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The Role of Economic Space in Decision Making : Comment

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My discussion focuses on the contributions, challenges and limits of the methodology proposed by Margaret SLADE and her co-authors. The article makes two points. The first point is conceptual: distance between economic agents and distance between product characteristics influence economic decisions. The second point is methodological: Margaret SLADE proposes a flexible econometric tool to take "distance" into account in applied industrial organization problems. Let me start by writing the main equation using matrix notations

$$y = Wy + BX + \Gamma u + \varepsilon$$

where W measures spatial influences on endogenous variables y, B represents influences in the characteristics space X and Γ measures the extent of spatial autocorrelation of unobservable variables u. The basic idea is to start from a distance $d_{i,j}$ and to measure spatial influences $W = [w_{i,j}]$ based on a non-parametric estimation method using then $d_{i,j}$'s as inputs.

Margaret SLADE and her co-authors have successfully applied this methodology to problems in which the dependent economic variable is either continuous or binary. The methodology is related to spatial econometrics but goes beyond the specification of the weighting matrix of spatial influences. Instead, both spatial and product characteristic influences are taken into account by using a non-parametric estimation procedure. This is clearly an original contribution.

I would like to point out that this methodology could also be applied to another class of problems in which the distance is not defined on a geographical or product space but is rather defined on a social space. This literature on social or non-market interactions is reviewed by BROCK and DURLAUF (2000). Agents interact on a network or graph and the strength of the social interaction is measured by a weight. It is clear that these kind of problems that have been studied theoretically could be empirically analyzed using Margaret SLADE's methodology by defining one distance as $d_{i,j} = 1$ if agents i and j interact ($d_{i,j} = 0$ otherwise) and by letting $w_{i,j}$ be a function of this distance and the strength of the interaction or the probability to interact between these two agents. Both measures that can be constructed from socio-economic data.

Let me illustrate three additional types of industrial organization issues where I believe the methodology could be successfully applied.

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Network externalities. The first example is related to models with so-called network externalities where the utility of a subscriber to a network, for instance a mobile phone network, depends on the total number of subscribers to the network. From an empirical point of view, assuming that an individual has the same probability to call any other user of the same network is too strong. In reality, the decision to subscribe only depends on how many "closest" friends and relatives have already subscribed or plan to do so in a near future. In this case, the economic decision to purchase a mobile phone would depend both on geographical and social distances.

Social externalities. We can expect social externalities in the music industry (or as a matter of fact in any market for Veblen conspicuous consumption goods). Teenagers and young adults have tastes that are strongly correlated by regions (local repertoire) and by age. Regardless of whether taste for different genres of music is directly observable or not, Margaret Slade provides a flexible methodology to deal with this spatial and social interdependence.

Informational externalities. Some discrete choices involve informational externalities. For instance, the decision to buy or to sell a stock on a financial market depends on news that spread from traders to institutional investors and then to individual investors. Again a notion of distance is involved. Another example is technology adoption. It has been argued for quite a time that information about the existence and the characteristics of a new technology is crucial for the adoption process and that this information is exchanged by local interactions, i.e. by talking to people who have a good knowledge about the new technology or who have already adopted it. Only informed agents make their decision to adopt or not. This process is again space dependent (e.g. the industrial revolution) and involve socio-economic interactions (people have to talk to each other).

While the methodology can be applied to a large range of issues, there are several challenges. First, in many applied problems, price and costs are endogenous variables and depend on product characteristics. This is true in simple hedonic models. If both prices and characteristics appear on the right hand side of the equation, some econometric issues can arise due to this dependence. In particular, as Margaret Slade acknowledges it herself, finding a set of valid instruments is a challenging issue. Secondly, there is an identification issue in this type of models with "spatially correlated" endogenous variables. This point has been made by Manski (1993): do we observe individual decisions because they are made by people belonging to the same group, same area, same industry and thus have the same y's or because they are made by individuals who have the same characteristics or by firms who offer the same type of products (same X's)? It would be useful to have a discussion that explains why this reflection problem does not apply to Margaret Slade's framework.

Let me conclude with the limits of the methodology proposed by Margaret Slade and her co-authors. Although the methodology is flexible, it relies on non-parametric estimation techniques that require a lot of observations. Given this fact and that several distances are in general available, it would be useful to have Monte-Carlo evidence on the finite sample properties of this estimator, especially when there are more than one distance involved in the procedure. Moreover, flexibility comes at a cost: there is little structure involved. In some case, it can be misleading to use nonparametric methods blindly without a structural model to find the right "distance" or to construct the right econometric model. Let me illustrate this point by the example of technological spillovers. The total amount of spillovers accruing to

a firm is generally measured by a weighted sum of spillovers from all other firms in the same sector of activity. This measure is justified by the assumption that an innovating firm benefits mostly from other firms that have a stock of similar knowledge, that conduct similar research projects, or that are closely related in vertical industries. However, it is not obvious to me that firms that are very "close" (using a given metric) to each other benefit the most from mutual knowledge spillovers. Technological breakthroughs sometimes result from the combination of knowledge developed in remotely connected industries. That would result in outliers at both ends of the "window" of estimation. Non-parametric methods based on local smoothing have a hard time dealing with this issue.

The lack of specification of the matrices of "spatial" influences limits the applicability of the methodology when the weights depend themselves on endogenous variables such as prices and market shares. Many of the examples presented by Margaret SLADE share this feature. Firms can open new stores (changes W), firms can create new products with similar characteristics (minimal differentiation) or on the contrary very different characteristics (maximal differentiation), which would change matrix B. Similarly, firms can collude or instead start price wars, which could change matrix W. All these events depend on the extent of competition today, i.e. prices and market shares, which brings new econometric issues in dynamic setting.

To sum up, the econometric methodology developed by Margaret SLADE and her co-authors can be applied to a wide range of economic issues. Extending the methodology to include dynamics is a challenging yet important and exciting research project. ■

References

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