Comments for the Session:

“Pricing of Environmental Goods: Measurement and Efficiency Issues”

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by

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papers commented on:

„Measuring the Benefits of Air Quality Improvement: A Spatial Hedonic Approach“, C. Kim, T. Phipps, L. Anselin
„The Value of Open Spaces for Residential Land Prices and Land Use Change“, J. Geoghegan, N. Bockstael
„The Long-Run Inefficiency of Block-Rate Pricing“, B. Ziv, I. Finkelshtain

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I. „Measuring the Benefits of Air Quality Improvement: A Spatial Hedonic Approach“

This paper seeks to answer the question of whether spill-over effects of pollution play an important role in determining housing prices, and demonstrates how these effects can be accounted for in valuing marginal air quality improvements. Specifically the paper investigates the use of spatial econometrics in a hedonic housing price model with an environmental effect. The application values improvements in SO2 levels in Seoul.

The spatial econometrics are nicely explained in this paper. The authors describe two related econometric models: the spatial lag model and the spatial error model. The spatial lag model is emphasized in this study, and uses as the maintained hypothesis that nearby observations of housing prices partially explain local housing prices. One of the variables explaining the local price is therefore the weighted sum of neighboring prices, where closer neighborhoods will have a greater effect. The model appears fairly tractable, and the authors provide a clear economic interpretation of the model structure. Perhaps one (unavoidable) criticism of the model is that it requires the arbitrary specification of a spatial-weight factor.

The authors use a sample of 609 owner-occupied houses in Seoul. Reliable price and SO2 data were available, and importantly, levels of SO2 in the various parts of the city have been stable and documented for several years. Thus, the housing market can be said to be in equilibrium and it can be assumed that the effects to be measured have been fully capitalized.

The results of the spatial lag hedonic price model are presented for three values of the spatial-weight factor. The results are fairly intuitive, and support the hypothesis that there is a spatial effect. The marginal value of a 4% improvement in air quality ranges from $3,000-$3,300 over the three models.

My comments are of the devil’s advocate variety. The statistical test confirms that there is a spatial effect. Another question, however, is if it makes a big difference in the valuation of the air quality change. To examine this, it would be interesting to estimate the same model without the spatial effect considered and calculate the marginal value of the marginal change. Surely the point estimates between the models would differ, but would they differ significantly? To test this, confidence intervals could be constructed for the
benefit estimates for both the spatial and non-spatial models by bootstrapping the data. One could then examine if the confidence intervals overlap to provide another test of the importance of the spatial effect.

II. „The Value of Open Spaces for Residential Land Prices and Land Use Change“

This paper begins with an interesting, big-picture discussion on land use/land cover change (LUCC). LUCC is at the heart of many environmental problems and issues, yet economists have had relatively little to say about modeling the behavior that leads to these changes. By understanding better the behavior that leads to (possibly environmentally unfriendly) land use change, policy makers can make more informed land-use management decisions. To this end the authors describe a two-stage model which models the behavior of residential consumers as well as land developers. In the first stage, a hedonic land value model is used to estimate the value to residential consumers of developable land. Importantly, the effect of open spaces in the area of the parcel is considered. In the second stage, a discrete choice model is used to estimate the probability that developers will develop certain parcels. Consumer values from the first stage are used as an explanatory variable in the second stage.

The paper represents work in progress, and thus far only the first stage of the model has been considered empirically. The authors present empirical results explaining land values in a four county rural, but fast developing, area in Maryland within commuting distance from Baltimore and Washington. The most interesting results involve those having to do with open spaces. Consistent with intuition, open spaces around a developable parcel increase the value of the parcel. Also, permanent open areas have a much stronger impact on land values than temporary, or potentially developable, open spaces. These results may have interesting policy implications, having to do with issues as wide ranging as zoning laws, the preservation of family farms near developing areas, and urban sprawl.

My comments focus first of all on the data, and then on possible extensions. First, as is clearly noted in the paper, the measure of land-value is potentially problematic. The value of the (undeveloped) land parcel is obtained by subtracting from the observed, final transaction price the assessed value of the residential structure. The authors note the likely bias in this measure, which seems important, particularly
as the model is extended to include the developers decisions. Perhaps errors-in-variables econometric techniques can be explored to address this issue.

