Index Methods for Forecasting: An Application to American Presidential Elections

J. Scott Armstrong. The Wharton School, University of Pennsylvania
Alfred G. Cuzán, The University of West Florida

Lichtman (2005) reports that the Keys model has been able to pick the winner of every presidential election since 1860, retrospectively through 1980 and prospectively from 1984-2004. Given this record, it seems sensible to examine this *index method*. We tested how well the Keys model predicted the winner of the popular vote, and also how closely it forecasted the actual percentage of the two-party vote going to the incumbent ticket. The index method performs well compared with regression models. It also offers the opportunity to incorporate many policy variables. Index methods can be applied to various choice problems faced by organizations.

Index vs. Regression Models

In the early days of forecasting, analysts would sometimes use an index to forecast. They would prepare a list of key variables and determine whether they were favorable (+1), unfavorable (-1) or indeterminate (0) with respect to a particular outcome. They would then add the scores and use the total in making forecasts. Thus, each variable was assigned the same weight. Applied to forecasting, this use of judgmental indexes has been called "experience tables" or "index methods."

Index methods have been used for various types of problems in forecasting. Burgess and Cottrell (1939) used an index method to predict the success of marriages. Others used index methods to forecast the success of prisoners who were paroled. If the candidate exceeded a certain score, he was paroled.

In an effort to improve parole predictions, Glueck and Glueck (1959) recommended using only the most important variables and assigning differential weights. This can be done by regression analysis. While regression analysis has been widely adopted, little research has been devoted to index methods.

Which approach yields the most accurate forecasts, index methods or regression models? Gough (1962) addressed this issue for parole predictions and found that regression modeling did not improve accuracy. Reviewing the research in this area, Armstrong (1985, p. 230) found three studies where regression was slightly more accurate (for academic performance, personnel selection, and medicine); however, five studies found that regression was less accurate (three on academic performance, and one each on personnel selection and psychology).

A related approach is to use equal weights in a regression, which brings regression-modeling closer to the index method. The equal weights are applied to standardized variables to avoid scaling problems. A large-scale study by Dana and Dawes (2005) found that equal weights forecasts were generally more accurate than regression on a wide variety of cross-sectional data. The gain from equal weights was larger for small sample sizes and when predictability was poor.

Regression analysis is limited in that, for most problems, only a few explanatory variables can be put into the model (e.g., perhaps 3 or 4 variables) because of limited data, measurement errors, and correlations among the explanatory variables (a problem called collinearity). Subjective indexes avoid these estimation problems. Given the many variables and the small amount of data, index methods would seem appropriate for forecasting presidential elections.

Lichtman's Index: The 13 Keys

Allan Lichtman is a historian, and, to the best of our knowledge, the only scholar who has applied an index method to predict the winner of presidential elections. His "Keys to the White House" model consists of 13 explanatory variables. Each predictor consists of a statement which, if true, bodes well for the incumbents and, if false, for the opposition. For example, "KEY 2 (Contest): There is no serious contest for the incumbent-party nomination" and "KEY 12 (Incumbent charisma): The incumbent-party candidate is charismatic or a national hero" (Lichtman 2005). True (or likely to be true) statements are scored 0 and false statements scored 1. He then counts the number of false statements. If fewer than six are false, the incumbents

2

are forecast to win. Conversely, if six or more "keys" turn against the incumbents, they are said to be likely to lose.

There are some drawbacks in the Keys method:

1. It uses only 13 variables. One of the benefits of the index method is that there is no limit on the number of variables.

2. Only one of the variables makes a reference to policy ("KEY 7: Policy Change: The incumbent administration effects major changes in national policy"), but it is vague as to the type of policy or the direction of change. One could imagine popular as well as unpopular changes. In ignoring policy variables, however, the Keys model is no worse than most other presidential forecasting models.

3. The assessment as to whether each Key is true or false is done subjectively by one person (Lichtman). What, for example, constitutes a "major" change in national policy? Presumably, this procedure could be improved by using a panel of experts.

4. The model challenges credibility because to win, the incumbent requires a larger number of favorable factors than the challenger. (To win, the incumbent needs 7 of the 13 Keys in his favor.) In general, incumbents are thought to have the advantage in political elections.

Using the Lichtman index to forecast the vote percent

Most forecasters of presidential elections, economists and political scientists alike, have estimated the percentage of the two-party vote going to the incumbents or to the Democratic candidate using differential weights in regression models (Jones 2005). Accordingly, we tested how well Lichtman's method predicts the actual percent of the two-party vote going to the incumbents. We regressed V, the percent of the two-party vote going to the incumbents, on L, the Lichtman index, which is the total number of Keys favorable to the incumbent. (This is the reverse of Lichtman's coding since he counts the number of keys that have turned *against* the incumbents.) We estimated the model over the 1860-2004 period, first including and then omitting the 1912 election, when the Republican Party split in two.

(Some researchers, like Fair (2002), whose data series we use, add Taft's and T. D. Roosevelt's vote for a counter-factual incumbent victory of 54%.) The mean absolute error (MAE) between the two models differed by only 0.1%, so here we report only those obtained for all elections. Also, we examined the call ratio of the model (i.e., the percent of forecasts that picked the popular vote winner correctly).

We obtained the following results:

V = 37.3 * 1.8 L, where

V = the percent of the two-party split going to the incumbent

L = the number of Keys favoring the incumbent

Thus, the model predicts that an incumbent starts with 37 percent of the vote (even if all Keys are unfavorable) and adds 1.8% to this base with each favorable Key.

