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The Impact of the Agglomeration Bonus on the Land Conservation:

An Optimal Stopping Model Approach

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Introduction

- Agglomeration bonus (AB) payment scheme was recently proposed to privatize the spatial externality of land conservation.
- AB consists of two payments: 1) participation payment; 2) connectivity bonus paid when the enrolled patch is adjacent to the conserved patches.
- Most literatures use the net present value rule, which treats landowners as myopic.
- This paper uses the optimal stopping model to frame the landowner’s decision and investigates the impact of AB on land conservation.

Objectives

- What’s the difference between the optimal stopping model and the net present value model for land conservation?
- How does the land connectivity metric in AB affect the landowner's decision?
- How does the opportunity cost affect the AB’s impact on land conservation?

Conclusions

- Unlike the net present value rule, the optimal stopping model assumes that landowners are forward-looking. The reservation price increases as the farming income increases, and the waiting time becomes longer as the reservation price increases.
- In terms of connectivity matric, higher connectivity weight and shorter connectivity length will lead to a more clustered conservation configuration.
- The final conservation configuration is also affected by the distribution of costs (or, land quality).
- The mean-preserving spread in offer price will raise the farmer's reservation price and slows down the land conservation process.
- The optimal stopping model derived in this paper provides a theoretical background for using the duration model to study the landowner's conservation decision.

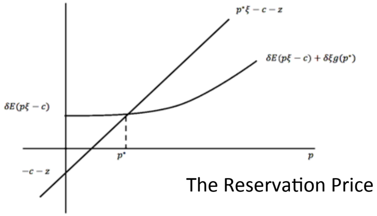
The Optimal Stopping Model

$$V_{it}(p_{it}) = \max_{x_{it}}\{p_{it}\xi_i(X,l) - c_{it}, z_{it}(\theta) + \delta\int_{\underline{p}}^{\overline{p}} V_{i,t+1}(p_{i,t+1})dF(p_{i,t+1})\}$$

$$\xi_i=(1-m)+m\cdot\zeta_i(X,l)$$

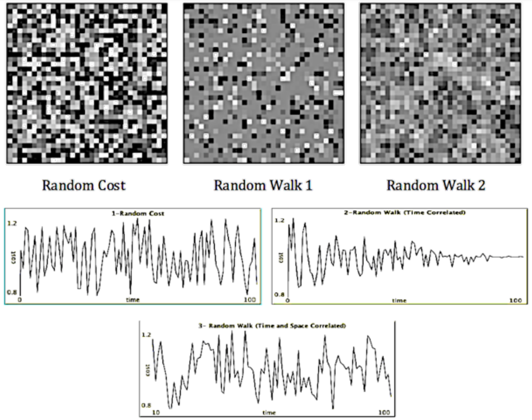
$$\zeta_i(X,l)=\frac{\sum_{d_{ij}<l} x_j}{\sum_{d_{ij}<l} 1}$$

$$p^*\xi(X,l) - c - z(\theta) = \delta E[p\xi(X,l) - c] + \delta\xi(X,l)\int_{\underline{p}}^{p^*} F(p)dp$$



The Reservation Price

Three Algorithms for Costs



Random Cost Random Walk 1 Random Walk 2

Simulation Results