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Why context should not count

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John Agnew has performed a real service by writing an interesting paper and delivering an eloquent presentation on the topic at the annual meetings. His 'state of political geography' paper clearly and forcefully explains where the discipline is and should be in the near future.

For the most part, I do not disagree with the many interesting points John Agnew makes. Indeed, I wish to be counted among those cheering him on when he makes the case that the 'geographical theory–elections connection was abandoned prematurely and stands in need of re-establishing'. In fact, I would even go further. If 'all politics is local', the study of American politics is missing much of politics in America. (Similar arguments could be made about politics in most other countries.) In contrast, aggregate data are packed with useful but underexploited information. For example, the USA can be divided into approximately 190 000 electoral precincts and detailed aggregate political data are available for each. Unfortunately, in large part because of the 'ecological inference problem', and the associated 'modifiable areal unit problem', studies based on historical election statistics have fallen into some disuse and analyses based on them into at least some disrepute. Classic studies, such as V. O. Key's (1949) *Southern Politics*, have been succeeded by scholarship using survey research, often to great advantage, but necessarily ignoring much of history and geography, focused as it is on the few recent, mostly national, elections where surveys are available. The nearly exclusive focus of researchers on national surveys means that the geographic component to social science data is often neglected. State-level surveys are available, but their quality varies considerably and the results are widely suspect in the academic community. Even if the address of each survey respondent were available, there would be insufficient data to learn about spatial variation except for the grossest geographic patterns, dividing the country up into no more than perhaps a dozen broad regions. And of course survey respondents' addresses remain confidential.

Despite my general agreement with Agnew's remarks, I shall focus for the remainder of this paper on some remaining areas where an alternative perspective might be useful. My argument is that *political geographers should not be so concerned with demonstrating that context matters*. My reasoning is based on three arguments. First, in fact context rarely counts (Section 1) and, second, the most productive practical goal for political researchers should be to show that it does not count (Section 2). Finally, a disproportionate focus on 'context counting' can lead, and has led, to some serious problems in practical research

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situations, such as attempting to give empirical answers to theoretical questions (Section 4) and theoretical answers to empirical questions (Section 3).

1. Context rarely counts

For social science phenomena we understand, political context rarely makes a huge difference. The field of geography would be important even if context did not matter, and at least in politics it often does not. I mean this in a very specific sense. For example, consider two voters. Both are conservative, poor, white men who identify with the Republican Party, prefer more defense spending and insist that the federal government balance the budget immediately. They are each afraid that someone will take their guns away, hope to end welfare as anyone knows it, and think Rush Limbaugh should be president. The only difference is that, after being raised as twins in Utah, they were separated. One moved to Lancaster County, Pennsylvania amidst many other voters like himself. The other settled in Brookline, Massachusetts, with Michael Dukakis and many other Liberal Democrats.

Now suppose Bill Clinton runs for re-election against Phil Gramm in 1996. Both voters would obviously vote for Graham. Academics know this with a reasonable degree of certainty from extensive research in political science, political geography and related fields. Politicians know this from district surveys, studying precinct election returns and talking with constituents. This might not have been so obvious without the last hundred years of quantitative and qualitative scholarly research, but it is plainly obvious today. But how much does context matter? How long did the context of liberal Brookline, Massachusetts cause the second voter to consider voting Democrat? To be more precise, how much did the probability of voting Republican differ between the two voters? The answer is pretty clear from the scholarly literature: not much.

The point applies much more generally. Who you talk to, the types of people you live near, the nature of your community, your political geography, all have some effect on the vote and on political opinions, but all empirical evidence seems to indicate that the effect is relatively small. The *geographic variation* is usually quite large to begin with, but after we control for what we have learned about voters, there isn't much left for *contextual effects*. So, in this narrow sense, geography matters but contextual effects do not. This is *not* merely an example of controlling away what we are interested in, since the literature seems to suggest that the causal effect of neighborhoods on individual voting and political opinions is quite small.