Since this is work in progress, the opportunities for interesting extensions are numerous. To tie into a theme from the session, I will note that there is likely a rather strong spatial component to the effects of open spaces in land prices. To this end the econometric techniques discussed in the previous paper could be a useful extension to this work.

III. „Electricity Deregulation: What’s in Store for the Environment“

Recent legislation has provided for the deregulation of electricity supply in the United States. This means that consumers will be able to choose their electricity supplier as they would choose any other good, basing their decision on price and observed characteristics of the good. Intuition suggests consumers will be willing to pay more for characteristics in electricity generation for which they have preferences. Thus, it has been suggested that firms be required to disclose the environmental characteristics of their product. This will then lead to a higher demand for environmentally friendly electricity, and as a result a cleaner environment. The purpose of this paper is to test if this notion is supported empirically.

The authors use a contingent-scenario mall intercept survey to value attributes of electricity products and to assess the value of disclosed characteristics. Specifically, respondents where asked to choose between two products, which differ by price, mix of generation fuels (fossil, nuclear, renewable), and ambient air emissions. The choice between the two possibilities is modeled using binary logit, with the choice being a function of the difference in price, fuel mixes, and emissions between the two options as well as income and several interaction terms. The empirical results are quite intuitive. For example, the results show that consumers in general are willing to pay more for lower emissions, more educated consumers prefer renewable sources, and environmentalists will pay more for both lower emissions and a higher mix of renewable sources. The magnitudes of the WTP estimates pass the „eyeball“ test. For example, more educated environmentalists would be willing to pay $3.34 more per month for a 50% reduction in emission.
My comments will focus on the survey instrument, and the robustness of the results. It is noted in the paper that the survey did not make an attempt to differentiate between types of emissions, and therefore between preference for different types of emissions. It may be a minor point for this study, but I think it is worth noting that preferences for different emission types may be quite different. For example, reductions in emissions that have a (direct) local effect may be valued differently than reductions in emissions that have an indirect, or global effect (e.g. CO2).

Of more direct interest are the robustness of the results. It is noted in a footnote that a utility consistent empirical specification was also estimated. It would be interesting to compare the reported results with these results, or perhaps results from a binary probit rather than a binary logit. It is of course a difficult task to pick the „correct“ empirical results. Therefore a comparison of the possibilities may be helpful. In addition, the data could be bootstrapped to estimate confidence intervals for the estimated WTP’s.

IV. „The Long-Run Inefficiency of Block-Rate Pricing“

Increasing block-rate pricing is a policy tool that can (potentially) be used to get an efficient allocation of a resource with favorable distribution effects. For example, in an irrigated agricultural sector a public utility may wish to subsidize water to farmers in order to preserve small, family farms. Under one form of block pricing, the firms receive a certain amount of water free, after which they are charged the marginal social cost for water. Assuming an interior solution, the firm then faces the correct marginal incentive, but the total burden of buying water is reduced.

This paper seeks to answer the question of whether we really can have our cake and eat it too; i.e. is increasing block rate pricing efficient and equitable? The authors show that there are two answers to the question. In the short run the policy is efficient, while in the long run it is sub-optimal. The long run is the emphasis of the paper. The authors demonstrate in a formal model very intuitive and appealing results. Heuristically, the block rate pricing scheme lowers average cost while maintaining the marginal costs. Thus, in the long run under free entry, firms will enter the market (not leave the market) seeking (because
of) rents from the subsidies. As expected, this leads to agricultural prices that are too low, water utilization that is too high, too many firms, and a production level per firm that is too small. The authors conclude from this that block rate pricing cannot deliver a first-best optimum in the long run.

Since the first-best results are quite clear, my comments will focus more on second-best questions. The authors note that often the goals of policy makers are not strictly economic; i.e. they may also be interested in preserving farms. In this sense, the inefficiencies resulting from the policy seem to be consistent with policy goals, and it may be that society is willing to trade this inefficiency for other benefits associated with family farms. In the conclusion, the authors do note that block rate pricing dominates flat rate pricing, subject to a constant number of farms. An extension to this question is if block rate pricing is the best policy for preserving farms, if this is the policy goal. It would be interesting to see how it compares to direct subsidies, or other policy tools.