

The Estimated Locality-Based Voting Disposition of Korean Elections and the Simulation of Its Prediction Effectiveness with an Artificial Neural Network Model.

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Several elections in Korea have shown the disposition of voting for the candidate from their native place since 1970, and it has become intensified and resulted in the locality-based voting disposition. In this regard, the goal of this study was to investigate the locality-based voting disposition with the data of the past general elections and presidential elections and to demonstrate to what extent its estimation of the previous election results could explain the following election.

There were two kinds of modifications beforehand. First, we referred to the electoral district at the 15th presidential election as the unit of the locality and adapted all the election data since the 13th presidential election to this standard unit. Second, because of a political alliance of three parties at the 14th presidential election, we also needed to adjust several different parties among elections to four types of locality-based parties, which were HoNam-based, YoungNam-based, ChungCheong-based, and the others-based parties.

Regarding the electoral district as a group, this study differentiated between two types of variances from the 13th to the 15th election data. Thus, the variance of the election data between individual voting places in each electoral district was defined as the variance within groups, and the variance of the election data between the electoral districts was defined as the variance between groups. In addition, the percentage of the variance between groups to the total variance of all over the electoral districts was calculated as the estimated value of the locality-based voting disposition.

The results of the estimated locality-based voting disposition were the following; for the HoNam-based party, they were 92.7% in JeonNam, 88.1% in JeonBuk, 17.3-24.2% in Seoul and district, and around 10% in the others. For the YoungNam-based party, they were 66.3% in KyungBuk, 58.8% in KyungNam, 19.1-25.8% in Seoul and district, and around 20% in the others excluding HoNam. For the ChungCheong-based party, they were 43.9% in ChungNam, 10.6% in ChungBuk, and around 5% in the others excluding HoNam.

Next, an Artificial Neural Network Model was used for the prediction of the following election result to find what amount of the explanation power the estimated locality-based voting disposition could have. During the learning phase, the input variables were the competitiveness index by the vote rate of each candidate at 13th general election as well as the estimated locality-based voting disposition at 13th presidential election while the output variable was the vote rate of the locality-based candidate in each electoral district at 14th general election. On the other hand, during the test phase, the input variables were the competitiveness index by the vote rate of each candidate at 14th general election as well as the estimated locality-based voting disposition at 14th presidential election while the output variable was the vote rate of the locality-based candidate in each electoral district at 15th general election. The result

indicated that r^2 between the estimated vote rate and the real vote rate was 0.972.

This study presents the implications for research concerned with elections of which not only could the locality-based voting disposition be identified statistically, but also its estimation would be good for prediction of the following election in practice. However, empirical studies are needed to develop more accurately predictive model of elections with other potentially important data (i.e., the political situation, the competitive structure such as what kind of candidates or how many candidates run for election, and so on).