For many political variables, regional variation might be large, but regional effects are not particularly impressive. But perhaps one might respond that this is precisely because political geography needs a renaissance; once we work harder, we will find that context matters after all. Of course, my point is an empirical generalization based on available data, and as such it is certainly wrong in some cases, and perhaps it is disproportionately wrong in those studies not yet conducted. That may be, but in the numerous studies of voting and other political behavior, the existing evidence is fairly thin for any argument about major contextual effects. Geographical variation yes, contextual effects no. This does not make geography unimportant any more than political science would be irrelevant if political institutions did not matter. But denying this empirical fact leads to a lot of unnecessary and confusing analyses.

2. Trying to show that context does not count

Whatever the effect of context, the goal of political geographers should be to try as hard as possible to make context *not* count. Indeed, the professional goal of all scientists should be to attempt to demonstrate that context makes no difference whatsoever.

To take an extreme example, scientists understand some aspects of physics reasonably well, and because of this I don't think there are physicists writing papers on a geographical theory of the electron, coloring in detailed maps of Canada by the number of electrons per province. This is perverse of course, but precisely because many aspects of electrons are reasonably well understood. Wherever we find an electron, we understand its characteristics well enough so that it is exchangeable with any other electron on the planet, and presumably in the universe.

In contrast, *we need political geography because political scientists don't understand enough about politics.* Political scientists need political geographers because they are skillful at pointing out what we do not understand. Geographical tools are essential for displaying areal variation in what we know, but this is nowhere near as powerful as the role of geography in revealing features of data and the political world that we would not otherwise have considered.

My point is basically that if we really understood politics, we would not need much of contextual effects. Political geography is so useful in large part because political scientists do not understand politics sufficiently—and because geography is perhaps the clearest way of understanding what it is we don't know. Information can be organized in many other ways: we can list unexplained facts alphabetically, or by size, color, weight, our degree of uncertainty about them, or how important we think they are. Geography is useful because we really do know a lot about it, and because humans happen to feel very comfortable thinking geographically. Displaying data geographically helps because it connects a variable we wish to explain with numerous others coded on the same level of geography. Moreover, because most observers know the values of many of these variables without having to look them up, geographical displays are instantly recognizable and interpretable. Thus, geography is useful because of a standard technique of pedagogy: it connects something we don't know to the information we do know.

There are exceptions to the rule that geography is mostly useful when we do not understand something. These include areas where geography is the immediate goal of the analysis. Studies of legislative redistricting constitute an important example, since these are concerned with the effects of changing the boundaries of geographic districts. In most cases, however, geography plays a supporting role, just as the field of statistics and mathematics helps other disciplines. So by trying to understand political opinions and political behavior, we are usually trying to show that context does not matter. We may fail and learn that in some cases, contrary to existing evidence, contextual effects are very important. But we would need to do this explicitly, rather than as a residual category of not-yet-explained phenomena. And in no case does the field of geography need to rely on demonstrating that context matters.

3. Theoretical analyses of empirical questions

I now turn to two areas where an excessive focus on context has misled more than one author. The first is Agnew's empirical analyses and arguments about the Goodman's regression model, the purpose of which is to make 'ecological inferences' (using aggregate data to learn about individual-level relationships when the individual-level data are not available).

Goodman's model (1959) is based on four variables and a simple accounting identity. As an example, let T_i denote the fraction of people voting in a precinct and X_i indicate the proportion of people who are African-American. Then let β_i^b summarize the fraction of

blacks who vote and β_i^w the fraction of whites who vote. T_i and X_i are observable, whereas β_i^b and β_i^w are the unobservable parameters of interest. All these variables are defined for a set of p electoral precincts (i.e. $i = 1, \ldots, p$).

Goodman then notes the following identity:

$$T_i = \beta_i^b X_i + \beta_i^w (1 - X_i) \tag{1}$$

$$= \beta_i^w + (\beta_i^b - \beta_i^w) X_i \tag{2}$$

where the second line in this equation may be helpful to recognize the linear relationship. However, this equation is a statement of fact, not an assumption of 'linearity, homoskedasticity, absence of multicollinearity', causality (Agnew, p. 138) or an assumption of any other kind. It is merely true.

