

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 metric, 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.

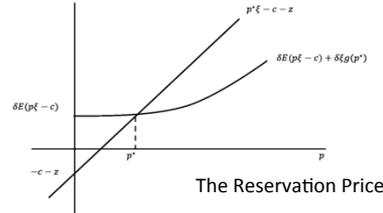
The Optimal Stopping Model

$$V_{it}(P_{it}) = \max_{x_{it}} \{ p_{it} \xi_i(X, I) - c_{it} \cdot z_{it}(\theta) + \delta \int_{\underline{P}}^{\bar{P}} V_{i,t+1}(P_{i,t+1}) dF(P_{i,t+1}) \}$$

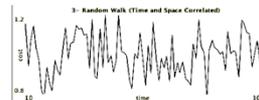
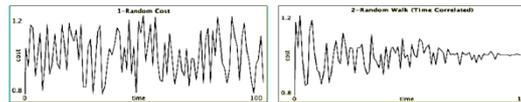
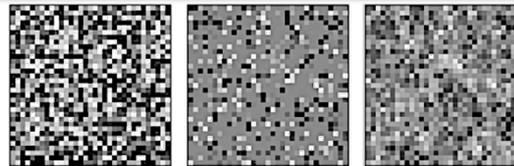
$$\xi_i = (1-m) + m \cdot \zeta_i(X, I)$$

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

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



Three Algorithms for Costs



Simulation Results