Retrospectively -- that is when we include all elections in fitting the model, and then see how closely it reproduces the historical results – the model came within 3.1% of the actual percent going to the incumbent. When we exclude one election at a time and see how the model would have predicted the excluded election (a procedure called a jackknife), the error averaged 3.2%. This was larger than any of the eight presidential regression models we analyzed for this period; the average error for the other eight models was 2.2%.

When we retrospectively calculated the percent of correct predictions by the Keys model (the call ratio), it was 100%. (We credit Lichtman's model with a correct call in 1912 because it predicted defeat for the incumbents even though in Fair's data series they "won" with 54% of the vote.) Given the relatively high percent error compared to other models, the finding that all elections were correctly forecasted is surprising. However, one must remember that this exercise merely fits a model to the data. Prior research in other areas has shown a poor relationship between fit and predictive ability (Armstrong 2001, pp. 460-462).

The critical test is how well the models forecast prospectively - that is, for years not included in the estimation sample. In Table 1 we compare the Keys model against three others: Abramowitz, Campbell, and Fair. These are traditional regression models, variations of which have been used in

forecasting presidential elections for the better part of two decades. We estimated each of these four models through the 1980 election, which was the final observation included in the original Keys model. Then, we used those models to forecast all subsequent elections through that of 2004. In this test, the Keys model performed well (Table 1). Not only were all election winners picked correctly, but its percent error was 2.3%, only slightly higher than the 2.1% errors for Abramowitz and Campbell, and about half as large as Fair's forecasts. In this test, Campbell's model also in correctly predicted the winner of all six elections.

Table 1. Presidential Elections, 1984-2004 (6 elections)

	Forecast Accuracy	
Model (estimation period)	**Absolute Percent Error**	**Call Ratio**
Abramowitz (1948-1980)	1.9	67
Campbell (1948-1980)	2.1	100
Fair (1916-1980)	4.5	67
Lichtman (1860-1980)	2.3	100

Extensions of the Index Method

Index methods do not have to be restricted to equal weights. In a 1772 letter to Priestly on how to make choices, Ben Franklin described another way, which he called "prudential algebra":

"I endeavor to estimate their respective weights; and where I find two, one on each side, that seem equal, I strike them both out. If I find a reason pro equal to some two reasons con, I strike out the three. If I judge some two reasons con, equal to three reasons pro, I strike out the five; and thus proceeding I find at length where the balance lies . . .. "

Given Ben Franklin's excellent record at problem solving, perhaps it would also be worthwhile to revisit his method, for it provides a useful way to capitalize on the value of expertise.

Index methods can be tailored to the situation. Certainly the needs and interests of the electorate have changed since 1860. The index methods could include all key issues for a given election, such as, for recent elections: gay rights, abortion, terrorism, union support, health care, minimum wage, estate taxes, tax rates, and free trade. The position of both candidates could be scored on whether it is in agreement with most voters' desires on each variable, or perhaps whether it agrees with the positions of the swing voters.   This list could also include findings related to such personal characteristics as height of the candidates and whether they look competent. When many elections, either prospectively or retrospectively have been predicted in this way, the resulting scores could be translated into a percentage vote for the incumbent.

Summary

Although the Keys model has correctly called the winner in 37 consecutive presidential elections, 31 of these were used to fit the model. It is the prospective forecasts of the last six elections that are of prime interest. In these, Lichtman's perfect record was matched by one of the three econometric models against which it was compared, and its average error was almost as low as for the best models.

Our conclusion is that the Keys model provides a useful alternative, but there is little reason to prefer it to the exclusion of other models. We expect the Keys model to serve as one of the important components for long-term (up to a year ahead at least) forecasts of presidential elections. It should be especially useful because it uses a different method and different information than current econometric models.

Indexes like the Keys model are worthy of the attention of researchers of causal methods and practitioners. This simple, easily understood method is expected to aid forecasting in situations where there are many causal variables, good domain knowledge about which variables are important and about the direction of effects, and limited amounts of data. These conditions apply where discrete choices must be made, such as for the selection of personnel, retail sites, investment opportunities, product names, or advertising campaigns.

6

References

Armstrong, J. S. 1985. *Long-range Forecasting: From Crystal Ball to Computer*. New York: John Wiley.

Armstrong, J. S. 2001. Evaluating forecasting methods, in J. S. Armstrong, *Principles of Forecasting*. Boston: Kluwer.

Burgess, E. W. & Cottrell, L. S. 1939. *Predicting Success or Failure in Marriage*. Englewood Cliffs, NJ: Prentice Hall.

Dana, J. & Dawes, R. M. 2005.   The superiority of simple alternatives to regression for social science predictions. *Journal of Educational and Behavioral Statistics,* 29 (3), 317-331.

Fair, R. 2004. A vote equation and the 2004 election. Available at http://fairmodel.econ.yale.edu/vote2004/vot1104a.pdf.

Glueck, S., & Glueck, E. (1959), *Predicting Delinquency and Crime*. Cambridge, Mass.: Harvard University Press

Gough, H. G. 1962. Clinical versus statistical prediction in psychology," in L. Postman (ed.), *Psychology in the Making*. New York: Knopf, pp. 526-584.

Jones, R. J. Jr. 2005. A Review of Presidential Election Forecasting in 2004. Paper presented at the 25th International Symposium on Forecasting, San Antonio, June 12-15. Full text of this article is available at politicalforecasting.com.

Lichtman, A. J. 2005. The keys to the White House: Forecast for 2008. *Foresight: The International Journal of Applied Forecasting*, issue 3, pp 5-9.