Goodman then assumes that the parameters of interest are constant over districts (so I drop the subscripts) and writes:

$$T_i = \beta^b X_i + \beta^w (1 - X_i) \tag{3}$$

Assuming parameter constancy *is* an assumption, in the sense that it can be wrong. Agnew, and many others in the literature trying to show that context counts, attack this assumption by numerous clever theoretical arguments. He explains that party lists and candidates must be common over Italy's 32 electoral districts, that party organizational strength should be common, and that the 'microdynamics' of neighborhood effects must be constant. He writes (p. 139) that 'together these three theoretical arguments constitute a nested hierarchy of spatial contexts for the meaningful disaggregation of aggregated data and estimation of electoral flows'. And he concludes that this nested hierarchy invalidates Goodman's assumption of constant parameters in Italian data.

There is much good theoretical analysis here, and it is useful for many purposes, but it is mostly a waste of time when it comes to deciding the issue of parameter constancy, which was its original goal. The fact is that this assumption is an entirely empirical question. Moreover, it is not a question that requires any inference, since it can be decided with aggregate data, with certainty, and in every dataset.

To see this point, note that Equation (1) contains no error term. Thus, the only possible deviations from the linear model are due to the unknown parameters, β_i^b and β_i^w. Now consider *Figure 1*, which is a scatterplot of X_i by T_i measured at the precinct level in Ohio's district 42. (The example is taken from American politics, but the same conclusions apply to every other ecological dataset.) If the Goodman model assumption of no parameter variation held, every circle in the figure, each of which represents an individual precinct, would fall exactly on a regression line. Instead, of course, there is variation in precincts around the line. The point is that *all* of the variation in these precincts must be due to parameter variation since the model and data contain *no* other source of variation. We need no knowledge of local politics to ascertain this and perhaps most importantly, theoretical analyses of context counting are irrelevant (King, 1996).

4. Empirical analyses of theoretical questions

I will consider one final problem that may occur by having too much of an exclusive focus on trying to demonstrate that context matters. This is the statistical question in geography known as the 'modifiable areal unit problem'. This is a worry that data analysts have which comes from running the same analysis on areal data aggregated to different levels and watching correlation coefficients and other statistics change sign and vary wildly in magnitude.

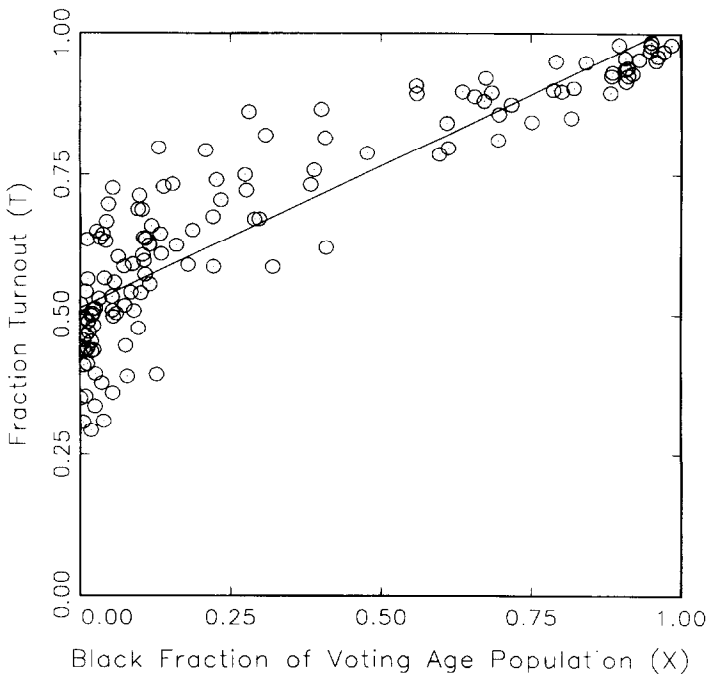

FIGURE 1. Turnout in Ohio State District 42.

