若干錯誤也需更正，例如，標題的 voting turnout 的原意，應該是指投票率而不是投票行爲，而「陳」履安的英文拼音應爲「Chen」而非「Cheng」，民進黨應爲 DPP 而非 DDP（第3頁），objective utility 似應爲 subjective utility（第3頁），get rid of 而非 get ride of（第9頁），第10頁'The series number...was EA9697T4'可以刪除，Berelson etl ad. 應爲 Berelson et al.（第14頁注釋4）。建議作者在修改原文後可以請英文的 editor 修改英文，一方面可以減少不必要的錯誤，另一方面，會使本文更具可讀性。

而有關「充分自由與社會安定」這個議題，作者前後用的定義並不相同（如第11頁爲 political left-right issue, p12 political policy preference, Table 1 national security and personal freedom），需請作者統一。對於 national identity 的定義，在第13頁中，作者似乎將統獨與「中國人與台灣人自我認定」都定義爲國家認同，建議要予以釐清，究竟國家認同作者如何定義。

整體而言，這是一篇研究國內議題投票行爲的重要作品，不過，還需要作者費更多心血，回應上述建議並作若干修改，方適宜刊登。

論文評審意見的答覆

感謝三位審查委員非常仔細與精媲的意見，除遣詞用語及文法等已依照委員意見加以修改外，個人對於本研究內容、方法等實質內容答辯，列述如下：

一、Mixed Logit 爲 discrete choice Model 的一種，類似其他的模型，此類方法通常以兩兩選項比較分析，而 base 的選擇通常軟體會自動選擇以樣本數多的爲基準，如欲對其他二組比較（民進黨 VS. 新黨）有興趣，則可把專屬個人的係數相乘即可（依附選擇的係數不變）。

二、「林、郝」與「陳、王」二組候選人在做 Mixed logit 分析時必須要合併成「泛新黨」的選項，主要的原因乃在於政大選研的調查中，有關三項政策議題的題目（H1AH3D）只提及三大黨的立場，而非四組候選人，也因此造成依附選擇型的政

策變項（即 Lij）若不合併將無法判讀。當然，另一種方法則如審查委員所提的直接放棄「陳、王」一組。只是如此一來，整體樣本將再次減少。（先前已去掉三百多個樣本，因其本回答最後投票的結果。）

三、三個統計模型中所顯示的1003個樣本，指的是全部有回答最後投票人選的總樣本數，其中包括投國民黨、民進黨及新黨的票。至於個別變項中，資料缺少（missing data）的問題，的確相當嚴重，在本研究中，我以 mean substitution 方法來解決。

四、密西根學者 Campbell 等人所寫的「美國選民」一書的確對議題投票的前提多所疑議，這也是爲什麼該學派強調政黨認同，或候選人評估等在影響選民投票行爲重要之故。然而本研究的基本重點與假設建構在「理性選擇理論」上，所以應可省略對選民與議題熟識的前提假設。