Scholars have studied this problem by running an analysis at some small level of geography, such as precincts, and then randomly reaggregating the data and rerunning the analysis (see, for example, Openshaw and Taylor, 1979; Openshaw 1984; Fotheringham and Wong, 1991). This basic research design has been applied to many different areal distributions, some with real data and some with artificially generated data. Most of these studies are designed to analyze contextual effects or the authors are worrying about contextual effects contaminating their results. The conclusions of these studies are almost always extreme pessimism that leads the authors to question the veracity of almost all empirical analyses. The search for a solution to this problem has always been empirical, where scholars hope to identify some data in which the modifiable areal unit problem does not occur. The hope has been that, through a detailed understanding of local context, and the nature of zoning schemes, researchers might be able to identify types of geographical distributions or configurations for which we need not worry about the problem.

In fact, the modifiable areal unit problem is not an empirical problem; it is a theoretical problem. Moreover, it is not difficult to solve in most cases. The problem is that statistics that have been used to study various geographical areas have not been *scale invariant*. If a researcher wishes to have statistics that are scale invariant, then there is no reason to choose correlation coefficients. We just need to identify or develop statistics that are invariant to the level of aggregation.

To take a simple example, if we wished to know the number of people in Italy, we could use the following procedure: first, count the number of people in each of the electoral districts, and second, add the numbers. This statistic is scale invariant: even if Italy's district lines were changed, or the number of districts were increased or decreased, this statistic would remain the same.

Consider two other statistics that are more politically meaningful, the average district vote (V) and the nationwide vote (W) in US House elections. We obtain V by computing the Democratic proportion of the two-party vote in each House district and averaging them. To compute W, add up the number of people who vote for the Democratic candidate in all the states and divide by the number of votes cast in all House elections that year. Note that $V \neq W$.

If we imagine for a moment that people did not change their votes as a function of where the district lines were drawn (a false assumption incidentally; see Gelman and King, 1994a,b), then W is scale invariant but V is not. That means that W is not subject to the modifiable areal unit problem, but V is. Does that mean we should always use W? Certainly not. W ignores the effects of the district lines, in which elections really take place. If we wish to know the effects of these districts, then we should not be looking for statistics that are invariate to precisely the phenomenon we wish to study. (It would be like having a bathroom scale that was invariant to the weight of the person standing on it!) In fact, the difference between W and V is one measure of the effect of the districting (or redistricting) on the election outcome.

Thus, the modifiable areal unit problem is not an empirical problem. Rather, it is a theoretical requirement of statistics that is appropriate in some, but not all, circumstances. Deriving scale-invariant statistics for the relationships between variables, corresponding to correlation or regression coefficients, may be more difficult, but it is a theoretical difficulty.

5. Concluding remark

If political geography were less intent on demonstrating the importance of contextual effects, analysts would be much better able to use their powerful theoretical tools to learn about the political world. I conclude by *mis*-quoting John Agnew: '"Mapping politics" can offer more than cartographic illustrations that decorate more compelling aspatial accounts, but only if we stop trying to show why context counts'.

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References

Fotheringham, A. S. and Wong, D. W. S. (1991) The modifiable areal unit problem in multivariate statistical analysis. *Environment and Planning A* **23**(7), 1025–45.

Gelman, A. and King, G. (1994a) Enhancing democracy through legislative redistricting. *American Political Science Review* **88**(3), 541–559.

Gelman, A. and King, G. (1994b) A unified method of evaluating electoral systems and redistricting plans. *American Journal of Political Science* **38**(2), 514–554.

Goodman, L. (1959) Some alternatives to ecological correlation. *American Journal of Sociology* **64**, 610–24.

Key, V. O. (1949) *Southern Politics in State and Nation*. New York: Knopf.

King, G. (1996) A Solution to the Ecological Inference Problem, book manuscript in progress, copies available until pulication via anonymous FTP from latte.harvard.edu:pub/gking/sei.zip.

Openshaw, S. and Taylor, P. J. (1979) A million or so correlation coefficients: three experiments on the modifiable areal unit problem. In *Statistical Methods in the Spatial Sciences* (N. Wrigley ed.), pp. 127–44. London: Pion.

Openshaw, S. (1984) *The Modifiable Areal Unit Problem*. Norwich: Geo Books, Concepts and Techniques in Modern Geography, No. 38.